APPENDICES

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APPENDIX A

Best Management Practices

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Reclamation Performance Standards

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APPENDIX A

BEST MANAGEMENT PRACTICES AND RECLAMATION PERFORMANCE STANDARDS

1.0 BEST MANAGEMENT PRACTICES (BMPS)

Geothermal resource leases are subject to the standard stipulations and lease terms. The current lease terms, dated September 2008 and subject to changes, are found on Form 3200-24a (included at the end of this Appendix). The right to explore, develop and utilize leased geothermal resources is inherent in the lease, subject to stipulations, legal requirements, and terms and conditions on permits. Specific conditions of approval and other mitigation measures would be required during subsequent authorizations. These include timing and location of activities during the development phase (see Section 2.4, Reasonably Foreseeable Development scenario). In addition, the BLM and other governmental agencies may require specific permits.

BMPs are mitigation measures applied on a site-specific basis to avoid, minimize, reduce, rectify, or compensate for adverse environmental or social impacts. They are applied to management actions to aid in achieving desired outcomes for safe, environmentally responsible resource development, by preventing, minimizing, or mitigating adverse impacts and reducing conflicts.

This section provides a list of sample BMPs that have been collected from various BLM, and other applicable agency documents addressing geothermal and fluid mineral leasing and development, including resource management plans, forest plans, and environmental reports for geothermal leasing and development. The purpose of this section is to provide a list of potential BMPs that could be incorporated as appropriate into the permit application by the lessee or could be included in the approved use authorization by the BLM as conditions of approval. When implementing new BMPs, the BLM will work with an affected lessee early in the process, to explain how BMPs may fit into their development proposals and how BMPs can be implemented in a cost effective and design appropriate manner. The BLM will discuss potential resource impacts with the lessee and seek the operator's recommended solutions. The BLM would encourage the lessee to incorporate necessary and effective BMPs into their project proposal. BMPs not incorporated into the permit application by the lessee may be considered and evaluated through the environmental review process and incorporated into the use authorization as conditions of approval or rights-of-way stipulations.

The BLM will incorporate BMPs into proposed use authorizations after appropriate review. The BMPs to be considered in nearly all circumstances include the following:

- Interim reclamation of well locations and access roads soon after the well is put into production;
- Painting of all new facilities a color that best allows the facility to blend with the background;
- Design and construction of all new roads to a safe and appropriate standard, "no higher than necessary" to accommodate their intended use; and

- Final reclamation of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography.

Other BMPs are more suitable for consideration by an administrative unit on a case-by-case basis, (1) depending on their effectiveness, (2) the balancing of increased operating costs vs. the benefit to the public and resource values, (3) the availability of less restrictive mitigation alternatives that accomplish the same objective, and (4) other site specific factors. To minimize adverse impacts to resources and uses in the proposed leasing area, the following BMPs and mitigation measures would be included or considered in Plans of Operation, which are required for surface-disturbing activities. The BMPs provide guidance for lessees on how to meet Section 6 of the standard lease terms for this project area. Depending on site-specific conditions and individual development plans, the following BMPs and mitigation measures may be required. Others could be identified during site-specific analyses.

2.0 GENERAL

These BMPs would help reduce or eliminate impacts to multiple elements of the human environment. Many BMPs would also minimize operator costs.

- Prior to geothermal exploration and development, a focused geotechnical survey should be conducted on potential areas of disturbance such as roads, drill pads, and power plant locations. Initial exploration (geophysics) does not disturb any land subsurface. The survey will evaluate and identify potential geologic hazards and would provide remedial grading recommendations, foundation and slab design criteria, and soil parameters for the design of geothermal power infrastructure. Prior to the initiation of geotechnical surveys (i.e., subsurface work as well as off-road travel), all areas of potential ground disturbance will be submitted to the appropriate environmental compliance activities (e.g., cultural resource survey, biological investigations) as determined by the BLM.

- The operator will collect available information describing the environmental and socio-cultural conditions in the vicinity of the proposed project and will provide the information to the agency.

- A monitoring program will be developed by the operator to ensure that environmental conditions are monitored during the exploration and well drilling, testing, construction, and utilization and reclamation phases. The monitoring program requirements, including adaptive management strategies, will be established at the project level to ensure that potential adverse impacts of geothermal development are mitigated. The monitoring program will identify the monitoring requirements for each major environmental resource present at the site, establish metrics against which monitoring observations can be measured, identify potential mitigation measures, and establish protocols for incorporating monitoring observations and additional mitigation measures into ongoing activities. The operator will provide results of the monitoring program to the agency in an annual report.

- Prior to commencing work, project boundaries (including access routes and staging/parking areas) will be staked or flagged, as necessary, to identify the limits of the work area. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits. Work area footprints will be restricted to existing disturbed areas to the extent feasible. No work will occur outside defined project limits.

2.1 Air Quality

- The operator will coordinate with the Great Basin Unified Air pollution Control District (GBUAPCD) to develop and implement an air quality monitoring plan.
- Drilling, well testing and geothermal production will comply with appropriate GBUAPCD hydrogen sulfide emission limits.
    - The operator will prepare and submit to the agency an Equipment Emissions Mitigation Plan for managing diesel exhaust, An Equipment Emissions Mitigation Plan will identify actions to reduce diesel particulate, carbon monoxide, hydrocarbons, and nitrogen oxides associated with construction and drilling activities. The Equipment Emissions Mitigation Plan will require that all drilling/construction-related engines are maintained and operated as follows:
    - Are tuned to the engine manufacturer's specification in accordance with an appropriate time frame.
    - Do not idle for more than five minutes (unless, in the case of certain drilling engines, it is necessary for the operating scope).
    - Are not tampered with in order to increase engine horsepower.
    - Include particulate traps, oxidation catalysts, and other suitable control devices on all drilling/construction equipment used at the project site.
    - Use diesel fuel having a sulfur content of 15 parts per million or less, or other suitable alternative diesel fuel, unless such fuel cannot be reasonably procured in the market area.
    - Include control devices to reduce air emissions. The determination of which equipment is suitable for control devices should be made by an independent Licensed Mechanical Engineer. Equipment suitable for control devices may include drilling equipment, work over and service rigs, mud pumps, generators, compressors, graders, bulldozers, and dump trucks.
- Hydrogen sulfide emissions would be abated during well testing, for example, through the injection of hydrogen peroxide and sodium hydroxide in to the test line.

<u>Construction Best Management Practices</u>

Fugitive Dust Suppression Program (Construction)

- Watering of unpaved roads and disturbed areas at least twice per day. Increase watering frequency when wind speeds exceed 15 miles/hour.

- Limiting speed of vehicles in construction areas to 25 miles per hour or less.
- Prior to soil disturbance, install windbreaks at the windward sides of construction areas. The windbreaks shall remain in place until the soil is either stabilized or permanently covered.
- Wet or cover excavated and stockpiled soil.
- Cover all trucks hauling dirt, sand, soil or other loose materials and maintain at least six inches freeboard between the top of the load and the top of the trailer.
- Maintain cargo compartments so that no spillage or loss of material can occur.
- Clean cargo compartments for all haul trucks at the delivery site, after removal of materials.
- Prior to entering a public roadway, employ tire cleaning and gravel ramps to limit accumulated mud and dirt deposited on the roads.
- Cleanup of spillage and material tracked out or carried out into a paved road surface within 8 hours.

Well Drilling Emissions and Testing Issues (Construction)

- Contractors will be hired by the lessee to conduct well drilling activities. These contractors will be required to have Statewide Portable Equipment Registrations (SPER) issued by the California Air Resources Board (CARB) or be permitted by Great Basin Unified Air Pollution Control District (GBUAPCD) for their diesel fueled engines. Typical SPER requirements for these types of engines include:
- The opacity shall be limited to 20 percent or less.
- PM_{10} emissions shall be limited to less than 0.1 grain per dry standard cubic feet (DSCF) corrected to 12 percent CO.
- Limit engine idling time to no more than five minutes and shut down equipment when not in use.
- The well flow testing shall be completed as expeditiously as possible.
- Well drilling activities shall use engines that meet or exceed the following EPA off-road engine emission standards: Tier 2 engines (at a minimum) from 2010 to 2015; Tier 3 engines (at a minimum) from 2015 to 2020; Tier 4 engines after 2020.
- The brine from a flow test is routed to a well test unit designed to minimize the release of entrained brine, which contributes to the particulate matter and metals

release. Other mitigation measures include: Brine flow rates shall be limited to 800,000 lbs/hr for both production wells and injection wells (CEOE 2003b, Response #3a).

- Flow tests shall last less than 96 hours.
- Consider the use of hydrogen peroxide to control the hydrogen sulfide (H_2S) emissions during well flow tests and initial commissioning.

Heavy Duty Diesel Equipment (Construction)

- Limit engine idling time to no more than five minutes and shut down equipment when not in use.
- Perform regular preventive maintenance to prevent emission increases due to engine problems.
- Use ultra-low-sulfur fuel meeting California standards for motor vehicle diesel fuel.
- All large construction diesel engines which have a rating of 100 horsepower (hp) or more shall be equipped with catalyzed diesel particulate filters (soot filters), unless certified by engine manufacturers or the on-site air quality control mitigation measures (AQCMM) that the use of such devices is not practical for specific engine types.
- Paving of all major access/egress routes to the project site and requiring construction workers and deliveries to take paved routes to and from the project site.
- Suspension of fugitive dust causing activities under windy (i.e. sustained winds >25 mph) conditions.

Operational Best Management Practices

Fugitive Dust Suppression Program (Operations)

- All access and internal power plant roads shall be paved.
- Limit vehicle speeds and water unpaved access roads to well pads.
- Direct load haul trucks with recently dewatered filter cake.
- Use wind break shields or structures at all exposed operation areas as feasible.
- Cover all haul trucks and maintain at least six inches of freeboard between the top of the load and the top of the trailer.
- Maintain cargo compartments so that no spillage or loss of material can occur.

- Clean cargo compartments for all haul trucks at the delivery site, after removal of materials.
- Prior to entering a public roadway, employ tire cleaning and gravel ramps to limit accumulated mud and dirt deposited on the roads. Cleanup of spillage and material tracked out or carried out into a paved road surface within eight hours.
- Designate a person to oversee the implementation of the fugitive dust control program.
- Employ electric motors for operations and maintenance equipment when feasible.

Cooling Tower Mitigation Measures (Operations)

- H_2S shall be controlled using a LO-CAT System with a control efficiency of 99.5 percent (CEOE 2002a, Appendix G.3).
- In addition to the LO-CAT System for H_2S abatement, the project will include a polishing system using a solid bed H_2S removal scavenger system.
- Evaluate ammonia removal technologies and assess whether an additional ammonia control system is feasible.
- Benzene shall be controlled using carbon absorbers with a control efficiency of 95 percent (CEOE 2002a, Appendix G.3).
- Offgassing of H_2S shall be minimized using oxidizers designed to oxidize at least 90 percent of the H_2S in the condensate (CEOE 2003b, Response #3d).
- The cooling tower shall be designed and built with a drift eliminator, such that the drift rate does not exceed 0.0005 percent (CEOE 2002b, DR#5).
- Hexavalent chromium containing compounds will not be used in the circulating water.

Filter Cake Handling Mitigation Measures

- Direct load filter cake into trucks, trailers or bins as it is generated.
- Tarp trailer and bins immediately after loading.
- Use sulfate scale inhibitors to minimize radioactivity from radium (Ra226 and Ra228) and radon from the silica filter cake.

2.2 Noise

- The operator will take measurements to assess the existing background noise levels at a given site and compare them with the anticipated noise levels associated with the proposed project.

- Within two miles of existing, occupied residences, geothermal well drilling or major facility construction operations will be restricted to non-sleeping hours (7:00 am to 10:00 pm).

- All equipment will have sound-control devices no less effective than those provided on the original equipment. All construction equipment used will be adequately muffled and maintained.

- All stationary construction equipment (i.e., compressors and generators) will be located as far as practicable from nearby residences.

- If blasting or other noisy activities are required during the construction period, nearby residents will be notified by the operator at least one hour in advance.

- Explosives will be used only within specified times and at specified distances from sensitive wildlife or streams and lakes, as established by the federal and state agencies.

2.3 Soils

- Erosive soils (defined as having severe or very severe erosion potential by the Natural Resources Conservation Service) on slopes greater than 30 percent should be protected to minimize the potential for adverse impacts.

- The operator will perform a detailed geotechnical analysis prior to the construction of any structures; so they will be sited to avoid any hazards from subsidence or liquefaction (i.e., the changing of a saturated soil from a relatively stable solid state to a liquid during earthquakes or nearby blasting). Structures and facilities will be designed and constructed in accordance with seismic safety standards.

- Silt fencing, waddles, hay bales, and other erosion control devices will be used on areas at risk of soil movement from wind and water erosion.

- Mulch will be used if necessary to control erosion, create vegetation micro-sites, and retain soil moisture and may include hay, small-grain straw, wood fiber, live mulch, cotton, jute, or synthetic netting. Mulch will be free from mold, fungi, and certified free of noxious or invasive weed seeds.

- Adequate drainage control devices and measures will be incorporated into road and well pad design at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road and well pad environments to avoid erosive concentrated flows.

- The amount of vegetation cleared will be kept to the minimum necessary to accommodate all necessary project components.

- Water will be applied to disturbed areas and windrowed topsoil during construction to reduce the impacts to soil from wind erosion.

- During initial construction, and prior to completion of construction, pre-interim reclamation stormwater management actions will be taken to ensure disturbed areas are quickly stabilized to control surface water flow and to protect both the disturbed and adjacent areas from erosion and siltation. This may involve construction and maintenance of temporary silt ponds, silt fences, berms, ditches, and mulching.

- Where possible, access roads should be located to follow natural contours and minimize side hill cuts and fills. Excessive grades on roads, road embankments, ditches, and drainages should be avoided, especially in areas with erodible soils. Project vehicles should be restricted to designated roads and well pad areas. Roads should be designed so that changes to surface water runoff are minimized and new erosion is not initiated.

- Access roads and onsite roads should be surfaced with aggregate materials where necessary to provide a stable road surface, support anticipated traffic, reduce fugitive dust, and prevent erosion. Culvert outlets should be rip-rapped to dissipate water energy at the outlet and reduce erosion.

- Road use should be restricted during the wet season if road surfacing is not adequate to prevent soil displacement, rutting, etc., and resultant stream sedimentation.

2.4 Water Resources

- In coordination with State regulatory agencies the operator will comply with all state and federal surface and ground water rules and regulations for all phases of geothermal exploration, development, operation and reclamation.

- Operators will develop a storm water management plan for the site to ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion.

- Operators will gain a clear understanding of the local hydrogeology. Areas of groundwater discharge and recharge and their potential relationships with surface water bodies will be identified.

- Operators will avoid creating hydrologic conduits between discrete aquifers during drilling, foundation excavation and other activities.

- Freshwater-bearing and other usable water aquifers will be protected from contamination by assuring all well casing (excluding the liner) is required to be cemented from the casing shoe to the surface.

- Periodic testing and monitoring via observation wells will be conducted in a manner to assure maximum protection of water resources from groundwater extraction, geothermal fluids or alterations in reservoir pressure.

- Water use will be minimized and water required for exploration and development will be obtained in a manner to assure maximum protection of water resources.

- The discharge of fill or dredged materials into waters of the United States, including wetlands, would be avoided to the greatest extent possible. Playa lakes and other wetlands provide important groundwater recharge functions in the Rose Valley.

- Avoid development of impervious geothermal facilities and access roads on the alluvial fans draining the Sierra Nevada and Coso Range. Alluvial fans provide important groundwater recharge functions in the Rose Valley.

- To the extent possible, span or avoid development in intermittent and ephemeral drainages. Construct roads perpendicular to stream crossings and avoid paralleling streams.

- To the extent possible, avoid development of geothermal facilities and access roads in the 100-year floodplain located in the low lying areas of the Rose Valley. The floodplain overlies the playa lakes that should also be avoided.

- Proposed geothermal exploration and development would comply with the Clean Water Act as implemented by the State Water Resources Control Board's National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, a general permit for construction activities, and the associated Order No. 92-08-DWQ, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity. Projects of one acre or more are subject to this general construction permit process.

- Developers would be required to eliminate or reduce non-stormwater discharges to stormwater systems, develop a Stormwater Pollution Prevention Plan (SWPPP) prior to beginning construction, inspect all stormwater control structures, and implement other pollution prevention measures, such as applicable BMPs and conservation measures during construction.

    - The SWPPP would include the specific measures and techniques for implementation to protect the project sites and adjacent areas from erosion and deposition during site grading, construction, and post-construction stabilization of sediment on the site.

    - The contractor would provide a copy of the SWPPP for the various crews performing work on the construction site, and a copy would be kept on-site during the project to satisfy the requirements of the NPDES permit. A draft of this SWPPP would be forwarded to the BLM for review prior to its finalization.

2.5 Vegetation

- The construction crews and contractors shall be responsible for working around all shrubs and trees within the construction zone to the extent feasible. Particular avoidance shall be applied to riparian trees (i.e., cottonwoods and willows). Shrubs and trees shall be flagged by a qualified botanist or arborist to indicate top priority for avoidance.

- Operators will develop a plan for control of noxious weeds and invasive species, which could occur as a result of new surface disturbance activities at the site. The most recent recommendations at the state and local level should be incorporated into any operating plan for the geothermal exploration and development. The plan will address monitoring, education of personnel on weed identification, the manner in which weeds spread, and methods for treating infestations. The use of certified weed-free mulching will be required. If trucks and construction equipment are arriving from locations with known invasive vegetation problems, a controlled inspection and cleaning area will be established to visually inspect construction equipment arriving at the project area and to remove and collect seeds that may be adhering to tires and other equipment surfaces.

- The use of certified, weed-free mulch will be required when stabilizing areas of disturbed soil.

- All vehicles and equipment associated with ground disturbance must be washed upon entry and exit of all project sites. Washing shall include wheels, undercarriages, bumpers, and all exposed surface parts of the vehicle capable of transporting seed. All tools such as chainsaws, hand clippers, pruners, etc. must also be cleaned before and after entering all project sites. When vehicles and equipment are washed, a daily log must record the following: 1) Location; 2) Date and time; 3) Methods used; 4) Staff present; 5) Equipment washed; and 6) Signature of responsible crew member. The written logs will be turned in to the BLM botanist upon completion of the project. Interim reports must be provided if requested or if the project extends beyond the planned period.

- Fill materials and road surfacing materials that originate from areas with known invasive vegetation problems will not be used.

- Revegetation, habitat restoration and weed control activities will be initiated as soon as possible after construction activities are completed.

- Herbicides shall be applied in accordance with state and federal law. No herbicides shall be used where Threatened or Endangered species occur. No herbicides shall be sprayed when wind velocities are above five miles per hour. No herbicides shall be used on native vegetation unless specifically authorized, in writing, by the BLM.

2.6 Fish and Wildlife

- The operator will prepare a habitat restoration plan to avoid (if possible), minimize, or mitigate negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. The plan will identify revegetation, soil stabilization, and erosion reduction measures that will be implemented to ensure that all temporary use areas are restored. The plan will require that restoration occur as soon as possible after completion of activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats. The Restoration and Revegetation Plan shall be submitted to the lead agencies for prior approval. All project activities must comply with the approved Restoration and Revegetation Plan.

- If work during the breeding/nesting season (February 15 through August 15) cannot be avoided, then prior to construction activities, a qualified biologist shall survey all breeding/nesting habitat. If vegetation is removed during March 15 through September 15, then pre-disturbance surveys will be conducted to determine whether active nests are present within the disturbance area. Nest surveys shall be conducted no more than three days prior to the start of construction activities. Documentation of findings, including a negative finding must be submitted to the California Department of Fish and Game (CDFG) prior to construction activities for review and concurrence. If no breeding/nesting birds are observed and concurrence has been received from CDFG, site preparation and activities may begin. If an active nest is discovered or breeding activities are located and concurrence has been received from the CDFG, the breeding habitat/nest site shall be fenced a minimum of 200 feet (500 feet for raptors, ½ mile for eagles) in all directions, and this area shall not be disturbed until the nest becomes inactive, the young have fledged, the young are no longer being fed by the parents, the young have left the area, and the young will no longer be impacted by the project. This buffer may be adjusted due to environmental factors or species specific requirements upon consultation with the CDFG, BLM and/or the U.S. Fish and Wildlife Service (USFWS).

- Prior to any construction activities and tree removal during the raptor nesting season, January 31st to September 1st, a qualified biologist shall conduct a single site survey for active nests no more than one week prior to any scheduled development. If an active nest is located, then no work shall be conducted within a 500 foot radius from the nest until the young have fledged and are independent of the adults. If an inactive raptor nest is observed within the vegetation at any construction sites proposed for vegetation removal, the CDFG shall be contacted to discuss mitigation measures should the nest become active during the project term.

- The operator will conduct surveys for plant and animal species that are listed or proposed for listing as threatened or endangered and their habitats in areas proposed for development where these species could potentially occur, following accepted protocols and in consultation with the USFWS and the CDFG as appropriate. Particular care should be taken to avoid disturbing listed species during surveys in any designated critical habitat. The operator will monitor activities and their effects on ESA-listed species throughout the duration of the project.

- The operator will identify important, sensitive, or unique habitat and biota in the project vicinity and site and should design the project to avoid (if possible), minimize, or mitigate potential impacts on these resources. The design and siting of the facilities will follow appropriate guidance and requirements from the BLM, and other resource agencies, as available and applicable.

- If pesticides are used on the site, an integrated pest management plan will be developed to ensure that applications would be conducted within the framework of all Federal, State, and local laws and regulations and entail only the use of EPA-registered pesticides.

- The operator will ensure that employees, contractors, and site visitors avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. In addition, pets will be controlled or excluded to avoid harassment and disturbance of wildlife.

- Ponds, tanks and impoundments (including but not limited to drill pits) containing liquids can present hazards to wildlife. Any liquids contaminated by substances which may be harmful due to toxicity, or fouling of the fur or feathers (detergents, oils), should be excluded from wildlife access by fencing, netting or covering at all times when not in active use. Liquids at excessive temperature should likewise be excluded. If exclusion is not feasible, such as a large pond, a hazing program based on radar or visual detection, in conjunction with formal monitoring, should be implemented. Clean water impoundments can also present a trapping hazard if they are steep-sided or lined with smooth material. All pits, ponds and tanks should have escape ramps functional at any reasonably anticipated water level, down to almost empty. Escape ramps can take various forms depending on the configuration of the impoundment. Earthen pits may be constructed with one side sloped 3:1 or greater lined ponds can use textured material; straight-sided tanks can be fitted with expanded metal escape ladders.

- In order to minimize risks of direct drainage into riparian areas or other sensitive habitats, equipment storage, fueling, and staging areas shall be located at upland areas at sufficient distance and in such a manner as to prevent runoff from entering sensitive habitat. Project related spills shall be reported to BLM/CDFG/USFWS or other appropriate agency, cleaned up immediately, and contaminated soils removed to approved disposal areas.

- If excavations are to be left open and unattended for more than 12 hours, an escape ramp will be constructed to the bottom of the pit with less than a 3:1 or greater slope to provide a means of escape for wildlife. Prior to commencement of work activity each day, staff will check any excavated pits for wildlife. All excavations to be backfilled must be inspected for wildlife immediately prior to backfilling.

- Project personnel will be restricted to the approved project limits. The project will not allow pets or hunting, killing, or harassment of native wildlife. The project will shield lighting and restrict dusk to dawn work activity that could affect diurnal and nocturnal foraging by native wildlife. Construction area and disturbance to soil and vegetation will be restricted to the minimum area possible to avoid unnecessary adverse impacts to wildlife habitat and native vegetation.

- Biological monitors will be present during project construction activities if sensitive biological resources within the area of potential impact would be adversely impacted. The monitors will be responsible for ensuring that impacts to special-status species, native vegetation, wildlife habitat, or unique resources will be avoided to the fullest extent possible. Where appropriate, monitors will flag the boundaries of areas where activities need to be restricted in order to protect native plants and wildlife or special-status species. Those restricted areas will be monitored to ensure their protection during construction.

- Construction crews will avoid impacting streambeds and banks of streams along the route to the extent possible. If necessary, a Streambed Alteration Agreement (SAA) will be secured from CDFG. Impacts will be mitigated based on the terms of the SAA.

- All pipelines outside of a power plant site or other fenced areas would be elevated at least 12 inches (0.3 meters) above the ground surface to allow wildlife mobility and prevent interference with natural drainage.

2.7 Cultural Resources

- Before any specific permits are issued under leases, treatment of cultural resources will follow the procedures established by the Advisory Council on Historic Preservation for compliance with Section 106 of the National Historic Preservation Act. All fieldwork will be performed under a Cultural Resource Use Permit issued by the BLM. A pedestrian inventory will be undertaken of all portions that have not been previously surveyed or are identified by BLM as requiring inventory to identify properties that are eligible for the National Register of Historic Places (NRHP). Those sites not already evaluated for NRHP eligibility will be evaluated based on surface remains, subsurface testing, archival data, and/or ethnographic sources. Archaeological survey and subsurface investigations will be monitored by tribal representatives, if requested. Subsurface testing will be kept to a minimum whenever possible if sufficient information is available to evaluate the site or if avoidance is an expected mitigation outcome. Recommendations regarding the eligibility of sites will be submitted to the BLM. The BLM will make determinations of eligibility and effect and consult with the State Historic Preservation Offices (SHPO) as necessary based on each proposed lease application and project plans. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated. Avoidance of impacts through project design will be given priority over data recovery as the preferred mitigation measure. Avoidance measures include moving project elements away from site locations or to areas of previous impacts, restricting travel to existing roads. Any data recovery will be preceded by approval of a detailed research design, Native American Consultation, and other requirements for BLM issuance of a cultural resource use permit under the Federal Land Policy and Management Act (FLPMA).

- If an area exhibits a high potential for containing cultural resources, but no artifacts were observed during an archaeological survey, monitoring by a qualified archaeologist could be required during all excavation and earthmoving in the high-potential area.

- Based on the results of survey and other investigations, the BLM may require a Cultural Resource Management Plan (CRMP) that details site-specific mitigation activities. The CRMP also will: 1) establish a monitoring program; 2) identify measures to prevent potential looting/vandalism or erosion impacts; and 3) address the education of workers and the public to make them aware of the consequences of unauthorized collection of artifacts and destruction of property on public land.

- Unexpected discovery of cultural or paleontological resources during construction will be brought to the attention of the responsible BLM authorized officer immediately. Work will be halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation measures are being developed.

2.8 Native American Issues and Concerns

- If requested, the applicant (BLM in their circumstance) will make presentations to interested Native American groups regarding the applicant's proposed project.

- Sacred sites or other locations of religious concern identified by Native Americans will be avoided by all project-related activities.

- Native American groups will be offered the opportunity to provide construction monitors.

- With due regard to human health and safety, the applicant will work to minimize the need to limit access to locations by Native Americans.

- Unexpected discovery of Native American cultural resources during construction will be brought to the attention of the responsible BLM authorized officer immediately, who will inform Native American tribal representatives. Work will be halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation measures are being developed. Under no circumstances will human skeletal remains, if discovered, be disturbed or altered and all work in the vicinity will halt until appropriate actions have been completed by Tribal representatives.

2.9 Paleontological Resources

- Operators will determine whether paleontological resources exist in a project area on the basis of the sedimentary context of the area, a records search for past paleontological finds in the area, and/or, depending on the extent of existing information, a paleontological survey.

- If paleontological resources are present at the site, or if areas with a high potential to contain paleontological material have been identified, a paleontological resources management plan will be developed. This plan will include a mitigation plan for avoidance, removal of fossils, or monitoring. If an area exhibits a high potential but no fossils were observed during survey, monitoring by a qualified paleontologist may be required during excavation and earthmoving in the sensitive area. The operator will submit a report to the agency documenting these activities. The paleontological resources management plan also will: 1) establish a monitoring program; 2) identify measures to prevent potential looting/vandalism or erosion impacts; and 3) address the education of workers and the public to make them aware of the consequences of unauthorized collection of fossils on public land.

- Unexpected discovery of paleontological resources during construction will be brought to the attention of the responsible BLM authorized officer immediately. Work will be halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation measures are being developed.

2.10 Visual

- The operator will incorporate visual design considerations into the planning and design of the project to minimize potential visual impacts of the proposal and to meet the Visual Resource Management objectives of the area and the agency.

- "Dulled" or galvanized metal finish towers or poles shall be used for transmission lines to reduce visual contrast.

- Non-specular (non-reflective) conductors shall be used for transmission lines to reduce visual contrast.

- Construct low-profile structures whenever possible to reduce structure visibility.

- Select and design materials and surface treatments to repeat or blend with landscape elements.

- Site projects outside of the viewsheds of publically accessible vantage points, or if this cannot be avoided, as far away as possible.

- Site projects to take advantage of both topography and vegetation as screening devices to restrict views of projects from visually sensitive areas.

- Site facilities away from and not adjacent to prominent landscape features (e.g., foothills or mountains, and water features).

- Avoid placing facilities on ridgelines, summits, or other locations such that they will be silhouetted against the sky from visually sensitive areas.

- Collocate facilities to the extent possible to use existing and shared rights-of-way, existing and shared access and maintenance roads, and other infrastructure to reduce visual contrast.

- Site linear features (aboveground pipelines, rights-of-way, and roads) to follow natural land contours rather than straight lines (particularly up slopes) when possible. Fall-line cuts should be avoided.

- Site linear features to cross other linear features (e.g., trails, roads) at right angles whenever possible to minimize viewing area and duration.

- Site and design structures and roads to minimize and balance cuts and fills and to preserve existing rocks, vegetation, and drainage patterns to the maximum extent possible.

- Use appropriately colored materials for structures or appropriate stains and coatings to blend with the project's backdrop. Refer to the Standard Environmental Colors chart available from the BLM.

- Use non-reflective or low-reflectivity materials, coatings, or paints whenever possible.

- Site pipelines adjacent to roadways to reduce surface disturbance and minimize visual contrast.
- No paint or permanent discoloring agents shall be applied to rocks or vegetation to indicate survey or construction activity limits.
- Paint grouped structures the same color to reduce visual complexity and color contrast.
- Design and install efficient facility lighting so that the minimum amount of lighting required for safety and security is provided but not exceeded and so that upward light scattering (light pollution) is minimized. This may include, for example, installing shrouds to minimize light from straying off-site, properly directing light to only illuminate necessary areas, and installing motion sensors to only illuminate areas when necessary to reduce offsite visual contrast during nighttime hours.
- Site construction staging areas and laydown areas outside of the viewsheds of publically accessible vantage points and visually sensitive areas, where possible, including siting in swales, around bends, and behind ridges and vegetative screens.
- Discuss visual impact mitigation objectives and activities with equipment operators prior to commencement of construction activities.
- Avoid installing gravel and pavement where possible to reduce color and texture contrasts with existing landscape.
- Use excess fill to fill uphill-side swales resulting from road construction in order to reduce unnatural-appearing slope interruption and to reduce fill piles.
- Avoid downslope wasting of excess fill material.
- Round road-cut slopes, vary cut and fill pitch to reduce contrasts in form and line, and vary slope to preserve specimen trees and nonhazardous rock outcroppings.
- Provide benches in rock cuts to accent natural strata.
- Use split-face rock blasting to minimize unnatural form and texture resulting from blasting.
- Segregate topsoil from cut and fill activities and spread it on freshly disturbed areas to reduce color contrast and to aid rapid revegetation.
- Bury utility cables in or adjacent to the road where feasible.
- Undertake interim restoration during the operating life of the project as soon as possible after disturbances. During road maintenance activities, avoid blading existing forbs and grasses in ditches and along roads.

- Randomly scarify cut slopes to reduce texture contrast with existing landscape and to aid in revegetation.

- Cover disturbed areas with stockpiled topsoil or mulch, and revegetate with a mix of native species establishing a composition consistent with the form, line, color, and texture of the surrounding undisturbed landscape."

- Restore rocks, brush, and natural debris whenever possible to approximate preexisting visual conditions.

2.11 Health and Safety

- Operators will develop a hazardous materials management plan addressing storage, use, transportation, and disposal of each hazardous material anticipated to be used at the site. The plan will identify all hazardous materials that would be used, stored, or transported at the site. It will establish inspection procedures, storage requirements, storage quantity limits, inventory control, nonhazardous product substitutes, and disposition of excess materials. The plan will also identify requirements for notices to federal and local emergency response authorities and include emergency response plans.

- Operators will develop a waste management plan identifying the waste streams that are expected to be generated at the site and addressing hazardous waste determination procedures, waste storage locations, waste-specific management and disposal requirements, inspection procedures, and waste minimization procedures. This plan will address all solid and liquid wastes that may be generated at the site.

- Operators will develop a spill prevention and response plan identifying where hazardous materials and wastes are stored on site, spill prevention measures to be implemented, training requirements, appropriate spill response actions for each material or waste, the locations of spill response kits on site, a procedure for ensuring that the spill response kits are adequately stocked at all times, and procedures for making timely notifications to authorities.

- A safety assessment will be conducted to describe potential safety issues and the means that would be taken to mitigate them, including issues such as site access, construction, safe work practices, security, heavy equipment transportation, traffic management, emergency procedures, and fire control.

- A health and safety program will be developed to protect both workers and the general public during construction and operation of geothermal projects.

- Regarding occupational health and safety, the program will identify all applicable federal and state occupational safety standards; establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses; Occupational Safety and Health Administration standard practices for safe use of explosives and blasting agents; and measures for reducing occupational electric and magnetic fields exposures); establish fire safety evacuation procedures; and define safety performance standards (e.g., electrical system standards and lightning protection standards). The program will include a training program to identify hazard training requirements for workers for each task and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies will be established.

- Regarding public health and safety, the health and safety program will establish a safety zone or setback for generators from residences and occupied buildings, roads, right-of-ways, and other public access areas that is sufficient to prevent accidents resulting from the operation of generators. It will identify requirements for temporary fencing around staging areas, storage yards, and excavations during construction or rehabilitation activities. It will also identify measures to be taken during the operation phase to limit public access to hazardous facilities (e.g., permanent fencing would be installed only around electrical substations, and facility access doors would be locked).

- Operators will consult with local planning authorities regarding increased traffic during the construction phase, including an assessment of the number of vehicles per day, their size, and type. Specific issues of concern (e.g., location of school bus routes and stops) will be identified and addressed in the traffic management plan.

- Operators will develop a fire management strategy to implement measures to minimize the potential for a human-caused fire.

- Underground utilities will be installed to minimize the amount of open trenches at any given time, keeping trenching and backfilling crews close together. Avoid leaving trenches open overnight. Where trenches cannot be back-filled immediately, escape ramps should be constructed at least every 100 feet.

2.12 Wild Horses and Burros

- The operator will ensure employees, contractors, and site visitors avoid harassment and disturbance of wild horses and burros, especially during reproductive (e.g., breeding and birthing) seasons. In addition, any pets will be controlled to avoid harassment and disturbance of wild horses and burros.

- Observations of potential problems regarding wild horses or burros, including animal mortality, will be immediately reported to the agency.

2.13 Livestock Grazing

- The operator will coordinate with livestock operators to minimize impacts to livestock operations.

2.14 Recreation

- Any necessary temporary route closures for construction would be coordinated with BLM and before beginning construction.

- Signs directing vehicles to alternative park access and parking would be posted in the event construction temporarily obstructs parking areas near trailheads.

- Signs and/or flagging that advise recreational users of construction activities would be posted in coordination with BLM. Whenever active work is being performed, the area should be posted with “Construction Ahead” signs on any adjacent access roads or trails that might be affected.

- Construction-related traffic would be restricted to routes approved by the agency(ies). Construction of new access roads or cross-country vehicle travel would not be permitted unless prior written approval is given by the authorized officer. Authorized roads used by the proposed action will be rehabilitated when construction activities are complete. The agency(ies) would work with the proponent to develop site-specific standards for route reconstruction.

- Whenever possible, construction activities would be avoided during high recreation use periods.

2.15 Scenic and Historic Trails

- When any right-of-way application includes remnants of a scenic or historic trail, is located within the viewshed of an historic trail’s designated centerline, or includes or is within the viewshed of a trail eligible for listing on the NRHP, the operator will evaluate the potential visual impacts to the trail associated with the proposed project and identify appropriate mitigation measures for inclusion in the operation plan.

2.16 Transportation/Roads/Pads

- Operators will consult with local planning authorities regarding increased traffic prior to the construction phase, including an assessment of the number of vehicles per day, their size, and type. Specific issues of concern (e.g., location of school bus routes and stops) will be identified and addressed in the traffic management plan.

- Traffic will be restricted to the roads developed for the project. Use of other unimproved roads will be restricted to emergency situations.

- Signs will be placed along roads to identify speed limits, travel restrictions, and other standard traffic control information. Signs directing vehicles to alternative park access and parking will be posted in the event construction temporarily obstructs recreational parking areas near trailheads. Whenever active work is being performed, the area will be posted with “construction ahead” signs on any adjacent access roads or trails that might be affected.

- Project personnel and contractors will be instructed and required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types, and site-specific conditions, to ensure safe and efficient traffic flow and to reduce wildlife collisions and disturbance and fugitive dust.

- When practical, construction activities will be avoided during high recreational use periods.

- To plan for efficient use of the land, necessary infrastructure will be consolidated wherever possible.

- Existing roads and pad sites will be used to the maximum extent feasible, but only if located in a safe and environmentally sound location. No new roads and pad sites will be constructed without agency authorization. If new roads and pad sites have been authorized, they will be designed and constructed by the operator to the appropriate agency standard, no higher than necessary to accommodate their intended function. Roads and pad sites will be routinely maintained by the operator to assure public safety and to minimize impacts to the environment such as erosion, sedimentation, fugitive dust, and loss of vegetation.

- An access road siting and management plan will be prepared incorporating existing Agency standards regarding road design, construction, and maintenance such as those described in the BLM 9113 Manual and the Surface Operating Standards for Oil and Gas Exploration and Development (i.e., the Gold Book, 4th Edition, 2007).

- A traffic management plan will be prepared for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan will incorporate measures such as informational signs, flaggers when equipment may result in blocked throughways, and traffic cones to identify any necessary changes in temporary lane configuration.

- Where possible, access roads will be located to follow natural contours and minimize side hill cuts and fills. Excessive grades on roads, road embankments, ditches, and drainages will be avoided, especially in areas with erodible soils.

- Roads will be designed so that changes to surface water runoff are minimized and new erosion is not initiated.

- Access roads will be located to minimize stream crossings. All structures crossing streams will be located and constructed so that they do not decrease channel stability or increase water velocity. Operators will obtain all applicable federal and state water crossing permits.

- Roads will be located away from drainage bottoms and avoid wetlands, if practicable.

- The operator will obtain agency authorization prior to borrowing soil or rock material from agency lands.

- Road use will be restricted during the wet season if road surfacing is not adequate to prevent soil displacement, rutting, etc., and resultant stream sedimentation.

- Access roads and on-site roads will be surfaced with aggregate materials where necessary to provide a stable road surface, support anticipated traffic, reduce fugitive dust, and prevent erosion.

- Dust abatement techniques will be used before and during surface clearing, excavation, or blasting activities. Dust abatement techniques will be used on unpaved, unvegetated surfaces to minimize fugitive dust. Speed limits (e.g., 25 mph) will be posted and enforced to reduce fugitive dust. Construction materials and stockpiled soils will be covered if they are a source of fugitive dust.

- Culvert outlets will be rip-rapped to dissipate water energy at the outlet and reduce erosion. Catch basins, roadway ditches, and culverts will be cleaned and maintained regularly.

2.17 Waste Management

- All refueling will occur in a designated fueling area that includes a temporary berm to limit the spread of any spill.

- Drip pans will be used during refueling to contain accidental releases.

- Drip pans will be used under fuel pump and valve mechanisms of any bulk fueling vehicles parked at the construction site.

- Any containers used to collect liquids will be enclosed or screened to prevent access to contaminants by wildlife, livestock, and migratory birds.

- Spills will be immediately addressed per the spill management plan, and soil cleanup and removal initiated as soon as feasible.

2.18 Pipelines

- Pipelines constructed above ground due to thermal gradient induced expansion and contraction will rest on cradles above ground level, allowing small animals to pass underneath. Projects should be analyzed to ensure adequate passage for all wildlife species. The pipeline will be raised higher to allow wildlife passage where needed. Because pipeline corridors through certain habitat types can alter local predator-prey dynamics by providing predators with lines of sight and travel corridors, large projects should be analyzed to ensure there will be no significant changes to predator-prey balance.

3.0 RECLAMATION PERFORMANCE STANDARDS

The following reclamation performance standards will be met:

3.1 Interim Reclamation

This includes disturbed areas that may be redisturbed during operations and will be redisturbed at final reclamation to achieve restoration of the original landform and a natural vegetative community.

- Disturbed areas not needed for active, long-term production operations or vehicle travel have been recontoured, protected from erosion, and revegetated with a self-sustaining, vigorous, diverse, native (or as otherwise approved) plant community sufficient to minimize visual impacts, provide forage, stabilize soils, and impede the invasion of noxious, invasive, and non-native weeds.

3.2 Final Reclamation

Includes disturbed areas where the original landform and a natural vegetative community have been restored.

- The original landform has been restored for all disturbed areas including well pads, production facilities, roads, pipelines, and utility corridors.

- General: A self-sustaining, vigorous, diverse, native (or otherwise approved) plant community is established on the site, with a density sufficient to control erosion and invasion by non-native plants and to reestablish wildlife habitat or forage production. At a minimum, the established plant community will consist of species included in the seed mix and/or desirable species occurring in the surrounding natural vegetation.

- Specific: No single species will account for more than 30% total vegetative composition unless it is evident at higher levels in the adjacent landscape. Permanent vegetative cover will be determined successful when the basal cover of desirable perennial species is at least 80% of the basal cover on adjacent or nearby undisturbed areas where vegetation is in a healthy condition; or 80% of the potential basal cover as defined in the National Resource Conservation Service Ecological Site(s) for the area. Plants must be resilient as evidenced by well-developed root systems and flowers. [Shrubs, will be well established and in a “young” age class at a minimum (therefore, not comprised mainly of seedlings that may not survive until the following year).]

- In agricultural areas, irrigation systems and soil conditions are reestablished in such a way as to ensure successful cultivation and harvesting of crops.

- Erosion features are equal to or less than surrounding area and erosion control is sufficient so that water naturally infiltrates into the soil and gullying, headcutting, slumping, and deep or excessive rills (greater than three inches) are not observed.

- The site is free of State- or county-listed noxious weeds, oil field debris and equipment, and contaminated soil. Invasive and non-native weeds are controlled.

3.3 Reclamation Actions

- During initial well pad, production facility, road, pipeline, and utility corridor construction and prior to completion of the final well on the well pad, pre-interim reclamation stormwater management actions will be taken to ensure disturbed areas are quickly stabilized to control surface water flow and to protect both the disturbed and adjacent areas from erosion and siltation. This may involve construction and maintenance of temporary silt ponds, silt fences, berms, ditches, and mulching.

- When the last well on the pad has been completed, some portions of the well location will undergo interim reclamation and some portions of the well pad will usually undergo final reclamation. Most well locations will have limited areas of bare ground, such as a small area around production facilities or the surface of a rocked road. Other areas will have interim reclamation where workover rigs and fracturing tanks may need a level area to set up in the future. Some areas will undergo final reclamation where portions of the well pad will no longer be needed for production operations and can be recontoured to restore the original landform.

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

3.4 Reclamation - General

Procedure:

- The agency will be notified 24 hours prior to commencement of any reclamation operations.

Site Maintenance and Hygiene:

- Immediately upon well completion, the well location and surrounding areas(s) will be cleared of, and maintained free of, all debris, materials, trash, and equipment not required for production.

- No hazardous substances, trash, or litter will be buried or placed in pits. Upon well completion, any hydrocarbons in the pit will be remediated or removed.

- All trash generated from this project will be collected and disposed of off BLM administered lands at an approved disposal site. The project site shall be kept clean of debris and microtrash to avoid attracting wildlife. All food-related trash items shall be enclosed in sealed containers and regularly removed from the site.

Vegetation Clearing:

- Vegetation removal and the degree of surface disturbance will be minimized wherever possible.

- Temporary impacts shall be returned to pre-existing contours and revegetated with a BLM approved native plant species mix. Special Status vegetation will be flagged and voided when necessary.

- [Example of site-specific requirement: During vegetation clearing activities, trees and woody vegetation removed from the well pad and access road will be moved aside prior to any soil disturbing activities. Care will be taken to avoid mixing soil with the trees and woody vegetation. Trees left for wood gathering will be cut [twelve inches or less from the ground], delimbed, and the trunks, six inches or more in diameter will be removed and placed either by the uphill side of the access road, or moved to the end of the road, or to a road junction for easy access for wood gatherers and to reduce vehicle traffic on the well pad. Trees with a trunk diameter less than six inches and woody vegetation will be used to trap sediment, slow runoff, or scattered on reclaimed areas to stabilize slopes, control erosion, and improve visual resources.]

Topsoil Management:

- Operations will disturb the minimum amount of surface area necessary to conduct safe and efficient operations. When possible, equipment will be stored and operated on top of vegetated ground to minimize surface disturbance.

- In areas to be heavily disturbed, the top eight inches of soil material, will be stripped and stockpiled around the perimeter of the well location to control run-on and run-off, and to make redistribution of topsoil more efficient during interim reclamation. Stockpiled topsoil may include vegetative material. Topsoil will be clearly segregated and stored separately from subsoils.

- Earthwork for interim and final reclamation will be completed within six months of well completion or plugging unless a delay is approved in writing by the BLM authorized officer.

- Salvaging and spreading topsoil will not be performed when the ground or topsoil is frozen or too wet to adequately support construction equipment. If such equipment creates ruts in excess of four inches deep, the soil will be deemed too wet.

- No major depressions will be left that would trap water and cause ponding.

- Water pipelines should be inspected daily to eliminate the potential for soil erosion caused by leaking or broken pipes.

- In agricultural areas, irrigation systems and soil conditions should be reestablished in such a way as to ensure successful cultivation and harvesting of crops.

Seeding:

- Seedbed Preparation. Initial seedbed preparation will consist of recontouring to the appropriate interim or final reclamation standard. All compacted areas to be seeded will be ripped to a minimum depth of 18 inches with a minimum furrow spacing of two feet, followed by recontouring the surface and then evenly spreading the stockpiled topsoil. Prior to seeding, the seedbed will be scarified and left with a rough surface.

  If broadcast seeding is to be used and is delayed, final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting in order to loosen up the soil and create seed germination micro-sites.

- Seed Application. Seeding will be conducted no more than 24 hours following completion of final seedbed preparation. A certified weed-free seed mix designed by the BLM to meet reclamation standards will be used.

No seeding will occur from [May 15 to September 15]. Fall seeding is preferred and will be conducted after [September 15] and prior to ground freezing. [Shrub species will be seeded separately and will be seeded during the winter.] Spring seeding will be conducted after the frost leaves the ground and no later than [May 15].

Erosion Control and Mulching:

- Mulch, silt fencing, waddles, hay bales, and other erosion control devices will be used on areas at risk of soil movement from wind and water erosion.

- Mulch will be used if necessary to control erosion, create vegetation micro-sites, and retain soil moisture and may include hay, small-grain straw, wood fiber, live mulch, cotton, jute, or synthetic netting. Mulch will be free from mold, fungi, and certified free of noxious or invasive weed seeds.

- If straw mulch is used, it will contain fibers long enough to facilitate crimping and provide the greatest cover.

Pit Closure:

- Reserve pits will be closed and backfilled within 60 days of release of the rig. All reserve pits remaining open after 60 days will require written authorization of the authorized officer. Immediately upon well completion, any hydrocarbons or trash in the pit will be removed. Pits will be allowed to dry, be pumped dry or solidified in-situ prior to backfilling.

- Following completion activities, pit liners will be completely removed or removed down to the solids level and disposed of at an approved landfill, or treated to prevent their reemergence to the surface and interference with long-term successful revegetation. If it was necessary to line the pit with a synthetic liner, the pit will not be trenched (cut) or filled (squeezed) while containing fluids. When dry, the pit will be backfilled with a minimum of five feet of soil material. In relatively flat areas the pit area will be slightly mounded above the surrounding grade to allow for settling and to promote surface drainage away from the backfilled pit.

Management of Invasive, Noxious, and Non-Native Species:

- All reclamation equipment will be cleaned prior to use to reduce the potential for introduction of noxious weeds or other undesirable non-native species.

- An intensive weed monitoring and control program will be implemented prior to site preparation for planting and will continue until interim or final reclamation is approved by the authorized officer.

- Monitoring will be conducted at least annually during the growing season to determine the presence of any invasive, noxious, and non-native species. Invasive, noxious, and non-native species that have been identified during monitoring will be promptly treated and controlled. A Pesticide Use Proposal will be submitted to the BLM for approval prior to the use of herbicides.

3.5 Interim Reclamation Procedures – Additional

Recontouring:

- Interim reclamation actions will be completed no later than six months from when the final well on the location has been completed, weather permitting. The portions of the cleared well site not needed for active operational and safety purposes will be recontoured to the original contour if feasible, or if not feasible, to an interim contour that blends with the surrounding topography as much as possible. Sufficient semi-level area will remain for setup of a workover rig and to park equipment. In some cases, rig anchors may need to be pulled and reset after recontouring to allow for maximum interim reclamation.

- If the well is a producer, the interim cut and fill slopes prior to re-seeding will not be steeper than a 3:1 ratio, unless the adjacent native topography is steeper. Note: Constructed slopes may be much steeper during drilling, but will be recontoured to the above ratios during interim reclamation.

- Roads and well production equipment will be placed on location so as to permit maximum interim reclamation of disturbed areas. If equipment is found to interfere with the proper interim reclamation of disturbed areas, the equipment will be moved so proper recontouring and revegetation can occur.

Application of Topsoil & Revegetation:

- Topsoil will be evenly respread and aggressively revegetated over the entire disturbed area not needed for all-weather operations including road cuts & fills and to within a few feet of the production facilities, unless an all-weather, surfaced, access route or small “teardrop” turnaround is needed on the well pad.

- In order to inspect and operate the well or complete workover operations, it may be necessary to drive, park, and operate equipment on restored, interim vegetation within the previously disturbed area. Damage to soils and interim vegetation will be repaired and reclaimed following use. To prevent soil compaction, under some situations, such as the presence of moist, clay soils, the vegetation and topsoil will be removed prior to workover operations and restored and reclaimed following workover operations.

Visual Resources Mitigation for Reclamation:

- Trees, if present, and vegetation will be left along the edges of the pads whenever feasible to provide screening.

- To help mitigate the contrast of recontoured slopes, reclamation will include measures to feather cleared lines of vegetation and to save and redistribute cleared trees, debris, and rock over recontoured cut and fill slopes.

- To reduce the view of production facilities from visibility corridors and private residences, facilities will not be placed in visually exposed locations (such as ridgelines and hilltops).

- Production facilities will be clustered and placed away from cut slopes and fill slopes to allow the maximum recontouring of the cut and fill slopes.

- All long-term above ground structures will be painted [Dead Brown] (from the "Standard Environmental Colors" chart) to blend with the natural color of the late summer landscape background.

3.6 Final Reclamation Procedures - Additional

- Final reclamation actions will be completed within six months of well plugging, weather permitting.

- All disturbed areas, including roads, pipelines, pads, production facilities, and interim reclaimed areas will be recontoured to the contour existing prior to initial construction or a contour that blends indistinguishably with the surrounding landscape. Salvaged topsoil will be respread evenly over the entire disturbed site to ensure successful revegetation. To help mitigate the contrast of recontoured slopes, reclamation will include measures to feather cleared lines of vegetation and to save and redistribute cleared trees, woody debris, and large rocks over recontoured cut and fill slopes.

- Water breaks and terracing will only be installed when absolutely necessary to prevent erosion of fill material. Water breaks and terracing are not permanent features and will be removed and reseeded when the rest of the site is successfully revegetated and stabilized.

- If necessary to ensure timely revegetation, the pad will be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species become firmly established, whichever comes later. Fencing will meet standards found on page 18 of the BLM/FS Gold Book, 4th Edition, or will be fenced with operational electric fencing.

- Final abandonment of pipelines and flowlines will involve flushing and properly disposing of any fluids in the lines. All surface lines and any lines that are buried close to the surface that may become exposed in the foreseeable future due to water or wind erosion, soil movement, or anticipated subsequent use, must be removed. Deeply buried lines may remain in place unless otherwise directed by the authorized officer.

3.7 Reclamation Monitoring and Final Abandonment Approval

- Reclaimed areas will be monitored annually. Actions will be taken to ensure that reclamation standards are met as quickly as reasonably practical.

- Reclamation monitoring will be documented in an annual reclamation report submitted to the authorized officer by [March 1]. The report will document compliance with all aspects of the reclamation objectives and standards, identify whether the reclamation objectives and standards are likely to be achieved in the near future without additional actions, and identify actions that have been or will be taken to meet the objectives and standards. The report will also include acreage figures for: Initial Disturbed Acres; Successful Interim Reclaimed Acres; and Successful Final Reclaimed Acres. Annual reports will not be submitted for sites approved by the authorized officer in writing as having met interim or final reclamation standards. Monitoring and reporting continues annually until interim or final reclamation is approved. Any time 30% or more of a reclaimed area is redisturbed, monitoring will be reinitiated.

- The authorized officer will be informed when reclamation has been completed, appears to be successful, and the site is ready for final inspection.

United States Department of the Interior Bureau of Land Management lease example, with terms and instructions, on the following three pages:

Form 3200-24A (September 2008)

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES

Print Reset

Form 3200-24a
(September 2008)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES
(For New Leases Issued Under the Energy Policy Act of 2005 [August 5, 2005])

Serial No.

The undersigned (see page 2) offers to lease all or any of the lands in item 2 that are available for lease pursuant to the Geothermal Steam Act of 1970, as amended (30 U.S.C. 1001-1025).

READ INSTRUCTIONS BEFORE COMPLETING

1. Name	1a. Street

1b. City	1c. State	1d. Zip Code

2. Surface managing agency if other than BLM: ______________________ Unit/Project: ______________________

Legal description of land requested (segregate by public domain and acquired lands): Enter T., R., Meridian, State and County

Total Acres Applied for ____________

Percent U.S. interest ____________

Amount remitted: Processing Fee $ ____________ Rental Fee $ ____________ Total $ ____________

DO NOT WRITE BELOW THIS LINE

3. Land included in lease: Enter T., R., Meridian, State and County

Total Acres in Lease ____________

Rental Retained $ ____________

In accordance with the above offer, or the previously submitted competitive bid, this lease is issued granting the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of all the geothermal resources in the lands described in Item 3 together with the right to build and maintain necessary improvements thereupon, for a primary term of 10 years and subsequent extensions thereof in accordance with 43 CFR subpart 3207. Rights granted are subject to: applicable laws; the terms, conditions, and attached stipulations of this lease; the Secretary of the Interior's regulations and formal orders in effect as of lease issuance; and, when not inconsistent with the provisions of this lease, regulations and formal orders hereafter promulgated.

Type of Lease:

❑ Competitive

❑ Noncompetitive

❑ Noncompetitive direct use (43 CFR subpart 3205)

Comments:

THE UNITED STATES OF AMERICA

BY ______________________________
(Signing Official)

____
(Printed Name)

______________________________ ____________
(Title) (Date)

EFFECTIVE DATE OF LEASE ____________

Check if this is a converted lease ❑

EFFECTIVE DATE OF LEASE CONVERSION ____________

(Continued on page 2)

4. (a) The undersigned certifies that:
(1) The offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States, any State or the District of Columbia; (2) All parties holding an interest in the offer are in compliance with 43 CFR part 3200 and the authorizing Act; (3) The offeror's chargeable interests, direct and indirect, do not exceed those allowed under the Act; and (4) The offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located.
(b) The undersigned agrees that signing this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which the offeror has been given notice. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the proper BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford the offeror no priority if it is not properly completed and executed in accordance with the regulations or if it is not accompanied by the required payments. Title 18 U.S.C. § 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

Duly executed this ________ day of ______________________________, 20_____. ______________________________ ______________________________

(Printed Name of Lessee or Attorney-in-fact) (Signature of Lessee or Attorney-in-fact)

LEASE TERMS

Sec. 1. Rentals—Rentals must be paid to the proper office of the lessor in advance of each lease year. Annual rental rates per acre or fraction thereof, as applicable, are:
(a) Noncompetitive lease (includes post-sale parcels not receiving bids, a direct use lease or a lease issued to a mining claimant): $1.00 for the first 10 years; thereafter $5.00; or
(b) Competitive lease: $2.00 for the first year; $3.00 for the second through tenth year; thereafter $5.00.
Annual rental is always due by the anniversary date of this lease (43 CFR 3211.13), regardless of whether the lease is in a unit or outside of a unit, the lease is in production or not, or royalties or direct use fees apply to the production.
Rental may only be credited toward royalty under 43 CFR 3211.15 and 30 CFR 218.303. Rental may not be credited against direct use fees. Failure to pay annual rental timely will result in late fees and will make the lease subject to termination in accordance with 43 CFR 3213.14.

Sec. 2. (a) Royalties—Royalties must be paid to the proper office of the lessor. Royalties are due on the last day of the month following the month of production. Royalties will be computed in accordance with applicable regulations and orders. Royalty rates for geothermal resources produced for the commercial generation of electricity but not sold in an arm's length transaction are: 1.75 percent for the first 10 years of production and 3.5 percent after the first 10 years. The royalty rate is to be applied to the gross proceeds derived from the sale of electricity in accordance with 30 CFR part 206 subpart H.
The royalty rate for byproducts derived from geothermal resource production that are minerals specified in section 1 of the Mineral Leasing Act (MLA), as amended (30 U.S.C. 181), is 5 percent, except for sodium compounds, produced between September 29, 2006 and September 29, 2011 (Pub. L. No. 109-338, §102; note to 30 U.S.C. 362) for which the royalty rate is 2 percent. No royalty is due on byproducts that are not specified in 30 U.S.C. § 181. (43 CFR 3211.19.)
If this lease or a portion thereof is committed to an approved communitization or unit agreement and the agreement contains a provision for allocation of production, royalties must be paid on the production allocated to this lease.
(b) Arm's length transactions—The royalty rate for geothermal resources sold by you or your affiliate at arm's length to a purchaser is 10 percent of the gross proceeds derived from the arm's-length sale (43 CFR 3211.17, 3211.18).
(c) Advanced royalties—In the absence of a suspension, if you cease production for more than one calendar month on a lease that is subject to royalties and that has achieved commercial production, your lease will remain in effect only if you make advanced royalty payments in accordance with 43 CFR 3212.15(a) and 30 CFR 218.305.
(d) Direct use fees—Direct use fees must be paid in lieu of royalties for geothermal resources that are utilized for commercial, residential, agricultural, or other energy needs other than the commercial production or generation of electricity, but not sold in an arm's length transaction (43 CFR 3211.18; 30 CFR 206.356). This requirement applies to any direct use of federal geothermal resources (unless the resource is exempted as described in 30 CFR 202.351(b) or the lessee is covered by paragraph (e), below) and is not limited to direct use leases. Direct use fees are due on the last day of the month following the month of production.
(e) If the lessee is a State, tribal, or local government covered by 43 CFR 3211.18(a)(3) and 30 CFR 206.366, check here: ❑. A lessee under this paragraph is not subject to paragraph (d), above. In lieu of royalties, the lessee under this paragraph must pay a nominal fee of
$ ______________________________.

Sec. 3. Bonds—A bond must be filed and maintained for lease operations as required by applicable regulations.

Sec. 4. Work requirements, rate of development, unitization, and drainage--Lessee must perform work requirements in accordance with applicable regulations (43 CFR 3207.11, 3207.12), and must prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves the right to specify rates of development and production and to require lessee to commit to a communitization or unit agreement, within 30 days of notice, if in the public interest. Lessee must drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in the amount determined by lessor. Lessor will exempt lessee from work requirements only where the lease overlies a mining claim that has an approved plan of operations and where BLM determines that the development of the geothermal resource on the lease would interfere with the mining operation (43 CFR 3207.13).

Sec. 5. Documents, evidence, and inspection—Lessee must file with the proper office of the lessor, not later than (30) days after the effective date thereof, any contract or evidence of other arrangement for the sale, use, or disposal of geothermal resources, byproducts produced, or for the sale of electricity generated using geothermal resources produced from the lease. At such times and in such form as lessor may prescribe, lessee must furnish detailed statements and all documents showing (a) amounts and quality of all geothermal resources produced and used (either for commercial production or generation of electricity, or in a direct use operation) or sold; (b) proceeds derived therefrom or from the sale of electricity generated using such resources; (c) amounts that are unavoidably lost or reinjected before use, used to generate plant parasitic electricity (as defined in 30 CFR 206.351) or electricity for lease operations, or otherwise used for lease operations related to the commercial production or generation of electricity; and (d) amounts and quality of all byproducts produced and proceeds derived from the sale or disposition thereof. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest.
In a format and manner approved by lessor, lessee must: keep a daily drilling record, a log, and complete information on well surveys and tests; keep a record of subsurface investigations; and furnish copies to lessor when required.
Lessee must keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee must maintain copies of all contracts, sales agreements, accounting records, billing records, invoices, gross proceeds and payment data regarding the sale, disposition, or use of geothermal resources, byproducts produced, and the sale of electricity generated using resources produced from the lease, and all other information relevant to determining royalties or direct use fees. All such records must be maintained in lessee's accounting offices for future audit by lessor and produced upon request by lessor or lessor's authorized representative or agent. Lessee must maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

Sec. 6. Conduct of operations—Lessee must conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee must take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses will be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee. Prior to disturbing the surface of the leased lands, lessee must contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessor may require lessee to complete minor inventories or short term special studies under guidelines provided by lessor. If, in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee must immediately contact lessor. Lessee must cease any operations that are likely to affect or take such species, or result in the modification, damage or destruction of such habitats or objects.

Sec. 7. Production of byproducts—If the production, use, or conversion of geothermal resources from these leased lands is susceptible of producing a valuable byproduct or byproducts, including commercially demineralized water for beneficial uses in accordance with applicable State water laws, lessor may require substantial beneficial production or use thereof by lessee.

Sec. 8. Damages to property—Lessee must pay lessor for damage to lessor's improvements, and must save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 9. Protection of diverse interests and equal opportunity—Lessee must maintain a safe working environment in accordance with applicable regulations and standard industry practices, and take measures necessary to protect public health and safety. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. Lessee must comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor may maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee must file with lessor any assignment or other transfer of an interest in this lease. Subject to the requirements of 43 CFR subpart 3213, lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which will be effective as of the date BLM receives it, subject to the continued obligation of the lessee and surety to be responsible for: paying all accrued rentals and royalties; plugging and abandoning all wells on the relinquished land; restoring and reclaiming the surface and other resources; and complying with 43 CFR 3200.4.

Sec. 11. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee must place all wells in condition for suspension or abandonment, reclaim the land as specified by lessor, and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells or continued protection of the environment.

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease or other applicable requirements under 43 CFR 3200.4, and the noncompliance continues for 30 days after written notice thereof, this lease will be subject to termination in accordance with the Act and 43 CFR 3213. This provision will not be construed to prevent the exercise by lessor of any other legal and equitable remedy or action, including waiver of the default. Any such remedy, waiver, or action will not prevent later termination for the same default occurring at any other time. Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or other applicable requirements under 43 CFR 3200.4, and immediate action is required, the lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the lessee's expense.

Sec. 13. Heirs and successors-in-interest—Each obligation of this lease will extend to and be binding upon, and every benefit hereof will inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

(Continued on page 3)

INSTRUCTIONS

A. General

1. Items 1 and 2 need to be completed only by parties filing for a noncompetitive lease. The BLM will complete the front of the form for other types of leases. The BLM may use the “Comments” space under Item 3 to identify when: the lessee has elected to make all lease terms subject to the Energy Policy Act of 2005 under 43 CFR 3200.7(a)(2) or 43 CFR 3200.8(b) (box labeled “converted lease” must also be checked); the lease is being issued noncompetitively to a party who holds a mining claim on the same lands as is covered by the lease under 43 CFR 3204.12; the lease is a direct use lease issued to a State, local, or tribal government (box at section 2(e) under Lease Terms must also be checked); the lease is a competitive lease with direct-use-only stipulations attached; or other special circumstances exist. A lessee who seeks to convert only the royalty rate of a lease under 43 CFR 3212.25 or who qualifies for a case-by-case royalty rate determination under 43 CFR 3211.17(b)(1)(i) should not use this form, but should instead use an addendum to the existing lease.

2. Entries must be typed or printed plainly in ink. The offeror must sign the form (Item 4) in ink.

3. An original and two copies of this offer must be prepared and filed in the proper BLM State Office. See regulations at 43 CFR 1821.10 for office locations.

4. If more space is needed, additional sheets must be attached to each copy of the form submitted.

B. Specific

Item 1—Enter the offeror’s name and billing address.

Item 2—Indicate the agency managing the surface use of the land and the name of the unit or project of which the land is a part. The offeror may also provide other information that will assist in establishing status of the lands. The description of land must conform to 43 CFR 3203.10. Total acres applied for must not exceed that allowed by regulations (43 CFR 3203.10; 43 CFR 3206.12).

Payments: For noncompetitive leases, the amount remitted must include the processing fee for noncompetitive lease applications (43 CFR 3204.10; 43 CFR 3000.12) and the first year’s rental at the rate of $1 per acre or fraction thereof. If the United States owns only a fractional interest in the geothermal resources, you must pay a prorated rental under 43 CFR 3211.11(d). The BLM will retain the processing fee even if the offer is completely rejected or withdrawn. To maintain the offeror’s priority, the offeror must submit rental sufficient to cover all the land requested. If the land requested includes lots or irregular quarter-quarter sections, the exact acreage of which is not known to the offeror, rental should be submitted on the assumption that each such lot or quarter-quarter section contains 40 acres. If the offer is withdrawn or rejected in whole or in part before a lease issues, the BLM will return the rental remitted for the parts withdrawn or rejected.

The BLM will fill in the processing fee for competitive lease applications (43 CFR 3203.17; 43 CFR 3000.12) and the first year’s rental at the rate of $2 per acre or fraction thereof.

Item 3—The BLM will complete this space.

NOTICES

The Privacy Act of 1974 and the regulation at 43 CFR 2.48(d) provide that you be furnished with the following information in connection with information required by this geothermal lease application.
AUTHORITY: 30 U.S.C. 1000 et seq.
PRINCIPAL PURPOSE—The information is to be used to process geothermal lease applications.
ROUTINE USES: (1) The adjudication of the lessee’s rights to the land or resources. (2) Documentation for public information in support of notations made on land status records for the management, disposal, and use of public lands and resources. (3) Transfer to appropriate Federal agencies when concurrence is required prior to granting uses or rights in public lands or resources. (4) Transfer to the appropriate Federal, State, local, or foreign agencies, when relevant to civil, criminal, or regulatory investigations or prosecutions.

APPENDIX B

Reasonable and Foreseeable Development

Scenario

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Appendix B

Reasonable and Foreseeable Development Scenario Haiwee Geothermal Leasing Area

November 18, 2009

Introduction

This Reasonable Foreseeable Development (RFD) scenario has been prepared as a basis for analyzing environmental impacts resulting from future leasing and development of federal geothermal resources within the Haiwee Geothermal Leasing Area (HGLA). As the name implies, the level and type of development anticipated in this RFD is a “best guess” of what may occur if these areas are leased. It is not intended to be a “maximum-development” scenario; however it is biased towards the higher end of expected development.

The foreseeable development described here could occur on any land within the HGLA (24,000 acres), regardless of surface or mineral ownership.

The anticipated total surface disturbance for the area is summarized below:

Region	BLM Disturbance (acres)	Total Disturbance (acres)
Haiwee Geothermal Leasing Area	353 (initial) 254 (final)	384 (initial) 276 (final)

Available Data and Assumptions

The HGLA encompasses about 38 sections, or approximately 24,000 acres. Of this, nearly all the land is BLM surface and subsurface. Of the 24,000 acre leasing area, only about 2,000 acres are non-federal, for a total federal area of about 22,000 acres. Included in the 22,000 acres of BLM-managed land are three pending lease applications covering about 4,500 acres.

This RFD will discuss total anticipated development for the entire 24,000 acres, and will use a simple ratio of 92% (22,000 acres/24,000 acres) for the anticipated development that could occur on BLM-managed land.

There are no direct data on which to base this RFD. There are no known temperature gradient wells in the immediate vicinity, nor have there been any deep exploration wells drilled in the area to date. Therefore, the basis of this RFD will be the proximity of the area to the Coso geothermal field, a field that currently produces approximately 2,00 MW (net) of electricity from a total of nine 30 megawatt (MW) geothermal turbine/generators.

The Coso field is located in an area of widespread ancient volcanic activity. This volcanic activity resulted from magma being intruded to unusually shallow depths, thereby providing a heat source for the geothermal field. The HGLA appears to be in the same general geologic regime.

The distance between the Coso geothermal field and the HGLA is about 10 to 15 miles. Proximity to a known producing geothermal field has little to do with the ultimate productivity of an area. However, from a geologic standpoint, there is a relatively high likelihood that some of the volcanic activity and fracturing in the Coso geothermal field may exist in the HGLA as well.

For the purpose of this RFD, it will be assumed that two 30 MW powerplants will be constructed and that the powerplants will have a useful life of 30 years. It will also be assumed that the productive areas will be less prolific than in the Coso geothermal field and will require more wells per MW than in the Coso geothermal field.

Potential Impacts

Exploration

Because there has not been any actual drilling in the leasing area, it will be assumed that some level of exploration will occur prior to full-field development. Exploration will include geophysical exploration such as seismic testing and the drilling of up to 20 temperature gradient wells.

Seismic testing can be either passive, to detect naturally-occurring events, or induced which would use small charges to create seismic reflections. Seismic testing typically requires the drilling of very shallow holes (less than 100 feet) for the placement of explosives or seismic monitoring devices. It will be assumed that the total surface disturbance relating to seismic testing will be two acres.

Temperature gradient wells are small diameter holes that cannot, by definition, penetrate a geothermal resource. The purpose of these wells is to identify areas that have the greatest amount of heat flow, which would be the most probable targets for production wells. It will be assumed that the total surface disturbance for each temperature gradient well is three acres, including the drilling location and the access road. It is likely that some of the drilling locations used for the temperature gradient wells will also be used for production wells. However, for the purpose of this RFD, it will be assumed that they will remain separate disturbances.

The total surface disturbance anticipated for exploration is 62 acres. It is anticipated that this will be a temporary impact as the 20 temperature gradient wells will be plugged and abandoned, and the 20 exploration well sites, along with the two acres disturbed by with seismic testing, will be reclaimed.

<u>*New wells*</u>

Surface Disturbance

To support 30 MW of net geothermal generation, a total of 15 production wells and seven injection wells will need to be drilled over the course of the estimated 30 year useful life of each powerplant. This includes both wells drilled initially, estimated to be nine production wells and three injection wells, and makeup or replacement wells, estimated to be six production wells and four injection wells, that will need to be drilled over the 30 year period to maintain the 30 MW of net production. It is anticipated that one new well will be drilled every three years. The wells would be located on up to five new well pads, with each pad large enough to accommodate the drilling of up to five wells. All wells on BLM-managed land will be permitted by BLM using standard review methods that ensure: 1) protection of ground water; 2) protection of public safety; and 3) that the environment is not unnecessarily or unduly damaged.

Each well is anticipated to be from 6,000 to 15,000 feet deep. However, these depths should not be considered a limiting factor when permitting because there is no strong correlation between depth and environmental impacts. In other words, an 18,000 foot well could be drilled with only slightly more impacts than a 15,000 foot well. The difference in impacts is within the high development bias of this RFD.

Because the resource is expected to be relatively deep, directional drilling would be practical and would result in drilling locations that could accommodate multiple wells. It will be assumed that at least five wells could be drilled from each well location. The assumption of five wells per location should not be considered a limiting factor in this RFD because additional wells could be drilled from an existing location with few additional impacts.

Each well pad will require approximately seven acres including cut and fill. As the topography is quite steep in parts of the HGLA, cut and fill could be significant.

Given the rugged topography, each well pad will need three miles of 30-foot wide access road and one mile of pipeline. It will be assumed that half the pipelines will follow the access roads in flatter areas, thereby adding 30 feet to the total width. It will also be assumed that the other half of the pipelines will be built in rugged areas and will go “cross country”. These pipelines will require 100 feet of disturbance initially but after construction, only a 30 foot access road will remain.

Total foreseeable surface disturbance for new well pads, roads, and pipeline corridors associated with the wellfield for *each* 30 MW powerplant is summarized below:

Description	Unit Surface Disturbance (acres)	Number	Total Surface Disturbance (acres)
Well pads	7	5	35
Access roads	3.6 acres/mi	15 miles	54
Flat-land Pipelines	1.2 acres/mi	2.5 miles	3
Rugged-land Pipelines (initial)	3.6 acres/mi	2.5 miles	9
Rugged-land Pipelines (final)	1.8 acres/mi	2.5 miles	5
Total Disturbed Acres - Wellfield			101 acres (initial) 97 acres (final)

Considering the surface disturbance from two wellfields to supply geothermal resources to the two 30 MW powerplants, the initial ***total*** surface disturbance would be 202 acres (101 acres x 2) and then about 194 acres (97 acres x 2) after reclamation.

Noise

Each well is expected to take between 90 and 150 days to drill. During this time, high levels of noise will be generated by the diesel engines that power the drilling rig and air compressors/mud pumps, as well as from the drawworks, drawworks brake, racking of pipe, and well testing. The racking of pipe and drawworks brake are higher pitched noises that typically travel further and are more difficult to mitigate than sources such as diesel engines. All diesel engines will use mufflers per standard industry practice. All well testing will be done through mufflers to reduce noise. Up to three drilling rigs could be in operation simultaneously and drilling is expected to take place 24 hours a day, seven days per week.

Air Quality

Diesel engine exhaust, well testing, and dust are the primary impacts to air quality from the drilling of wells. Vented steam during a well test can contain significant amounts of dust, hydrogen sulfide, and other non-condensable gases. Hydrogen sulfide emissions are abated through the injection of hydrogen peroxide and sodium hydroxide into the test line. Dust emissions from well testing are reduced by injecting water into the test line. Dust emissions from roads can be mitigated by periodic watering.

Ground Water

It is unknown whether there are Underground Sources of Drinking Water in the HGLA, but given the geology, significant ground water sources are unlikely. If ground water does occur, geothermal wells include multiple casing strings at shallow depths where aquifers are most likely to exist. For a 9,000 foot well, surface casing is normally set between 300 and 1,000 feet, an intermediate string is set at 2,000 to 4,000 feet, and a production string is set to 4,000 to 6,000 feet. All casing is cemented in place using standard industry practice. In addition, all injection wells are required to be periodically tested for mechanical integrity. The testing protocol will depend on the nature of any aquifers and the type of resource encountered

Powerplants

Surface Disturbance

Based on the type of reservoir encountered at the Coso geothermal field, it is anticipated that two dual flash powerplant locations will be built to utilize the hot water and steam from the leases in the HGLA. Each powerplant will be capable of generating 30 MW (net) of electricity.

In a dual flash powerplant, hot water from the wells is first sent to a high pressure separator where the pressure is reduced, thereby causing some of the hot water to flash to steam. The steam is sent to a high pressure turbine. The hot water that is not flashed to steam is then sent to a low pressure separator where the pressure is once again reduced and some of the hot water flashes into low pressure steam. The low pressure steam is sent to a low pressure turbine. Whatever hot water is not flashed into steam is sent to an injection well. Typically, this process only flashes 20% to 30% of the hot water into steam, on a mass basis.

After leaving the turbine, both the high and low pressure steam are condensed into water and then sent to a cooling tower for further temperature reduction. The cool water is circulated through the condenser to increase plant efficiency. Water that is not evaporated in the cooling process or used in the condenser loop is also sent to an injection well.

Each plant location would require about 20 acres, which would be 25 acres of total surface disturbance including cut and fill. Each plant would also require three miles of access road and four miles of new transmission line to intertie with an existing transmission line that runs through the southwest portion of the HGLA. It is assumed that the access road will require 30 feet of surface disturbance, which includes cut and fill. Transmission intertie lines require 100 feet of initial surface disturbance; however, once the lines are constructed all but a 20foot access road would be reclaimed with native vegetation.

The total surface disturbance for both powerplants is summarized in the following table:

Description	Unit Surface Disturbance (acres)	Number	Total Surface Disturbance (acres)
Powerplant location	25 acres/powerplant	2 powerplants	50
Access roads	3.6 ac/mi	6 miles	22
Transmission lines - initial	12.1 ac/mi	4 miles	48
Transmission lines - final	2.4 acres/mi	4 miles	10
Total Disturbed Acres - Powerplants			120 (initial) 82 (final)

Noise

Powerplant noise usually entails a constant low-level hum primarily created by the cooling tower fans.

Air Quality

A dual flash plant will discharge any non-condensable gases that are produced with the steam including carbon dioxide, methane, ammonia, and hydrogen sulfide. However, local air quality districts typically have strict limits on hydrogen sulfide emissions. To mitigate hydrogen sulfide emissions, the hydrogen sulfide gases are scrubbed from the steam using a “Stretford”, iron kealate, or burner process.

Visual

Powerplants will be sited using terrain to obstruct visual impacts to the extent possible. All facilities will also be painted a color that blends into the natural setting. Steam plumes from the cooling towers, may rise several hundred feet above the cooling towers on cold, clear days, but may be absent on warm, dry days, especially in summer.

Seismic impacts

Development at The Geysers geothermal field has resulted in the creation of micro-seismic events that seem to be tied to production and/or injection. This has been a cause for concern in the development of other geothermal fields as well. The Geysers is a unique dry-steam resource that is only found in two or three other places in the world. Induced seismicity is not typical to geothermal development. The induced seismicity experienced at The Geysers is less than magnitude 3.0 on the Richter scale. While larger earthquakes do occur within The Geysers, there is little evidence that these are tied to geothermal activity. More likely, the larger events are related to naturally-occurring movement along the many faults in the area.

Environmental analysis done at The Geysers has concluded that while micro-seismic events are a result of geothermal activity, these events are not large enough to cause structural damage to homes or other improvements. Therefore, this has not been considered a significant impact.

APPENDIX C

Rose Valley Groundwater Chemistry

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APPENDIX C

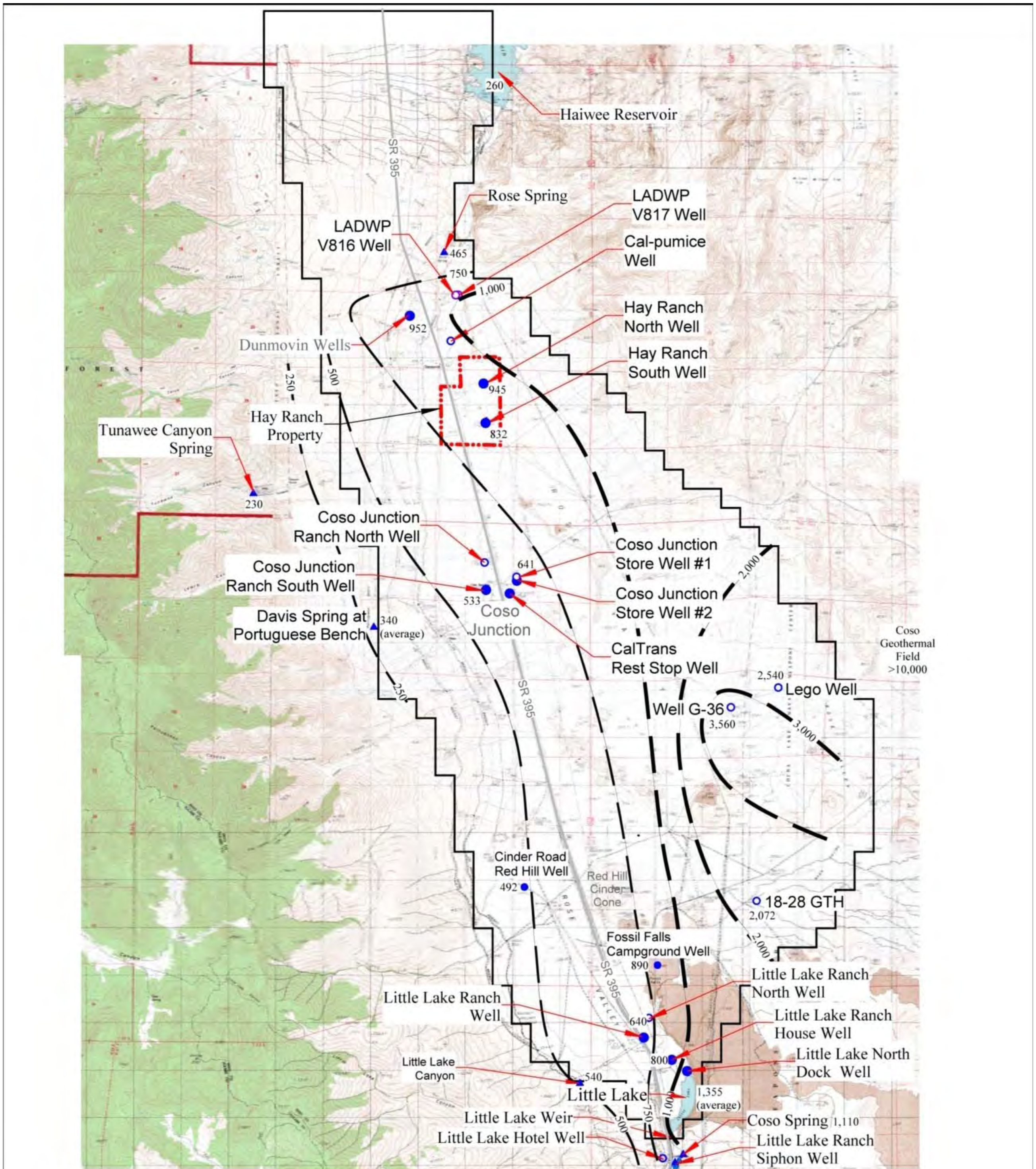
Rose Valley Groundwater Chemistry

This section discusses the chemistry of the waters found in the vicinity of the Haiwee Geothermal Leasing Area (HGLA). Particular focus is given to identifying water types and distinguishing the sources of various waters as well as the relationship between a variety of waters identified in the area.

The chemistry of waters found in Rose Valley and the related watershed varies widely reflecting the multiple types of waters within the hydrological system typical of the semi-arid western United States with the addition of a hydrothermal system. Water chemistry is influenced by the interaction between groundwater and rock along the hydrological flow paths with the addition of a geothermal brine component. Recharge waters from drainage of the mountains surrounding Rose Valley have lower dissolved solids than the valley’s groundwater, which typically is higher in dissolved solids reflecting longer transit times and a greater degree of water-rock interaction. Surface waters can be even higher in dissolved solids where it is impacted by evaporation (Güler 2002). Outflow of saline geothermal brines from the Coso geothermal system to the east may also provide a component of flow to the Rose Valley hydrological system.

Total dissolved solids (TDS) range from very low to a few hundred milligrams per liter (mg/L) in surface streams draining the Sierras to the west or in springs of the Coso-Argus Range to the east to several thousand mg/L in geothermal brines in the Coso Geothermal Reservoir to the east and related geothermal surface manifestations. Groundwater in the northern Rose Valley near Hay Ranch is characterized by TDS between 800 and 900 mg/L whereas groundwater in the southern Rose Valley is characterized by TDS from 500 to 700 mg/L. At Little Lake the water is slightly brackish with TDS from 1,500-2,500 mg/L. The TDS levels in the upper several hundred feet throughout the Rose Valley are shown in Figure C-1.

The Coso geothermal system was initially a liquid-dominated system containing sodium chloride brines with a small steam cap in the shallowest parts of the field. The fluids contain non-condensable gases which are primarily carbon dioxide. Where there is steam present, the gases partition into the steam phase. The steam cap has grown during the last 20 years of supplying power generation. Surface manifestations include both brine-fed and steam-fed features. The brine fed features are typically brine-groundwater mixtures while the steam-fed features are mud-pots and fumaroles affected by steam or steam condensate containing acidic gases mixing with surface waters or surface material. The chemistry of the geothermal system will be discussed further in the sections below. While the TDS of the geothermal fluids is distinctly higher than the rest of the area (10,000 mg/L), it is not included in the contours because the connection is not well defined.



SOURCE: Geologica 2008

Figure C-1 Distribution of Total Dissolved Solids in Rose Valley

Hydrochemical Analyses and Water Types

Chemical analysis of water samples collected in the Rose Valley and vicinity indicates that there are several distinct water types. Sierran waters (and minor amounts of water from the Coso Range) recharge the area (Güler 2002, Williams 2004). There also appears to be or to have been a small inflow of subterranean discharge from the Coso Geothermal System which reaches as far as the LEGO well. The chemistry and isotopic signatures of the other types of water suggest that the Rose Valley hydrological system contains waters that have followed different and sometimes complex pathways from their mountain sources to points of discharge.

Güler (2002), and Williams (2004) compiled an extensive database of chemical analyses of waters within the area to evaluate and characterize water quality. They grouped the waters within the area into several water types:

- Sierran: springs and streams that drain the Sierras; calcium (Ca)- (sodium, Na)-bicarbonate (HCO3); average TDS≈200 mg/L
- Indian Wells Rose Valley: springs, streams and shallow groundwater in basins along the eastern side of the Sierra; Na-Ca-HCO3-(sulfate, SO4); average TDS≈700 mg/L
- Coso-Argus Group: surface and spring samples from the Coso and Argus Ranges; Ca-HCO3 - average TDS≈500 mg/L
- Little Lake Group: Samples from Little Lake and surrounding springs; Na-(Mg)-HCO3 -Cl; average TDS≈1,200 mg/L
- Geothermal Brine: from deep (500-3,000 m Coso geothermal reservoir); Na-Cl; TDS≈10,000 mg/L

To these we add two types of waters found at Coso Hot Springs:

- Geothermal steam-fed surface fluid
- Geothermal brine-fed surface fluids

Waters in the vicinity of the program area have also been classified based on the relationship to the point of recharge; the chemistry of water in Basin and Range-type hydrological systems can be explained by increasing degrees of water-rock interaction and chemical evolution. High Sierra recharge waters (Group 1) are Ca-Na-HCO3 water with average TDS of 67 mg/l where as low elevation Sierra and Coso Range waters and basin fill groundwaters (Group 2) are slightly more evolved based on water-rock interaction and are typically Na-Ca-HCO3 water with average TDS of 356 mg/l. The waters in the program area are primarily Group 1 and 2 types, but within the area slightly to the north, there are more concentrated and evolved waters. Group 3 are transitional Na-HCO3-Cl waters typically found on basin floors with an average TDS of 1018 mg/l representing greater evolution. Group 4 are brackish Na-CL waters with average TDS of 5133 mg/l and Group 5 are brines with an average TDS of 94,000 mg/l.

Figure C-2 shows the distribution of these waters in the vicinity of the HGLA. Geothermal waters represent waters with higher degrees of water rock interaction partially influenced by higher temperatures, interaction with different minerals and the influence of magmatic influx. Although they are primarily NaCl brines, they are not included in this classification.

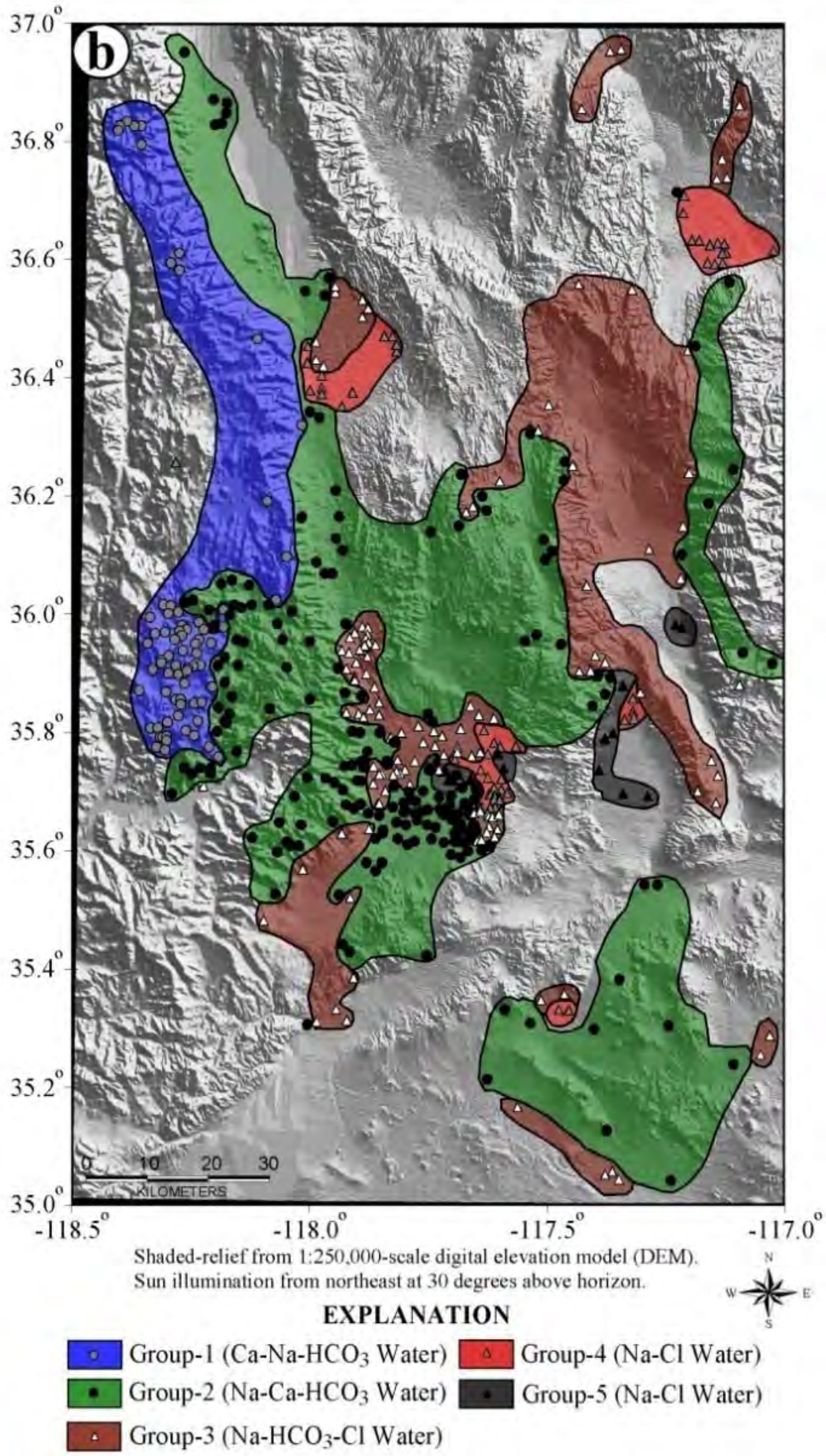


Figure C-2 Water Types in the Vicinity from Gruler (2002)

A review of chemical and isotopic analysis of water samples from Rose Valley and the adjacent mountains suggests that Sierran, Indian Wells-Rose Valley (IWRV), Little Lake (LL), and possibly a component of geothermal brine water types are present in Rose Valley groundwater. Within the IWRV type, Portuguese Bench, Coso Junction, and Hay Ranch waters are clearly distinguished from each other and from Little Lake and geothermal waters, particularly in the conservative element of chloride. Little Lake waters, represented by the LL Ranch House Well, LL (an average of surface waters), and the Coso Spring are clearly distinguished from other Rose Valley groundwaters by higher concentrations of all constituents except Ca and Mg. The only exception is the geothermal-influenced LEGO and 18-28 GTH wells. Williams (2004) suggests that elevated Na relative to Ca, Mg, and Cl, as well as boron (B) and lithium (Li) indicate a geothermal component in Little Lake waters. However, the elevated chloride in Little Lake waters may also be a result of evaporation (concentration) of waters from nearby Sierran recharge from the west (as represented by Little Lake Canyon Spring) combined with groundwater flow down the valley (represented by Little Lake north well water).

Hay Ranch groundwater appears to be a more concentrated version of Haiwee Reservoir water. The dominance of sulfate in waters in the northern part of Rose Valley (Hay Ranch and Dunmovin) distinguishes these waters from the rest of the valley. Although the Hay Ranch wells were drilled deeper than many of the other wells in the valley, the Dunmovin well is not, so depth alone probably does not produce the difference in water chemistry. Concentration of these waters by evaporation would not produce the chemistry of the Little Lake waters, suggesting that other waters must mix with the northern Rose Valley waters as they flow southward towards Little Lake prior to evaporation in the Lake which produces the distinct chemistry of Little Lake water.

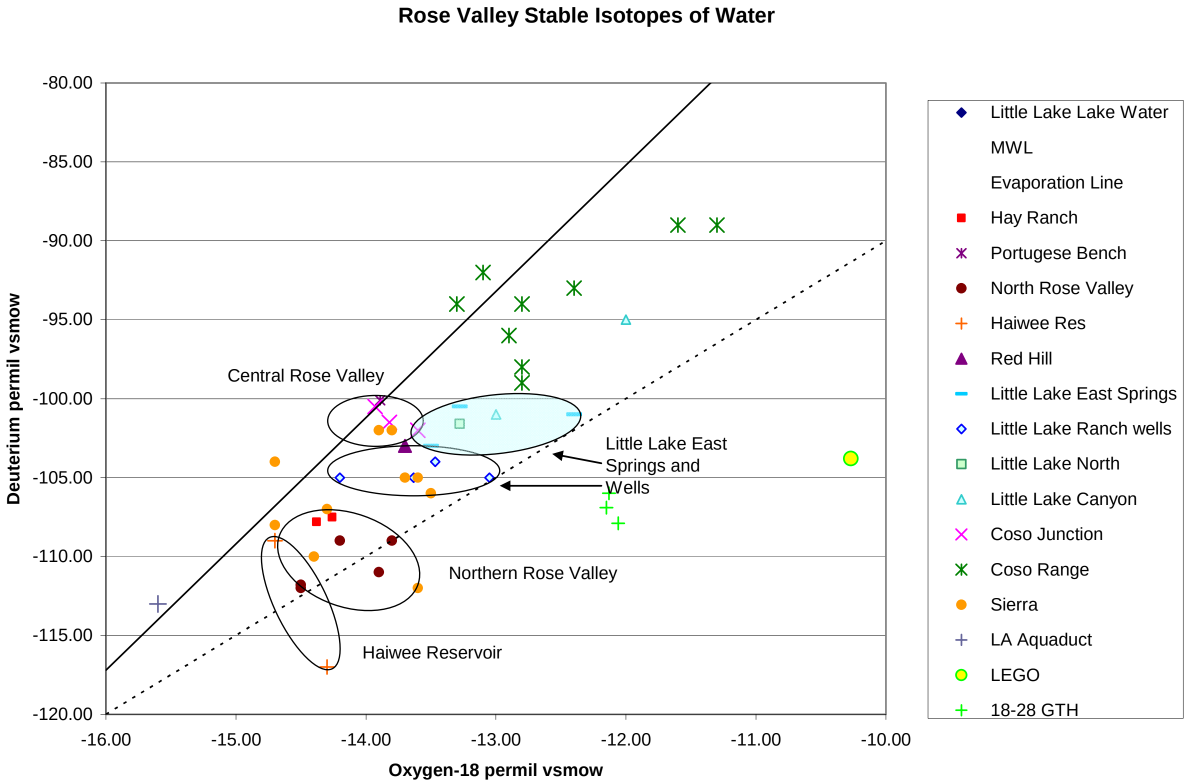
Despite the different chemistries of waters at discharge points within Rose Valley watershed most waters appear to generally have the same origin. Similar boron/chloride ratios (the ratio of two relatively conservative elements) support similar origins. Boron/chloride ratios within the Hay Ranch watershed are similar to water from the Sierras and to the Coso geothermal waters suggesting that although various processes change the absolute concentrations of these conservative elements, the source of the water is likely precipitation in the Sierra and Coso Ranges.

Isotope Data

Stable water isotope (oxygen-18 and deuterium) signatures are commonly used to evaluate the origins of waters. Isotope concentrations of waters from within the Rose Valley and its watershed reflect variable sources as well as evaporation. Stable isotopic data for Rose Valley waters was collected from numerous sources (MHA-RHT 2009) from analysis in many laboratories over many years. Within single data sets variation of oxygen-18 is around $\pm 0.2^{o}/_{oo}$ and deuterium is approximately $1^{o}/_{oo}$, the range of variability around the data presented below is probably greater that these numbers.

Evaporation enriches waters in the heavier stable isotopes making the waters less isotopically negative. At first glance, the stable isotopes of Little Lake waters appear different from all other waters. These differences can be explained by isotopic fractionation which occurs during the evaporation of these shallow lakes (Figure C-3).

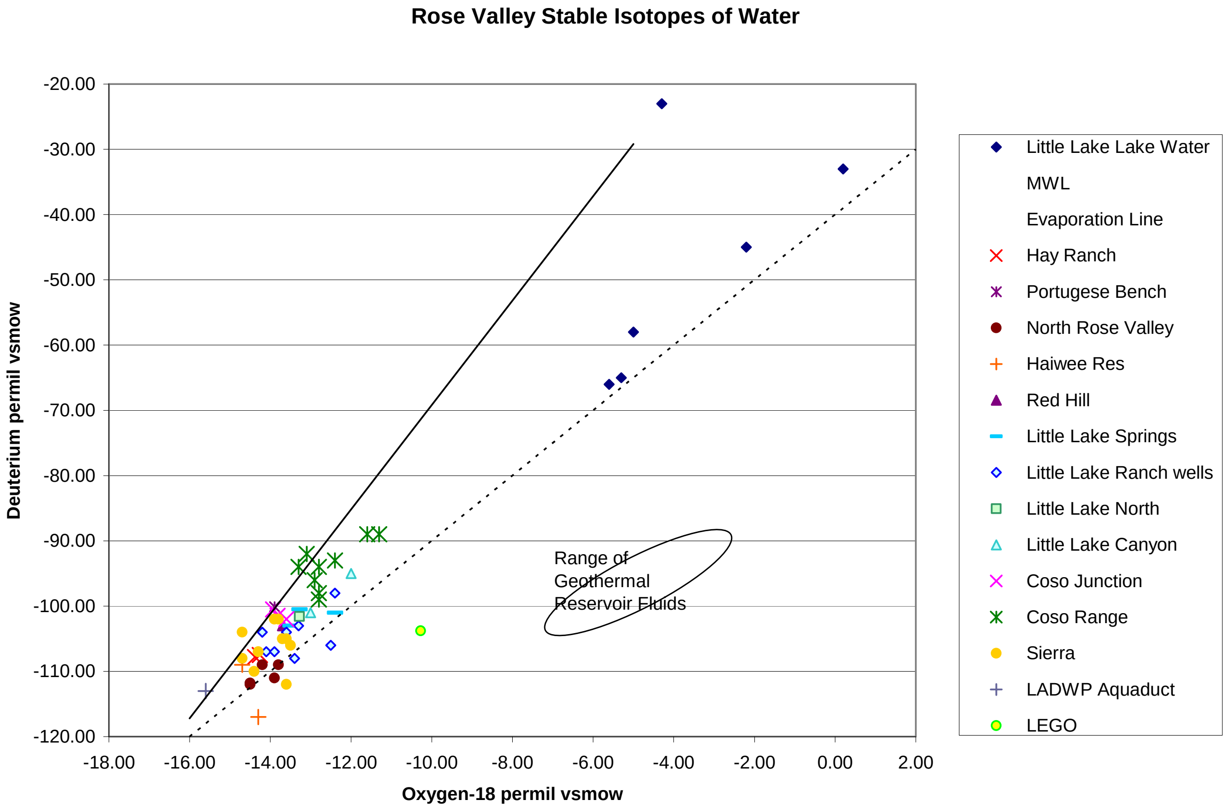
Figure C-3 Stable Isotopes of Rose Valley excluding the lake water from Little Lake



SOURCE: Fournier and Thompson (1980), Guler (2002), Geotrans, (2004), Coso Operating Company (2007), US Navy GPO (2007 and 2008).

Based on stable isotopic composition of groundwater represented by well and spring waters (minimizing the effect of evaporation), sources of groundwater from the northern to the southern end of the valley can be distinguished from each other. These differences may in part reflect differences in recharge from the Sierra, which is isotopically lighter (more negative) to the north as represented by the Los Angeles Department of Water and Power (LADWP) Aqueduct water and Haiwee Reservoir and isotopically heavier (less negative) in the south. The Haiwee reservoir sample may also be influenced by evaporation. The stable isotopic signature of the northern part of the Valley (including Hay Ranch waters) is similar to the Haiwee Reservoir and the highest or more northerly Sierras. Portuguese Bench and Coso Junction waters appear to be similar to each other and isotopically more like the Sierras farther south than Haiwee and more directly west of Rose Valley (Figure C-4). Thus, the isotopic signature of Rose Valley groundwaters suggest that there is recharge from the Sierras all along the north-south axis of the valley, with different isotopic signatures, in addition to some valley underflow from north to south.

Figure C-4 Stable Isotopes of Waters from Rose Valley and Vicinity



SOURCE: Fournier and Thompson (1980), Guler (2002), Geotrans, (2004), Coso Operating Company (2007).

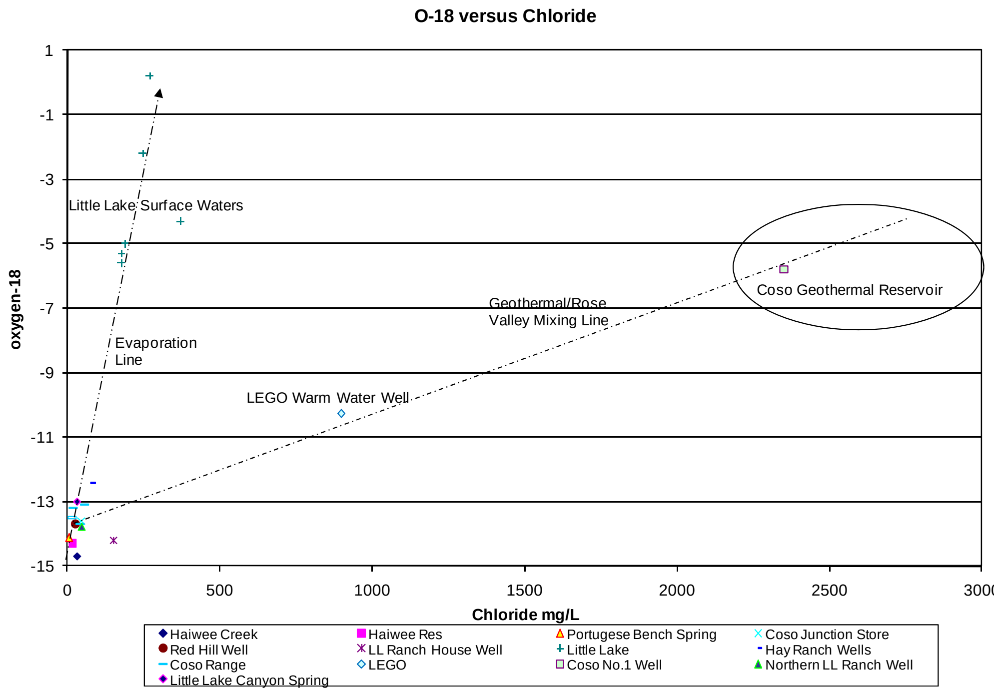
The isotopic signature of groundwater in wells or springs down gradient from Little Lake (i.e., Little Lake East Spring, also known as Coso Spring, and Little Lake Ranch Wells) is probably affected by the isotopic shift related to evaporation of the lake water. Therefore, the Little Lake North Well probably represents un-evaporated recharge to the Lake from groundwater whereas Little Lake Canyon spring may indicate recharge to the Little Lake from the west. The source waters for Little Lake appear to be either:

1) From the Sierran source area similar to Portuguese Bench springs with a longer subsurface pathway (which increases oxygen-18 by water-rock interaction but not deuterium), or
2) Predominantly Portugese Bench type Sierra water and a small amount of geothermal water (or geothermal mixed water), or
3) Predominantly Portuguese Bench type Sierra water and a small amount of Rose Valley underflow from the north.

If the major source of Little Lake water was directly from the Hay Ranch area via subsurface groundwater flow, significant evaporation would have to occur prior to arriving at Little Lake which is unlikely. In addition groundwater flow within the Rose Valley would have a major diversion around Coso Junction. While the chloride concentrations in Little Lake water could be produced by mixing a component of the geothermal water from the east, the combination of isotopic signature and chloride concentrations in Little Lake are most likely generated by evaporating water similar to that observed in the Little Lake

North Well or in the Little Lake Canyon Spring to the west or a combination of the two (Figure C-5). In either case, water isotopes suggest the water sources for the Little Lake area are predominantly from the local Sierran watershed to the west and are distinct from the Northern Rose Valley water chemistries, potentially indicating more recharge to the Little Lake area from the west than from the north. Slight displacement towards a lighter isotopic signature from the area around Portuguese Bench may reflect a slight influence of groundwater underflow from north to south through Rose Valley.

Figure C-5 Oxygen-18 versus Chloride Relationships in Waters around Rose Valley



Water Potability

Drinking water quality (potability) of waters within the Rose Valley ranges from excellent to marginal. Available data (MHA-RMT, 2009) indicate that Hay Ranch waters exceed primary drinking water standards (EPA, 2003) for arsenic, nitrate and nitrite. Secondary drinking water standards are primarily related to aesthetics and taste. Several waters exceed the secondary drinking water standard levels for TDS and sulfate. Recent analysis of water samples from the Hay Ranch wells indicates the water does not meet secondary drinking water standards for TDS, sulfate, iron and manganese.

APPENDIX D

Sensitive Wildlife Species

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Appendix D

Table D-1 Sensitive Wildlife Species with Potential to Occur within the Haiwee Action Area

Scientific Name	Species	Listing Status: FEDERAL	Listing Status: STATE	Listing Status: OTHER	Habitat Requirements	Potential for Occurrence
Birds						
Accipiter gentilis	Northern Goshawk	BLM Sensitive		DFG SC	Within, and in the vicinity of, coniferous forest. Uses old nests and maintains alternate sites. Usually nests on north slopes, near water; red fir, lodgepole pine, Jeffrey pine, and aspens are typical nest trees.	**Low.** Small area with potential habitat. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Aquila chrysaetos	Golden Eagle			DFG FG, USFWS BCC	Species occur in open habitats, especially in the mountains and hills, where it can spot prey from the air. They nest atop tall trees or high on rocky cliffs. Golden Eagles are uncommon year-round residents in Inyo County.	**High.** Small area with potential habitat. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Asio otus	Long-eared owl			DFG SSC	Long-eared Owls inhabit open woodlands, forest edges, riparian strips along rivers, hedgerows, juniper thickets, woodlots, and wooded ravines and gullies.. Roosting sites are usually in the heaviest forest cover available	**Low.** Small area with potential habitat. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Athene cunicularia	Burrowing Owl	BLM Sensitive		DFG SC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Uses rodent burrows in sparse grassland, desert, and agricultural habitats.	**High.** Suitable open habitat is found sporadically throughout the action area, especially in the open disturbed areas and grasslands. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Buteo swainsonii	Swainson's Hawk		ST		Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, agricultural areas, and ranches. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**Moderate.** Small area with potential habitat. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Falco peregrinus	Peregrine falcon	Delisted	SE		Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds, and man-made structures. Nest consists of a scrape on a depression or a ledge in an open site.	**Moderate.** Small patches of potential habitat found in western portion of the action area. It is determined that development in the action area may affect, but is not likely to adversely affect, this species,
Haliaeetus leucocephalus	Bald Eagle	Delisted	ST		Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests are within one mile of water. Nests in large, old-growth or dominant live trees with open branches, especially Ponderosa pine. Roosts communally in winter.	**Low.** Insufficient open aquatic habitat within the action area. It is determined that development in the action area will not affect this species.
	Loggerhead Shrike			DFG SSC, USFWS BCC	The Loggerhead Shrike occupies open country with lookout perches, woodlands, open scrub, and the margins of dry grasslands. It is a fairly common year-round resident in Inyo County.	**Moderate.** Loggerhead Shrikes are expected to occur and nest in low numbers throughout the action area, especially near the transmission line corridors, where they can perch high above the

Table D-1 Sensitive Wildlife Species with Potential to Occur within the Haiwee Action Area

Scientific Name	Species	Listing Status: FEDERAL	Listing Status: STATE	Listing Status: OTHER	Habitat Requirements	Potential for Occurrence
						habitat to search for prey. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Toxostoma lecontei	Le Conte's Thrasher	BLM Sensitive		DFG SSC, USFWS BCC	Inhabit low, hot, barren deserts and valleys, usually in regions of scant vegetation where the bird's light color blends with the sandy gravel environment. In Inyo County Le Conte's Thrashers are uncommon, year-round residents.	**Low**. They are expected to occur and nest infrequently and in low numbers throughout the action area.
Mammals						
Antrozous pallidus	Pallid Bat	BLM Sensitive, FSC		DFG SSC, WBWG: H	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. This species is very sensitive to disturbance of roosting sites.	**High**. Potential foraging habitat in action area, but very limited rocky roosting habitat.
Corynorhinus tonwsendii	Townsend's Big-Eared Bat	BLM Sensitive, FSC		DFG SSC, WBWG: H	Occurs throughout California in a variety of habitats, but most common in mesic sites. Roosts in the open, hanging from walls or ceilings. Very sensitive to human disturbance.	**High.** Known sightings in the vicinity of the action area. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Lasionycteris noctivagans	silver-haired bat			WBWG: H	Silver-haired bats are among the most common bats in forested areas of the United States. They are considered to be a solitary, tree-roosting species	**High.** Known sightings in the vicinity of the action area. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Lasiurus blossivillii	Western Red Bat			DFG SSC, WBWG: H	Roosts primarily in trees, 2 to 40 feet off the ground. Occurs from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below, with open areas for foraging.	**High.** Known sightings in the vicinity of the action area. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Spermophilus mohavensis	Mohave Ground Squirrel				Open desert scrub, alkali scrub and Joshua tree woodland. Also feeds in annual grasslands, restricted to Mojave desert. Prefers sandy to gravelly soils, avoids rocky areas, uses burrows at base of shrubs for cover. Nests are in burrows.	**Present.** Known sightings in the vicinity of the action area. It is determined that development in the action area may adversely affect this species.
	American Badger	ST		DFG SSC	It is most abundant in drier, open sites with friable soils in most shrub, forest, and herbaceous habitats. Badgers dig burrows for shelter and for natal dens.	**High.** Species is expected to occur and previous surveys have documented the species sign (i.e., dens, scat) within the action area. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
Vulpes macrotis arsipus	Desert Kit Fox			Ca Fur-bearing Mammal		**High.** Species is expected to occur and previous surveys have documented the species sign (i.e., dens, scat) within the action area. Multiple

Table D-1 Sensitive Wildlife Species with Potential to Occur within the Haiwee Action Area

Scientific Name	Species	Listing Status FEDERAL	STATE	OTHER	Habitat Requirements	Potential for Occurrence
						habitats including desert scrub, saltbush, chaparral, and grassland.
Reptiles						
Gopherus agassizii	Desert Tortoise	FT	ST		Most common in desert scrub, desert wash and Joshua Tree habitats; occurs in almost every desert habitat. Requires friable soil for burrow and nest construction creosote bush habitat with annual wildflower blooms.	**Present.** Occurrence records exist for the species in the vicinity of the action area and suitable habitat exists. Additionally, known range of the desert tortoise includes Indian Wells Valley and Rose Valley (BLM 2005). Surveys conducted in 2009 found desert tortoises or their sign in low densities throughout these areas (Laberteaux 2009). It is determined that development in the action area may affect, but is not likely to adversely affect, this species.
	Northern sagebrush lizard	BLM Sensitive		DFG SSC	Occurs in the Great Basin and mountainous areas, inhabiting montane chaparral, hardwood and conifer habitats, eastside pine and juniper habitats, and Great Basin shrub habitats of the Sierra Nevada and the Cascades. Isolated populations occur at Sutter Buttes in the Sacramento Valley, in the Coast Range, and in the desert mountains of Inyo County.	**High.** Known sightings in the vicinity of the action area. It is determined that development in the action area may affect, but is not likely to adversely affect, this species.

Status Codes
FE Federally listed as Endangered
FT Federally listed as Threatened
FPE Federally proposed for listing as Endangered
FPT Federally proposed for listing as Threatened
FPD Federally proposed for delisting
FC Federal candidate species (former Category 1 candidates)
FSC Species of Concern
SE State-listed as Endangered

Status Codes
ST State-listed as Threatened
SCE State candidate for listing as Endangered
SCT State candidate for listing as Threatened
SCD State candidate for delisting
BLM Sensitive
DFG SC: Department of Fish and Game Species of Concern
DFG FP: Department of Fish and Game Fully Protected Species
USFWS BCC: Fish and Wildlife Service Birds of Conservation Concern
WSBG:H The Western Bat Working Group Species designated as “High Priority

Potential for Occurrence (PFO)
Absent from Site – Species is restricted to habitats that do not occur within the action area.
Low Potential for Occurrence – No historical records exits of the species occurring within the action area or its immediate vicinity, and/or the habitats needed to support the species on the site are of poor quality.
Moderate Potential for Occurrence –Either a historical record exists of the species within the immediate vicinity of the action area and/or the habitat requirements associated with the species occur within the action area
High Potential for Occurrence – Both a historical record exists of the species within the action area or its immediate vicinity and the habitat requirements strongly associated with the species occur within the action area.
Species Present – The species is known to occur.

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APPENDIX E

Demographics

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Appendix E

Table E-1 Race and Ethnicity Composition in Counties and CCDs of the Haiwee Geothermal Leasing Area SSA (2000 Census)

	Total	White alone	% of total	African American alone	% of total	American Indian and Alaska Native alone	% of total	Asian alone	% of total	Hawaiian and Other Pacific Islander alone	% of total	Some other race alone	% of total	Population of two or more races:	% of total	Hispanic or Latino	% of total
California			**59.5%**		**6.7%**		**1.0%**		**10.9%**		**0.3%**		**16.8%**			**10,966,556**	**32.4%**
Inyo County	17,945	14,367	80.1%	29	0.2%	1,802	10.0%	163	0.9%	15	0.1%	825	4.6%	744	4.1%	2,257	12.6%
Independence CCD	2,612	1,952	74.7%	6	0.2%	419	16.0%	12	0.5%	5	0.2%	76	2.9%	142	5.4%	215	8.2%
Lone Pine CCD	2,479	1,973	79.6%	2	0.1%	183	7.4%	21	0.8%	1	0.0%	181	7.3%	118	4.8%	587	23.7%
Kern County, California	661,645	407,581	61.6%	39,798	6.0%	9,999	1.5%	22,268	3.4%	972	0.1%	153,610	23.2%	27,417	4.1%	254,036	38.4%
East Kern CCD	69,614	53,884	77.4%	3,995	5.7%	925	1.3%	2,251	3.2%	268	0.4%	5,050	7.3%	3,241	4.7%	10,995	15.8%
San Bernardino County	1,709,434	1,006,960	58.9%	155,348	9.1%	19,915	1.2%	80,217	4.7%	5,110	0.3%	355,843	20.8%	86,041	5.0%	669,387	39.2%
Red Mountain-Trona CCD	2,293	1,994	87.0%	34	1.5%	52	2.3%	14	0.6%	9	0.4%	106	4.6%	84	3.7%	323	14.1%
Three-County Region	2,389,024	1,428,908	59.8%	195,175	8.2%	31,716	1.3%	102,648	4.3%	6,097	0.3%	510,278	21.4%	114,202	4.8%	925,680	38.7%
CCDs in Study Area	**76,998**	**59,803**	**77.7%**	**4,037**	**5.2%**	**1,579**	**2.1%**	**2,298**	**3.0%**	**283**	**0.4%**	**5,413**	**7.0%**	**3,585**	**4.7%**	**12,120**	**15.7%**

Source: United States Department of Commerce (2000a).

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Table E-2 Age and Gender Composition in the Counties and CCDs of the Haiwee Geothermal Leasing Area SSA (2000 Census).

	Total:	Male	Under 5 years	Under 18 years	18 to 64 years	65+	Median Age	Female:	Under 5 years	Under 18 years	18 to 64 years	65+	Median Age
Inyo County	17,945	9,254	493	2,226	5,050	1,485	42.2	9,184	468	1,682	5,090	1,944	43.6
Lone Pine CCD	2,479	1,287	83	303	686	215	42.8	1,275	68	244	691	272	43
Independence CCD	2,612	1,312	64	286	706	256	43.8	1,364	64	237	735	328	45.8
Kern County	661,645	367,927	28,545	108,449	204,026	26,907	30	322,263	27,162	75,768	184,186	35,147	31.4
East Kern CCD	69,614	38,064	2,747	10,816	21,237	3,264	33.5	34,297	2,616	7,632	20,329	3,720	34.4
San Bernardino County	1,709,434	926,297	73,273	282,532	508,538	61,954	29.3	856,410	69,803	199,712	502,390	84,505	31.4
Red Mountain-Trona CCD	2,293	1,243	77	352	685	129	37.2	1,127	74	237	664	152	37.6
Three-County Region	2,389,024	1,303,478	102,311	393,207	717,614	90,346	na	1,187,857	97,433	277,162	691,666	121,596	na
CCDs in Study Area	**76,998**	**41,906**	**2,971**	**11,757**	**23,314**	**3,864**	na	**38,063**	**2,822**	**8,350**	**22,419**	**4,472**	na
Percents of Gender Total (except California median age)													
California	100.0%	53.6%	3.8%	14.0%	31.3%	4.5%	32.2	100.0%	7.1%	19.4%	61.2%	12.2%	34.4
Independence CCD	100.0%	50.2%	2.5%	10.9%	27.0%	9.8%		100.0%	4.7%	17.4%	53.9%	24.0%	
Kern County	100.0%	55.6%	4.3%	16.4%	30.8%	4.1%		100.0%	8.4%	23.5%	57.2%	10.9%	
East Kern CCD	100.0%	54.7%	3.9%	15.5%	30.5%	4.7%		100.0%	7.6%	22.3%	59.3%	10.8%	
Red Mountain-Trona CCD	100.0%	54.2%	3.4%	15.4%	29.9%	5.6%		100.0%	6.6%	21.0%	58.9%	13.5%	
Three-County Region	100.0%	54.6%	4.3%	16.5%	30.0%	3.8%		100.0%	8.2%	23.3%	58.2%	10.2%	
CCDs in Study Area	**100.0%**	**54.4%**	**3.9%**	**15.3%**	**30.3%**	**5.0%**		**100.0%**	**7.4%**	**21.9%**	**58.9%**	**11.7%**	

Source: United States Department of Commerce (2000a).

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Table E-3 Educational Attainment in Inyo, Kern, and San Bernardino Counties and CCDs in the Haiwee Geothermal Leasing Area SSA (2000 Census)*

	No schooling completed	8th grade and under	High School graduate	Degree	Bachelors Degree	Masters degree	school degree	Doctorate degree
California	3.2%	8.2%	20.1%	7.1%	17.1%	6.0%	2.3%	1.2%
Inyo County	0.4%	4.0%	31.3%	7.7%	10.5%	4.3%	1.8%	0.6%
Independence CCD	0.4%	2.8%	38.1%	8.2%	8.9%	2.3%	0.9%	0.6%
Lone Pine CCD	0.7%	7.3%	29.9%	6.6%	9.1%	3.8%	0.8%	0.5%
Kern County	4.4%	10.7%	25.4%	6.4%	9.1%	3.0%	1.0%	0.4%
East Kern CCD	1.3%	3.8%	25.2%	9.4%	11.2%	5.4%	0.8%	0.8%
Lake Isabella CCD	0.5%	5.0%	34.9%	6.2%	5.8%	1.7%	0.5%	0.2%
San Bernardino County	2.5%	7.9%	25.0%	7.6%	10.4%	3.6%	1.4%	0.6%
Red Mountain-Trona CCD	0.5%	4.0%	36.9%	5.1%	6.7%	2.3%	0.0%	0.0%
Three County Area	3.0%	8.6%	25.2%	7.2%	10.0%	3.4%	1.3%	0.5%
CCDs Total	**1.1%**	**4.1%**	**28.0%**	**8.5%**	**9.9%**	**4.5%**	**0.8%**	**0.6%**

*percent of population over 25 years old

Source: United States Department of Commerce (2000a).

Table E-4 1999 Income Distribution in the CCDs and Counties of the Haiwee SSA

		Individuals					Households				
	Per capita income in 1999	Total Below Poverty Line	and 1.5 Times Poverty Line	1.5-2.0 Times	2.0 and over	Under $20k	$20-40k	$40-$75k	$75-125k	$125-200k	$200k or more
California	$ 22,711	14.2%	9.9%	8.9%	66.9%	19.6%	22.7%	28.9%	18.3%	6.9%	3.6%
Inyo County	$ 19,639	12.6%	10.3%	10.4%	66.7%	29.7%	26.4%	27.6%	12.6%	2.9%	0.8%
Independence CCD	$ 18,894	10.4%	9.3%	10.7%	69.6%	26.8%	27.9%	30.9%	11.8%	2.4%	0.4%
Lone Pine CCD	$ 15,719	20.1%	12.7%	11.3%	55.9%	42.1%	27.2%	21.0%	7.9%	1.9%	0.0%
Kern County	$ 15,760	20.8%	13.7%	11.0%	54.5%	28.2%	27.1%	27.5%	13.0%	3.0%	1.2%
East Kern CCD	$ 19,149	13.9%	10.0%	9.6%	66.5%	22.9%	24.6%	31.4%	16.8%	3.5%	0.8%
Lake Isabella CCD	$ 15,897	20.0%	15.4%	13.9%	50.7%	43.1%	29.9%	18.1%	5.9%	1.7%	1.3%
San Bernardino County	$ 16,856	15.8%	11.1%	10.4%	62.6%	21.9%	25.2%	31.1%	16.1%	4.3%	1.3%
Red Mountain-Trona CCD	$ 17,001	18.9%	9.3%	10.1%	61.7%	27.3%	25.5%	35.8%	10.6%	0.8%	0.0%
Three Counties Combined	na	17.2%	11.8%	10.6%	60.5%	23.8%	25.8%	30.1%	15.2%	3.9%	1.3%
CCDs combined	na	15.1%	10.9%	10.4%	63.6%	27.7%	25.8%	28.6%	14.1%	3.0%	0.8%

Source: United States Department of Commerce (2000a).

APPENDIX F

Emissions

APPENDIX F

EMISSIONS

- HAIWEE CONSTRUCTION EMISSIONS
  - CONSTRUCTION HEAVY EQUIPMENT EMISSIONS
  - FUGITIVE DUST EMISSION CALCULATIONS
  - CONSTRUCTION WORKER COMMUTE EMISSION CALCULATIONS
  - CONSTRUCTION TRUCK TRIP EMISSIONS
  - OPERATIONAL VEHICLE EMISSION CALCULATIONS

- HAIWEE DRILL RIG EMISSIONS

HAIWEE DRILL RIG EMISSIONS

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Table F-1
Drilling Rig
Emissions Calculations - Tier 3 Drilling Rig
Haiwee Geothermal Leasing Area

Table 1: Emissions from Drilling Rig Engines for Initial Wells

		Exploration		Operation	
Average Power Rating (hp)	500	20	Number of Wells	12	Number of Wells
Fuel Type	Diesel	24	Operating Hours per day/drill rig	24	Operating Hours per day/drill rig
Total Operating Hours - Exploration	2400	5	Drilling days per well	60	Drilling days per well
Total Operating Hours - Initial Wells	17280				
Load Factor	0.75				

	Tier 3 Emission Factors (grams/hp-hr)							No of Generators	Hrs Per Day	Total Hours
	CO	VOC	NOX	SOX	PM10	CO2	CH4			
Exploration	2.60E+00	1.50E-01	2.85	1.25E+00	1.50E-01	5.26E+02	3.86E-02	1	24	2400
Initial Well Drilling	2.60E+00	1.50E-01	2.85	1.25E+00	1.50E-01	5.26E+02	3.86E-02	1	24	17280
										lbs/day

	Emissions, lbs/hour								Emission, tons (total)							
	CO	VOC	NOX	SOX	PM10	PM2.5	CO2	CH4	CO	VOC	NOX	SOX	PM10	PM2.5	CO2	CH4
Exploration	2.15	0.12	2.36	1.03	0.12	0.12	435.00	0.03	2.58	0.15	2.83	1.24	0.15	0.15	522.00	0.04
Initial Well Drilling	2.15	0.12	2.36	1.03	0.12	0.12	435.00	0.03	18.57	1.07	20.36	8.91	1.07	1.06	3758.37	0.28
lbs/day	51.59	2.98	56.55	24.74	2.98	2.95	10439.91	0.77								

NOTE: NOx emissions from manufacturer/test data; CO, VOC, SOx, and PM10 emissions from EPA AP-42, Section 3.3 for diesel equipment.

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CONSTRUCTION HEAVY EQUIPMENT EMISSIONS

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Table F-2
Construction Heavy Equipment Emissions
Haiwee Geothermal Leasing Area

Emission Factors

Equipment	FUEL	HP	ROG (lb/hr)	CO (lb/hr)	NOX (lb/hr)	SOX (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)	No of Equipment	Hrs Per Day	Days in Service	ROG lbs/day	CO lbs/day	NOX lbs/day
Exploration																	
Tracked Loader	DIESEL	108	0.1354	0.4732	0.8257	0.0008	0.0709	0.0631	65	0.0122	0.0784	1	8	180	1.08	3.79	6.61
Wheeled Loader	DIESEL	164	0.1312	0.6288	1.0135	0.0012	0.0583	0.0519	106	0.0118	0.0963	1	11	180	1.44	6.92	11.15
Motor Grader	DIESEL	174	0.1554	0.7363	1.1931	0.0014	0.0688	0.0612	124	0.0140	0.1133	3	8	180	3.73	17.67	28.63
Water Truck	DIESEL	189	0.1469	0.3944	1.3513	0.0019	0.0461	0.0410	167	0.0133	0.1284	1	8	180	1.18	3.16	10.81
Subtotal															**7.43**	**31.53**	**57.20**
Wellfield Development																	
Tracked Loader	DIESEL	108	0.1354	0.4732	0.8257	0.0008	0.0709	0.0631	65	0.0122	0.0784	1	8	250	1.08	3.79	6.61
Wheeled Loader	DIESEL	164	0.1312	0.6288	1.0135	0.0012	0.0583	0.0519	106	0.0118	0.0963	1	11	250	1.44	6.92	11.15
Motor Grader	DIESEL	174	0.1554	0.7363	1.1931	0.0014	0.0688	0.0612	124	0.0140	0.1133	3	8	250	3.73	17.67	28.63
Water Truck	DIESEL	189	0.1469	0.3944	1.3513	0.0019	0.0461	0.0410	167	0.0133	0.1284	1	8	250	1.18	3.16	10.81
Subtotal															**7.43**	**31.53**	**57.20**
Power Plant Construction																	
Tracked Loader	DIESEL	108	0.1354	0.4732	0.8257	0.0008	0.0709	0.0631	65	0.0122	0.0784	1	8	250	1.08	3.79	6.61
Wheeled Loader	DIESEL	164	0.1312	0.6288	1.0135	0.0012	0.0583	0.0519	106	0.0118	0.0963	1	11	250	1.44	6.92	11.15
Motor Grader	DIESEL	174	0.1554	0.7363	1.1931	0.0014	0.0688	0.0612	124	0.0140	0.1133	3	8	250	3.73	17.67	28.63
Roller Compactor	DIESEL	95	0.1054	0.4098	0.6619	0.0007	0.0574	0.0511	59	0.0095	0.0629	1	11	250	1.16	4.51	7.28
Crane	DIESEL	399	0.1635	0.5691	1.5327	0.0018	0.0571	0.0508	180	0.0148	0.1456	1	11	250	1.80	6.26	16.86
Truck Mounted Lift	DIESEL	60	0.0607	0.2451	0.4012	0.0004	0.0324	0.0288	38	0.0055	0.0381	1	8	250	0.49	1.96	3.21
Water Truck	DIESEL	189	0.1469	0.3944	1.3513	0.0019	0.0461	0.0410	167	0.0133	0.1284	1	11	250	1.62	4.34	14.86
Subtotal															**11.32**	**45.44**	**88.60**

Assumptions: SCAQMD Emission Factors, 2012
Horsepower ratings from URBEMIS defaults

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Table F-2
Construction Heavy Equipment Emissions
Haiwee Geothermal Leasing Area

Equipment	Emissions: SOX lbs/day	PM10 lbs/day	PM2.5 lbs/day	CO2 lbs/day	CH4 lbs/day	N2O lbs/day	ROG tons (total)	CO tons (total)	Emission, tons (total): NOX tons (total)	SOX tons (total)	PM10 tons (total)	PM2.5 tons (total)	CO2 tons (total)	CH4 tons (total)	N2O tons (total)
Exploration															
Tracked Loader	0.01	0.57	0.50	519.16	0.10	0.63	0.097	0.341	0.595	0.001	0.051	0.045	47	0.009	0.056
Wheeled Loader	0.01	0.64	0.57	1169.47	0.13	1.06	0.130	0.622	1.003	0.001	0.058	0.051	105	0.012	0.095
Motor Grader	0.03	1.65	1.47	2974.12	0.34	2.72	0.336	1.590	2.577	0.003	0.149	0.132	268	0.030	0.245
Water Truck	0.01	0.37	0.33	1332.36	0.11	1.03	0.106	0.284	0.973	0.001	0.033	0.030	120	0.010	0.092
Subtotal	**0.07**	**3.23**	**2.87**	**5995.11**	**0.67**	**5.43**	**0.67**	**2.84**	**5.15**	**0.01**	**0.29**	**0.26**	**539.56**	**0.06**	**0.49**
Wellfield Development															
Tracked Loader	0.01	0.57	0.50	519.16	0.10	0.63	0.135	0.473	0.826	0.001	0.071	0.063	65	0.012	0.078
Wheeled Loader	0.01	0.64	0.57	1169.47	0.13	1.06	0.180	0.865	1.394	0.002	0.080	0.071	146	0.016	0.132
Motor Grader	0.03	1.65	1.47	2974.12	0.34	2.72	0.466	2.209	3.579	0.004	0.206	0.184	372	0.042	0.340
Water Truck	0.01	0.37	0.33	1332.36	0.11	1.03	0.147	0.394	1.351	0.002	0.046	0.041	167	0.013	0.128
Subtotal	**0.07**	**3.23**	**2.87**	**5995.11**	**0.67**	**5.43**	**0.93**	**3.94**	**7.15**	**0.01**	**0.40**	**0.36**	**749.39**	**0.08**	**0.68**
Power Plant Construction															
Tracked Loader	0.01	0.57	0.50	519.16	0.10	0.63	0.135	0.473	0.826	0.001	0.071	0.063	65	0.012	0.078
Wheeled Loader	0.01	0.64	0.57	1169.47	0.13	1.06	0.180	0.865	1.394	0.002	0.080	0.071	146	0.016	0.132
Motor Grader	0.03	1.65	1.47	2974.12	0.34	2.72	0.466	2.209	3.579	0.004	0.206	0.184	372	0.042	0.340
Roller Compactor	0.01	0.63	0.56	648.88	0.10	0.69	0.145	0.563	0.910	0.001	0.079	0.070	81	0.013	0.086
Crane	0.02	0.63	0.56	1981.11	0.16	1.60	0.225	0.783	2.107	0.002	0.079	0.070	248	0.020	0.200
Truck Mounted Lift	0.00	0.26	0.23	304.57	0.04	0.30	0.061	0.245	0.401	0.000	0.032	0.029	38	0.005	0.038
Water Truck	0.02	0.51	0.45	1832.00	0.15	1.41	0.202	0.542	1.858	0.003	0.063	0.056	229	0.018	0.177
Subtotal	**0.10**	**4.88**	**4.35**	**9429**	**1.02**	**8.42**	**1.41**	**5.68**	**11.08**	**0.01**	**0.61**	**0.54**	**1179**	**0.13**	**1.05**
					2.36	**19.28**	**3.01**	**12.46**	**23.37**	**0.03**	**1.30**	**1.16**	**2238.60**	**0.25**	**2.01**

Assumptions: SCAQMD Emission Factors, 2012
Horsepower ratings from URBEMIS defaults

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FUGITIVE DUST EMISSION CALCULATIONS

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Table F-3
Fugitive Dust Emission Calculations
Haiwee Geothermal Leasing Area

Fugitive Dust Emissions by Activity

With watering 3 times daily
Control Efficiency: 61 percent

Grading	**Total Area to be Disturbed**	**Maximum Daily Grading**	**Emission Factor, lbs PM10/acre/day**	**Emissions, lbs PM10/day**	**Emissions, lbs PM2.5/day**	**Emissions, lbs PM10/day**	**Emissions, lbs PM2.5/day**
Exploration	62	6.2	20	124	26.04	48.36	10.1556
Wellfield Development	202	20.2	20	404	84.84	157.56	33.0876
Power Plant Construction	120	12	20	240	50.4	93.6	19.656

	PM10 Emissions, tons/year	**PM2.5 Emissions, tons/year**
	0.2418	0.050778
Assume 10% of site to be graded per day.	0.7878	0.165438
	0.468	0.09828

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CONSTRUCTION WORKER COMMUTE EMISSION CALCULATIONS

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Table F-4
Construction Worker Commute Emission Calculations
Haiwee Geothermal Leasing Area

Construction Phase	Vehicle Class	No. of Workers Per Construction Phase	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	CO Start-Up (g/start)[a]	NO_X Running Exhaust (g/mi)	NO_X Start-Up (g/start)[a]	ROG Running Exhaust (g/mi)	ROG Start-Up (g/start)[a]	ROG Hot-Soak (g/trip)	ROG Resting Loss (g/hr)	ROG Running Evaporative (g/mi)	ROG Diurnal Evaporative (g/hr)	SOx Running Exhaust (g/mi)	SOx Start-Up (g/start)[a]	PM10 Running Exhaust (g/mi)	PM10 Start-Up (g/start)[a]	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Start-Up (g/start)[a]	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	CO Running Exhaust (g/mi)
Exploration	Light-Duty Auto	7	35	80	2.875	12.15	0.318	0.625	0.109	1.046	0.334	0.039	0.058	0.083	0.003	0.002	0.01	0.015	0.008	0.013	0.009	0.014	0.002	0.005	310.451
	Light-Duty Truck	3	35	80	7.009	20.759	0.827	0.867	0.29	1.602	0.542	0.068	0.121	0.137	0.004	0.002	0.016	0.019	0.008	0.013	0.014	0.017	0.002	0.005	384.226
Wellfield Development	Light-Duty Auto	100	35	80	2.875	12.15	0.318	0.625	0.109	1.046	0.334	0.039	0.058	0.083	0.003	0.002	0.01	0.015	0.008	0.013	0.009	0.014	0.002	0.005	310.451
	Light-Duty Truck	100	35	80	7.009	20.759	0.827	0.867	0.29	1.602	0.542	0.068	0.121	0.137	0.004	0.002	0.016	0.019	0.008	0.013	0.014	0.017	0.002	0.005	384.226
Power Plant Construction	Light-Duty Auto	100	35	80	2.875	12.15	0.318	0.625	0.109	1.046	0.334	0.039	0.058	0.083	0.003	0.002	0.01	0.015	0.008	0.013	0.009	0.014	0.002	0.005	310.451
	Light-Duty Truck	100	35	80	7.009	20.759	0.827	0.867	0.29	1.602	0.542	0.068	0.121	0.137	0.004	0.002	0.016	0.019	0.008	0.013	0.014	0.017	0.002	0.005	384.226

Paved Road Fugitive Dust
EPA's AP-42, Section 13.2.1, November 2006
E = k(sL/2)^0.65 x (W/3)^1.5 - C
For light-duty trucks assume 2 tons/vehicle
Assume silt loading for 10,000 ADT roadways = 0.03 g/m3
Assume k = 0.016 PM10
Assume 6 miles in addition for track-out for PM10
Emission Factors
PM10 9.81231E-05

Unpaved Road Fugitive Dust
EPA's AP-42, Section 13.2.2
Industrial Roads
E = k (s/12)^a x (W/3)^b
Assume 61% control efficiency for watering 3 x daily
For light-duty trucks assume 2 tons/vehicle
k = 1.5 for PM10, 0.15 for PM2.5
s = 8.5, a = 0.9, b = 0.45
Emission Factors
PM10 0.357378738
PM2.5 0.035737874

Emission Factors from EMFAC2007 Model, assuming 2012
Assume startup after 8 hours
Assume 45 minutes run time total

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Table F-4
Construction Worker Commute Emission Calculations
Haiwee Geothermal Leasing Area

		O2	CH4		N2O		Emissions, lbs/day												Total Emissions, tons						
Construction Phase	Vehicle Class	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	CO	NOx	VOCs	SOx	PM10	PM2.5	Paved Road Fugitive Dust PM10	Paved Road Fugitive Dust PM2.5	CO2	CH4	N2O	Construction Days	CO	NOx	VOCs	SOx	PM10	PM2.5	Paved Road Fugitive Dust PM10
Exploration	Light-Duty Auto	164.917	0.026	0.06	0.03	0.06	3.92	0.41	0.23	0.00	0.04	0.02	0.05	0.01	388.37	0.03	0.04	180	0.35	0.04	0.02114	3.39E-04	0.00349	0.00182	0.00495
	Light-Duty Truck	194.251	0.048	0.093	0.08	0.08	3.98	0.45	0.23	0.00	0.02	0.01	0.02	0.00	205.87	0.03	0.04	180	0.36	0.04	0.02075	1.93E-04	0.00178	0.00102	0.00212
							7.91	**0.86**	**0.47**	**0.01**	**0.06**	**0.03**	**0.08**	**0.02**	**594.24**	**0.06**	**0.08**		**0.71**	**0.08**	**0.04**	**0.00**	**0.01**	**0.00**	**0.01**
Wellfield Development	Light-Duty Auto	164.917	0.026	0.06	0.03	0.06	56.06	5.88	3.36	0.05	0.55	0.29	0.78	0.16	5548.16	0.49	0.56	250	7.01	0.74	0.41943	6.72E-03	0.06917	0.03605	0.09812
	Light-Duty Truck	194.251	0.048	0.093	0.08	0.08	132.77	14.97	7.68	0.07	0.66	0.38	0.78	0.16	6862.27	0.89	1.42	250	16.60	1.87	0.96042	8.93E-03	0.08262	0.04723	0.09812
							188.84	**20.85**	**11.04**	**0.13**	**1.21**	**0.67**	**1.57**	**0.33**	**12410.44**	**1.37**	**1.98**		**23.60**	**2.61**	**1.38**	**0.02**	**0.15**	**0.08**	**0.20**
Power Plant Construction	Light-Duty Auto	164.917	0.026	0.06	0.03	0.06	56.06	5.88	3.36	0.05	0.55	0.29	0.78	0.16	5548.16	0.49	0.56	250	7.01	0.74	0.41943	6.72E-03	0.06917	0.03605	0.09812
	Light-Duty Truck	194.251	0.048	0.093	0.08	0.08	132.77	14.97	7.68	0.07	0.66	0.38	0.78	0.16	6862.27	0.89	1.42	250	16.60	1.87	0.96042	8.93E-03	0.08262	0.04723	0.09812
							188.84	**20.85**	**11.04**	**0.13**	**1.21**	**0.67**	**1.57**	**0.33**	**12410.44**	**1.37**	**1.98**		**23.60**	**2.61**	**1.38**	**0.02**	**0.15**	**0.08**	**0.20**

Paved Road Fugitive Dust
EPA's AP-42, Section 13.2.1, November 2006
E = k(sL/2)^0.65 x (W/3)^1.5 - C
For light-duty trucks assume 2 tons/vehicle
Assume silt loading for 10,000 ADT roadways = 0.03 g/m3
Assume k = 0.016 PM10
Assume 6 miles in addition for track-out for PM10
Emission Factors

PM10	9.81231E-05

Unpaved Road Fugitive Dust
EPA's AP-42, Section 13.2.2
Industrial Roads
E = k (s/12)^a x (W/3)^b
Assume 61% control efficiency for watering 3 x daily
For light-duty trucks assume 2 tons/vehicle
k = 1.5 for PM10, 0.15 for PM2.5
s = 8.5, a = 0.9, b = 0.45
Emission Factors

PM10	0.357378738
PM2.5	0.035737874

Emission Factors from EMFAC2007 Model, assuming 2012
Assume startup after 8 hours
Assume 45 minutes run time total

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Table F-4
Construction Worker Commute Emission Calculations
Haiwee Geothermal Leasing Area

Construction Phase	Vehicle Class	Total Emissions, tons Paved Road Fugitive Dust PM2.5	CO2	CH4	N2O
Exploration	Light-Duty Auto	0.00104	35	0.00306	0.00352
	Light-Duty Truck	0.00045	19	0.00240	0.00384
		0.00	**53.48**	**0.01**	**0.01**
Wellfield Development	Light-Duty Auto	0.02061	694	0.06063	0.06987
	Light-Duty Truck	0.02061	858	0.11095	0.17775
		0.04	**1551.30**	**0.17**	**0.25**
Power Plant Construction	Light-Duty Auto	0.02061	694	0.06063	0.06987
	Light-Duty Truck	0.02061	858	0.11095	0.17775
		0.04	**1551.30**	**0.17**	**0.25**

Paved Road Fugitive Dust
EPA's AP-42, Section 13.2.1, November 2006
E = k(sL/2)^0.65 x (W/3)^1.5 - C
For light-duty trucks assume 2 tons/vehicle
Assume silt loading for 10,000 ADT roadways = 0.03 g/m3
Assume k = 0.016 PM10
Assume 6 miles in addition for track-out for PM10
Emission Factors
PM10 9.81231E-05

Unpaved Road Fugitive Dust
EPA's AP-42, Section 13.2.2
Industrial Roads
E = k (s/12)^a x (W/3)^b
Assume 61% control efficiency for watering 3 x daily
For light-duty trucks assume 2 tons/vehicle
k = 1.5 for PM10, 0.15 for PM2.5
s = 8.5, a = 0.9, b = 0.45
Emission Factors
PM10 0.357378738
PM2.5 0.035737874

Emission Factors from EMFAC2007 Model, assuming 2012
Assume startup after 8 hours
Assume 45 minutes run time total

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CONSTRUCTION TRUCK TRIP EMISSIONS

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Table F-5
Construction Truck Trip Emissions
Haiwee Geothermal Leasing Area

Construction Phase	Vehicle Class	No. of Trucks per day	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	NO_X Running Exhaust (g/mi)	ROG Running Exhaust (g/mi)	SOx Running Exhaust (g/mi)	PM10 Running Exhaust (g/mi)	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	PM2.5 Running Exhaust (g/mi)	PM2.5 Tire Wear (g/mi)	PM2.5 Brake Wear (g/mi)	CO2 Running Exhaust (g/mi)	CH4 Running Exhaust (g/mi)	N2O Running Exhaust (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10
Exploration																						
Support Truck	Medium Duty Truck, Diesel	4	35	80	1.362	5.316	0.154	0.014	0.199	0.012	0.013	0.183	0.003	0.005	1505.00	0.007	0.51	0.96	3.75	0.11	0.01	0.16
Delivery Truck	Heavy Duty Truck, Diesel	1	35	80	3.883	13.537	0.769	0.017	0.434	0.036	0.028	0.399	0.009	0.012	1827.808	0.036	1.29	0.68	2.39	0.14	0.00	0.09
Wellfield Development																		**1.65**	**6.14**	**0.24**	**0.01**	**0.25**
Support Truck	Medium Duty Truck, Diesel	16	35	80	1.362	5.316	0.154	0.014	0.199	0.012	0.013	0.183	0.003	0.005	1505.00	0.007	0.51	3.84	15.00	0.43	0.04	0.63
Delivery Truck	Heavy Duty Truck, Diesel	3	35	80	3.883	13.537	0.769	0.017	0.434	0.036	0.028	0.399	0.009	0.012	1827.808	0.036	1.29	2.05	7.16	0.41	0.01	0.26
Power Plant Construction																		**5.90**	**22.16**	**0.84**	**0.05**	**0.90**
Support Truck	Medium Duty Truck, Diesel	8	35	80	1.362	5.316	0.154	0.014	0.199	0.012	0.013	0.183	0.003	0.005	1505.00	0.007	0.51	1.92	7.50	0.22	0.02	0.32
Delivery Truck	Heavy Duty Truck, Diesel	2	35	80	3.883	13.537	0.769	0.017	0.434	0.036	0.028	0.399	0.009	0.012	1827.808	0.036	1.29	1.37	4.78	0.27	0.01	0.18
																		3.29	**12.28**	**0.49**	**0.03**	**0.49**
Subtotal																						

Emission Factors from EMFAC2007 Model, assuming 2012 composite emission factors.
Assume startup after 8 hours
Assume 45 minutes run time total

Assume 45 minutes run time total
2012 Emission Factors from EMFAC2007, average temp 60F; Great Basin

Paved Road Fugitive Dust
EPA's AP-42, Section 13.2.1, November 2006
E = k(sL/2)^0.65 x (W/3)^1.5 - C
For LDT assume 2 tons/vehicle, MDT assume 13 tons/vehicle, HDT assume 20 tons/vehicle
Assume silt loading for 10,000 ADT roadways = 0.03 g/m3
Assume k = 0.016 PM10
Assume 6 miles in addition for track-out for PM10
Emission Factors

PM10, LDT	9.81231E-05
PM10, MDT	0.008944829
PM10, HDT	0.017495628

Unpaved Road Fugitive Dust
EPA's AP-42, Section 13.2.2
Industrial Roads
E = k (s/12)^a x (W/3)^b

For LDT assume 2 tons/vehicle, MDT assume 13 tons/vehicle, HDT assume 20 tons/vehicle
k = 1.5 for PM10, 0.15 for PM2.5
s = 8.5, a = 0.9, b = 0.45
Assume 61% control efficiency for watering 3x daily
Emission Factors

PM10, LDT	0.357378738
PM10, MDT	0.829735596
PM10, HDT	1.007230136
PM2.5, LDT	0.035737874
PM2.5, MDT	0.08297356
PM2.5, HDT	0.100723014

Assume 6 miles each way of unpaved road travel

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Table F-5
Construction Truck Trip Emissions
Haiwee Geothermal Leasing Area

		Emissions, lbs/day							Total Emissions, tons										
Construction Phase	**Vehicle Class**	**PM2.5**	**Paved Road Fugitive Dust PM10**	**Paved Road Fugitive Dust PM2.5**	**CO2**	**CH4**	**N2O**	**Construction Days**	**CO**	**NOx**	**VOCs**	**SOx**	**PM10**	**PM2.5**	**Paved Road Fugitive Dust PM10**	**Paved Road Fugitive Dust PM2.5**	**CO2**	**CH4**	**CH4**
Exploration																			
Support Truck	Medium Duty Truck, Diesel	0.13	5.60	1.18	1061.75	0.00	0.36	180	0.09	0.34	0.00978	8.89E-04	0.01422	0.01213	0.50387	0.10581	96	0.00044	0.03207
Delivery Truck	Heavy Duty Truck, Diesel	0.07	1.40	0.29	322.37	0.01	0.23	180	0.06	0.21	0.01221	2.70E-04	0.00790	0.00667	0.12597	0.02645	29	0.00057	0.02041
Wellfield Development		**0.21**	**7.00**	**1.47**	**1384.12**	**0.01**	**0.58**		**0.15**	**0.55**	**0.02**	**0.00**	**0.02**	**0.02**	**0.63**	**0.13**	**124.57**	**0.00**	**0.05**
Support Truck	Medium Duty Truck, Diesel	0.54	22.39	4.70	4247.01	0.02	1.43	270	0.52	2.03	0.05867	5.33E-03	0.08534	0.07276	3.02324	0.63488	573	0.00267	0.19239
Delivery Truck	Heavy Duty Truck, Diesel	0.22	4.20	0.88	967.12	0.02	0.68	270	0.28	0.97	0.05493	1.21E-03	0.03557	0.03000	0.56686	0.11904	131	0.00257	0.09186
Power Plant Construction		**0.76**	**26.59**	**5.58**	**5214.12**	**0.04**	**2.11**		**0.80**	**2.99**	**0.11**	**0.01**	**0.12**	**0.10**	**3.59**	**0.75**	**703.91**	**0.01**	**0.28**
Support Truck	Medium Duty Truck, Diesel	0.27	11.20	2.35	2123.50	0.01	0.71	270	0.26	1.01	0.02933	2.67E-03	0.04267	0.03638	1.51162	0.31744	287	0.00133	0.09620
Delivery Truck	Heavy Duty Truck, Diesel	0.15	2.80	0.59	644.74	0.01	0.45	270	0.18	0.64	0.03662	8.10E-04	0.02371	0.02000	0.37791	0.07936	87	0.00171	0.06124
		0.42	**14.00**	**2.94**	**2768.25**	**0.02**	**1.17**		**0.44**	**1.66**	**0.07**	**0.00**	**0.07**	**0.06**	**1.89**	**0.40**	**373.71**	**0.00**	**0.16**
Subtotal																			

Emission Factors from EMFAC2007 Model, assuming 2012 composite emission factors.
Assume startup after 8 hours
Assume 45 minutes run time total

Assume 45 minutes run time total
2012 Emission Factors from EMFAC2007, average temp 60F; Great Basin

Paved Road Fugitive Dust
EPA's AP-42, Section 13.2.1, November 2006
E = k(sL/2)^0.65 x (W/3)^1.5 - C
For LDT assume 2 tons/vehicle, MDT assume 13 tons/vehicle, HDT assume 20 tons/vehicle
Assume silt loading for 10,000 ADT roadways = 0.03 g/m3
Assume k = 0.016 PM10
Assume 6 miles in addition for track-out for PM10
Emission Factors

PM10, LDT	9.81231E-05
PM10, MDT	0.008944829
PM10, HDT	0.017495628

Unpaved Road Fugitive Dust
EPA's AP-42, Section 13.2.2
Industrial Roads
E = k (s/12)^a x (W/3)^b

For LDT assume 2 tons/vehicle, MDT assume 13 tons/vehicle, HDT assume 20 tons/vehicle
k = 1.5 for PM10, 0.15 for PM2.5
s = 8.5, a = 0.9, b = 0.45
Assume 61% control efficiency for watering 3x daily
Emission Factors

PM10, LDT	0.357378738
PM10, MDT	0.829735596
PM10, HDT	1.007230136
PM2.5, LDT	0.035737874
PM2.5, MDT	0.08297356
PM2.5, HDT	0.100723014

Assume 6 miles each way of unpaved road travel

OPERATIONAL VEHICLE EMISSION CALCULATIONS

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Table F-6
Operational Vehicle Emission Calculations
Haiwee Geothermal Leasing Area

		No. of Workers	Speed	VMT	CO		NO_x		ROG						SOx		PM10				PM2.5				CO2	
Operations	Vehicle Class	Per Construction Phase	(mph)	(mi/vehicle-day)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]
Workers	Light-Duty Auto	60	35	80	2.875	12.15	0.318	0.625	0.109	1.046	0.334	0.039	0.058	0.083	0.003	0.002	0.01	0.015	0.008	0.013	0.009	0.014	0.002	0.005	310.451	164.917
	Light-Duty Truck	25	35	80	7.009	20.759	0.827	0.867	0.29	1.602	0.542	0.068	0.121	0.137	0.004	0.002	0.016	0.019	0.008	0.013	0.014	0.017	0.002	0.005	384.226	194.251

Paved Road Fugitive Dust
EPA's AP-42, Section 13.2.1, November 2006
E = k(sL/2)^0.65 x (W/3)^1.5 - C
For light-duty trucks assume 2 tons/vehicle
Assume silt loading for 10,000 ADT roadways = 0.03 g/m3
Assume k = 0.016 PM10
Assume 6 miles in addition for track-out for PM10
Emission Factors
PM10 9.81231E-05

Unpaved Road Fugitive Dust
EPA's AP-42, Section 13.2.2
Industrial Roads
E = k (s/12)^a x (W/3)^b
Assume 61% control efficiency for watering 3 x daily
For light-duty trucks assume 2 tons/vehicle
k = 1.5 for PM10, 0.15 for PM2.5
s = 8.5, a = 0.9, b = 0.45
Emission Factors
PM10 0.357378738
PM2.5 0.035737874

Emission Factors from EMFAC2007 Model, assuming 2012
composite emission factors.
Assume startup after 8 hours
Assume 45 minutes run time total

Table F-6
Operational Vehicle Emission Calculations
Haiwee Geothermal Leasing Area

		CH4		N2O		Emissions, lbs/day												Total Emissions, tons										
Operations	Vehicle Class	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	CO	NOx	VOCs	SOx	PM10	PM2.5	Paved Road Fugitive Dust PM10	Paved Road Fugitive Dust PM2.5	CO2	CH4	N2O	Work Days	CO	NOx	VOCs	SOx	PM10	PM2.5	Paved Road Fugitive Dust PM10	Paved Road Fugitive Dust PM2.5	CO2	CH4	N2O
Workers	Light-Duty Auto	0.026	0.06	0.03	0.06	33.64	3.53	2.01	0.03	0.33	0.17	0.47	0.10	3328.90	0.29	0.34	250	4.20	0.44	0.25166	4.03E-03	0.04150	0.02163	0.05887	0.01236	416	0.03638	0.04192
	Light-Duty Truck	0.048	0.093	0.08	0.08	33.19	3.74	1.92	0.02	0.17	0.09	0.20	0.04	1715.57	0.22	0.36	250	4.15	0.47	0.24011	2.23E-03	0.02065	0.01181	0.02453	0.00515	214	0.02774	0.04444
						66.83	**7.27**	**3.93**	**0.05**	**0.50**	**0.27**	**0.67**	**0.14**	**5044.47**	**0.51**	**0.69**		**8.35**	**0.91**	**0.49**	**0.01**	**0.06**	**0.03**	**0.08**	**0.02**	**630.56**	**0.06**	**0.09**

Paved Road Fugitive Dust
EPA's AP-42, Section 13.2.1, November 2006
E = k(sL/2)^0.65 x (W/3)^1.5 - C
For light-duty trucks assume 2 tons/vehicle
Assume silt loading for 10,000 ADT roadways = 0.03 g/m3
Assume k = 0.016 PM10
Assume 6 miles in addition for track-out for PM10
Emission Factors

PM10	9.81231E-05

Unpaved Road Fugitive Dust
EPA's AP-42, Section 13.2.2
Industrial Roads
E = k (s/12)^a x (W/3)^b
Assume 61% control efficiency for watering 3 x daily
For light-duty trucks assume 2 tons/vehicle
k = 1.5 for PM10, 0.15 for PM2.5
s = 8.5, a = 0.9, b = 0.45
Emission Factors

PM10	0.357378738
PM2.5	0.035737874

Emission Factors from EMFAC2007 Model, assuming 2012
composite emission factors.
Assume startup after 8 hours
Assume 45 minutes run time total

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APPENDIX G

Numerical Groundwater Flow Modeling

APPENDIX G
NUMERICAL GROUNDWATER FLOW MODELING
ROSE VALLEY, INYO, COUNTY, CALIFORNIA

Prepared by

Daniel W. Matthews, R.G.

For POWER Engineers, Inc.

On Behalf of
U.S. Bureau of Land Management

February 2010

APPENDIX G

NUMERICAL GROUNDWATER FLOW MODELING
ROSE VALLEY, INYO, COUNTY, CALIFORNIA

G1. INTRODUCTION

This appendix describes the numerical groundwater flow model used to evaluate potential impacts of groundwater extraction from the uppermost groundwater-bearing zone in the Rose Valley, California, groundwater basin for the Geothermal Leasing Environmental Impact Statement (EIS) being prepared by Power Engineers on behalf of the U.S. Bureau of Land Management (BLM). For this project, GEOLOGICA Inc. (GEOLOGICA) revised and recalibrated a numerical model previously developed by GEOLOGICA (2008) for the Rose Valley groundwater basin. Groundwater flow evaluations were conducted using the U.S.G.S. MODFLOW computer code (McDonald and Harbaugh, 1988) implemented in the Groundwater Vistas graphical environment (Environmental Simulations, 2007).

G1.1. Purpose

The purpose of the evaluations and analysis described in this appendix were: to evaluate the groundwater conditions; and to analyze the potential impacts to groundwater resources in Rose Valley that might develop as a result of geothermal exploration, well, well field, and power plant construction, and well field and power plant operation and maintenance.

G1.2. Scope

The scope of this task included evaluating information regarding hydrogeologic conditions in Rose Valley, revising an existing numerical groundwater flow model of Rose Valley developed by GEOLOGICA (2008) to better represent those conditions, calibrating the model to new monitoring data collected by Inyo County between November 2007 and November 2009, and developing scenarios to forecast the potential impacts of alternatives to the proposed project. In addition, GEOLOGICA conducted sensitivity analyses to evaluate the impact of uncertainty in various input parameters on model predictions.

G2. ENVIRONMENTAL SETTING

Sections below describe the environmental setting of the study area including physiography, geology, hydrogeology, surface water, and concludes with an evaluation of the water budget for Rose Valley.

G2.1. Physiography

Rose Valley is a long, narrow valley located on the eastern flank of the Sierra Nevada Mountains in Inyo County, California. The alluvial portion of the groundwater basin is approximately 16 miles long from the southern end of the Haiwee Reservoir to just south of Little Lake, and has a maximum width of approximately 6 miles at its widest point.

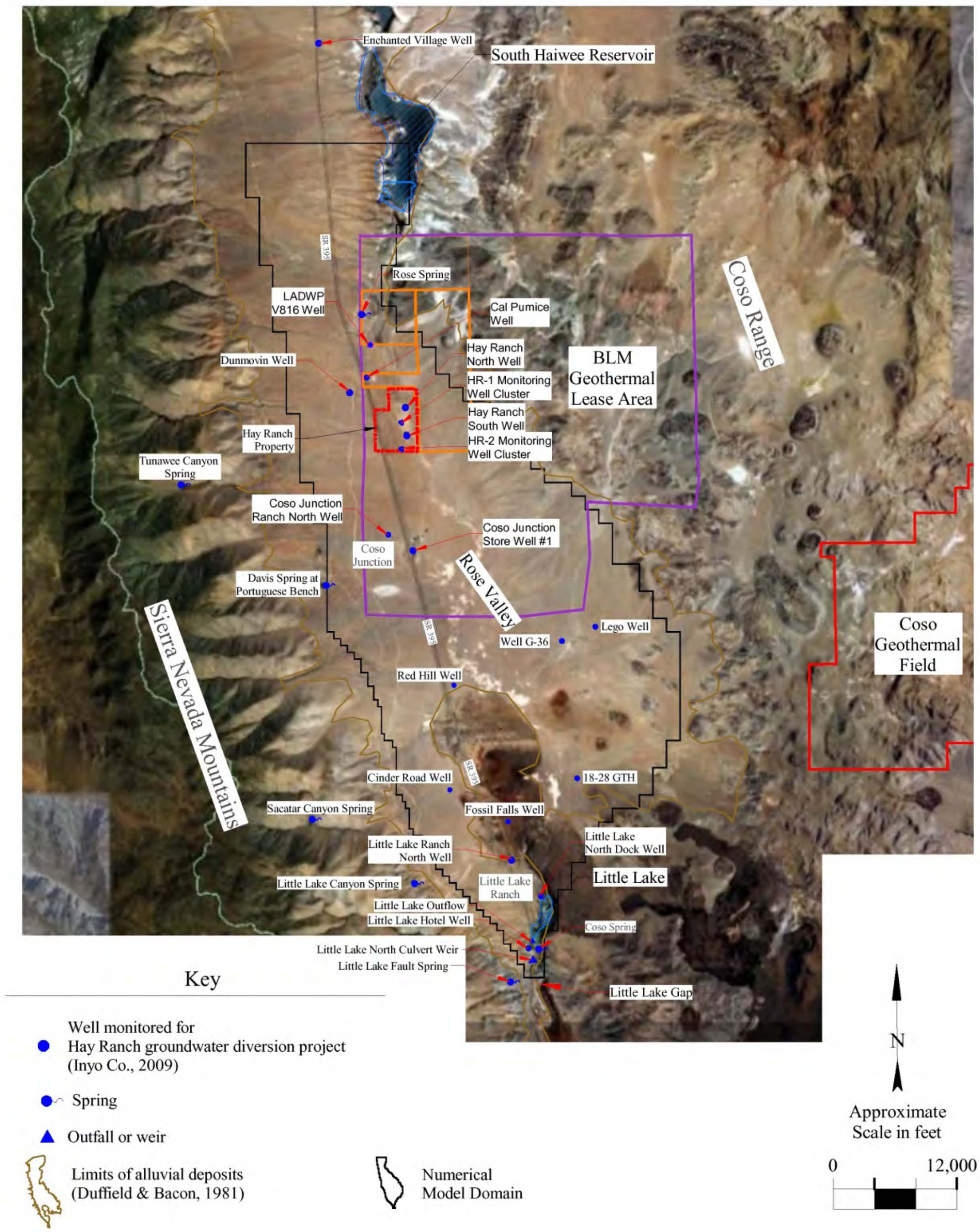


Figure G-1: Physiographic Features of Rose Valley

Rose Valley is topographically separated from the Owens Valley to the north by Dunmovin Hill, a topographic high that is composed of a massive landslide or series of debris flow deposits that originated from the Sierra Nevada range to the west (Bauer, 2002). Rose Valley is separated from the Indian Wells Valley to the south by a topographic high formed by a combination of granitic rocks and volcanic flows, and by the Little Lake Gap, which is an approximately 1,000 ft wide water-carved canyon within the volcanics (Bauer, 2002). **Figure**

G-1 depicts relevant physiographic features of the study area. The ground surface of the valley floor generally slopes gently to the south at a rate of approximately 30 to 35 feet per mile.

G2.2. Geology

Rose Valley is a graben surrounded and underlain by igneous and metamorphic basement rocks of the Sierra Nevada and Coso Ranges. Alluvial sediments were encountered to depths as great as 3,489 feet in borings advanced in the north central portion of the basin (Schaer, 1981) and may extend to depths greater than 5,000 feet below ground surface (bgs) based on gravity surveys (GeoTrans, 2004). Younger (30 to 0.4 million years old) volcanic rocks of the Coso Range outcrop east of the central and northern Rose Valley and are predominately rhyolitic, dacitic, and andesitic in composition. The southern boundary of the Rose Valley groundwater basin is marked by outcrops of volcanic rocks related to eruptions within or flows from the Coso Range and volcanic cinder cones in the Red Hill area. **Figure G-2** provides a geologic map of the study area.

As summarized by Bauer (2002), the basin fill consists, in descending order, of recent alluvial fan deposits including debris flows from the bordering Sierra Nevada Mountains, volcanic deposits including basalt, ash, cinders, and tuff, lacustrine deposits of the Coso Formation, and older alluvial fan deposits from the Sierra Nevada and Coso Ranges. The recent alluvial deposits usually occur between ground surface and depths of up to 800 ft, and consist of a mixture of sands and gravels interbedded with clay. The maximum drilled thickness of these deposits occurs in the north central part of the valley near the Hay Ranch property. The Coso Formation uncomformably overlies basement rocks in the Coso Range and Rose Valley, and is comprised of a heterogeneous assemblage of primarily lacustrine deposits, with lesser amounts of volcanic tuff and alluvial fan deposits. Bauer (2002) described the Coso Formation as being comprised of four members in descending stratigraphic order: the Rhyolite Tuff Member, the Coso Lake Beds Member, the Coso Sand Member, and the Basal Fanglomerate Member.

- **Rhyolite Tuff Member –** The Rhyolite Tuff Member occurs along the east side of the southern Haiwee Reservoir and extends south into the north end of the valley along the western slope of the Coso Range.

- **Coso Lake Beds Member –** The Coso Lake Beds Member reportedly is composed of alternating beds of fine to-coarse-grained sand, arkosic, green clay with interspersed volcanic ash, and thin-bedded white rhyolitic tuffs containing pumice fragments. Deposits of the Coso Lake Beds Member reportedly extend north into the southern Owens Valley, where it is known as the Owens Lake Bed Member.

- **Coso Sand Member –** The Coso Sand Member consists of poorly consolidated, fine-to-coarse grained alluvial gravels, sand, and red clay beds derived from the granitic basement rocks of the Coso Range and reworked Sierra Nevada alluvial fan materials. The Coso Sand Member occurs at depths from 1,500 ft to 3,000 ft bgs and the unit is thickest to the west, decreasing in thickness rapidly to the east.

- **Basal Fanglomerate Member** – The Basal Fanglomerate Member was infrequently encountered in well borings drilled in the valley. It consists of reworked colluvial deposits localized by basement topography and structures.

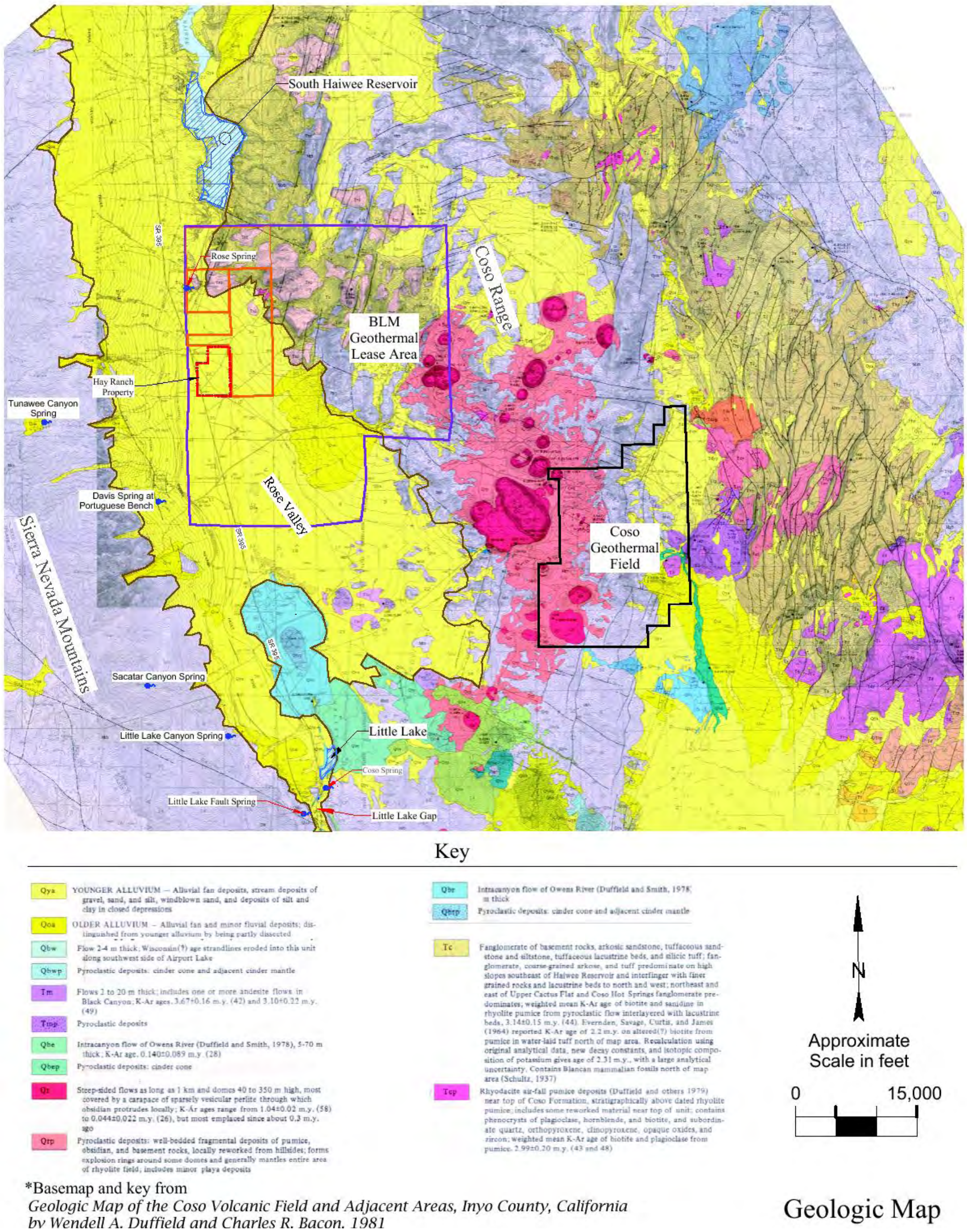


Figure G-2: Geologic Map

Coso Operating Company (COC) recently completed two sets of clustered multi-level monitoring wells to depths of up to 605 feet (ft) below ground surface (bgs) on the Hay

Ranch property (SGSI, 2009a; 2009b; and 2009c). The lithology encountered during drilling was described as alluvium consisting of fine to coarse sand with gravel to 20 ft bgs, which is underlain by fluvial-type deposits containing silt, fine to coarse sand, cobbles, and boulders down to 200 feet bgs. Below 200 feet bgs SGSI reported encountering lacustrine-type deposits containing fine to coarse sand, numerous silt and clay interbeds, and occasional gravel interbeds to a total depth of 570 feet bgs. At depths of approximately 308 to 336 feet bgs and 464 to 478 feet bgs, two significant swelling clay units were encountered in the HR-1 and HR-2 well clusters which were confirmed by geophysical logging. The lithology observed in HR-1 and HR-2 is not inconsistent with the existing model construction.

G2.3. Hydrogeology

G2.3.1. Hydrostratigraphic Units

The principal hydrostratigraphic units that comprise the Rose Valley aquifer consist of recent alluvial deposits, and the Coso Lake Bed and Coso Sand Members of the Coso Formation. Older bedrock is largely impermeable or low permeability and typically impedes or excludes groundwater flow.

SGSI (2009c) concluded that the uppermost groundwater-bearing unit in Rose Valley, which occurs within the upper 600 ft of the sediment column is separated into three aquifer-zones (upper, intermediate, and deep) as a result of the presence of low permeability clay horizons encountered at depths of approximately 325 ft and 475 ft bgs in the HR-1 well cluster and approximately 30 ft deeper in the HR-2 well cluster and south Hay Ranch production well. The horizontal extent of the clay horizons cannot be determined with available information.

G2.3.2. Groundwater Occurrence and Flow

The groundwater table is typically first encountered during drilling within the upper portion of the recent alluvial deposits. Depth to groundwater ranges from 140 to 240 ft bgs in the north and central parts of Rose Valley, decreases to approximately 40 ft bgs at the northern end of the Little Lake Ranch, and surfaces near the south end of the Little Lake Ranch property. Because the ground surface slopes more steeply to the south than the groundwater table, the groundwater table surfaces at and discharges from springs beneath Little Lake, sustaining the lake and the surface water discharge from Coso Spring immediately to the south of the lake. At the south end of Rose Valley, groundwater flow through the Little Lake Gap is constrained by bedrock on the west, an apparent subsurface bedrock rise below, and low or reduced permeability in the basalt lava flows to the east.

Groundwater elevation data obtained from the Inyo County for the Hay Ranch Monitoring Project (Inyo Co. 2009, 2010) were used to develop a groundwater elevation contour map for November 2009 (**Figure G-3**). Groundwater elevation data used to develop the contour map are tabulated in **Table G-1**. The November 2009 groundwater elevation contour map of Rose Valley indicated southeasterly groundwater flow along the axis of the northwest to southeast trending valley.

Table G-1: Rose Valley Groundwater Elevation Data

	Groundwater Elevation, ft amsl	
Well	November 2007(1)	November 2009(2)
Enchanted Village	NM	3,755.5
LADWP 816	3435.2	3,438
Dunmovin	NM	3,253.0
Cal Pumice	3266	3,265.4
Hay Ranch North	3,245	3,245.3
HR-1A	NM	3,244.3
HR-1B	NM	3,243.1
HR-1C	NM	3,245.6
HR-2A	NM	3,241.1
HR-2B	NM	3,238.5
HR-2C	NM	3,242.6
Hay Ranch South	3,240.90	3,241.8
Coso Junction Ranch	3232.7	3,232.2
Coso Junction Store #1	3229.3	3,229.8
Red Hill	NM	3,200.8
Lego	3200.5	3,200.6
G-36	3199.6	3,200.0
Cinder Road	NM	3,187.0
18-28 GTH	3188.2	3,188.5
Fossil Falls	NM	3,175.6
Little Lake Ranch North	3158.95	3,158.9
Little Lake Ranch Dock	NM	3,147.9
Little Lake Surface	NM	3,147.4
Little Lake Ranch Hotel	NM	3,138.3

Notes:

(1) MHA (2008).

(2) Average November 2009 groundwater elevation estimated by Geologica from groundwater elevation hydrographs presented at the Inyo County Water Department's Hay Ranch Monitoring Website, http://www.inyowater.org/coso/default.html accessed December 4, 2009.

** See Figure G-3 for well locations.

NM = Not measured.

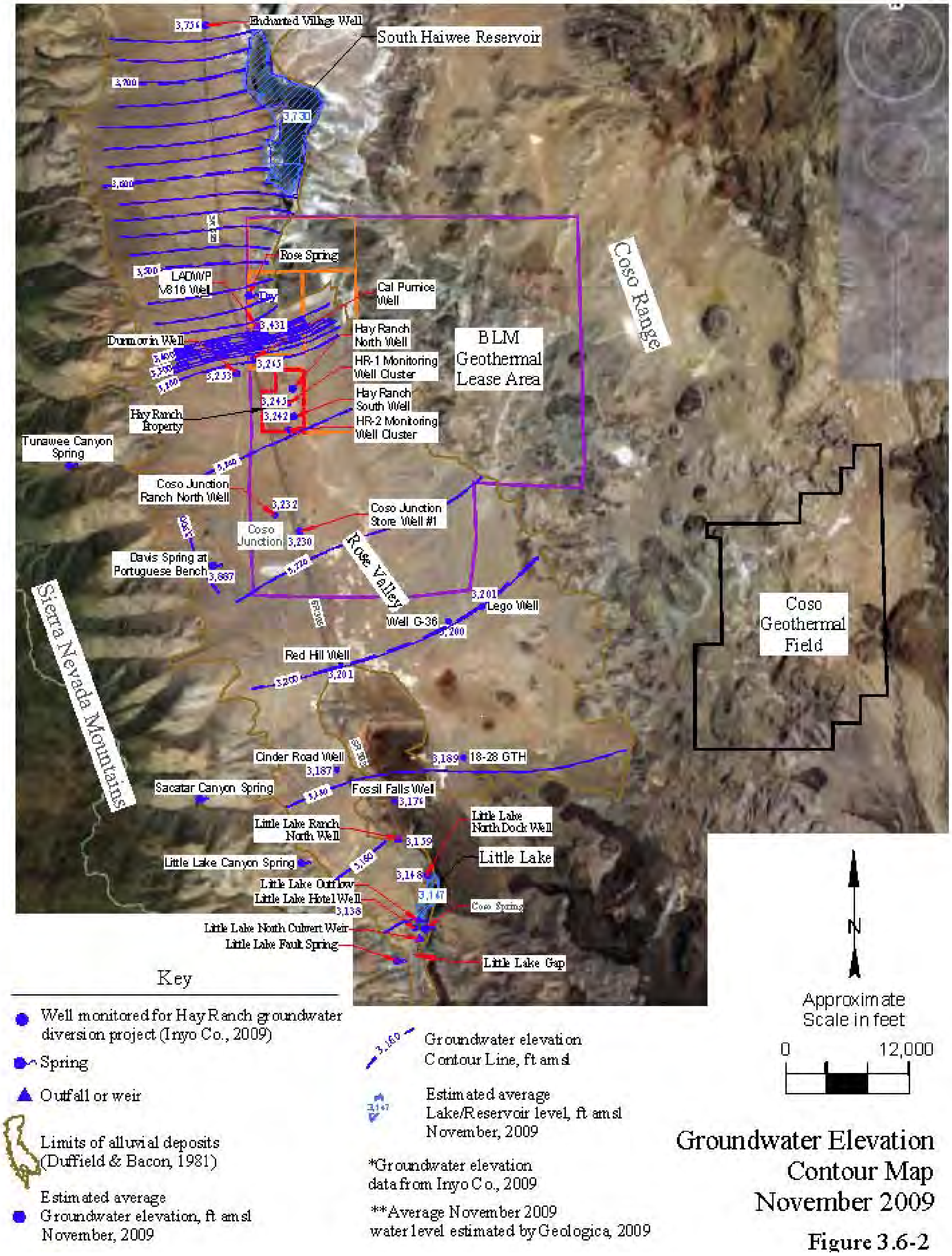
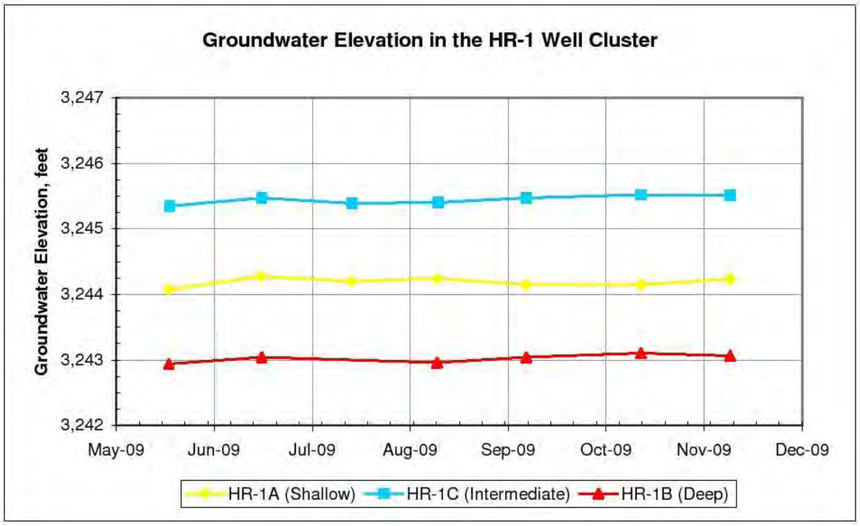


Figure G-3: November 2009 Groundwater Elevation Contour Map

Water level measurements in the clustered multi-level wells (HR-1A, HR-1B, and HR-1C and HR-2A, HR-2B, and HR-2C) advanced on the Hay Ranch property in the north central part of the valley indicated the presence of groundwater elevation differences that suggest generally downward hydraulic gradients overall but with higher potentiometric elevations in the intermediate groundwater-bearing zone compared to the upper and deep groundwater-bearing zones (see **Figure G-4**).



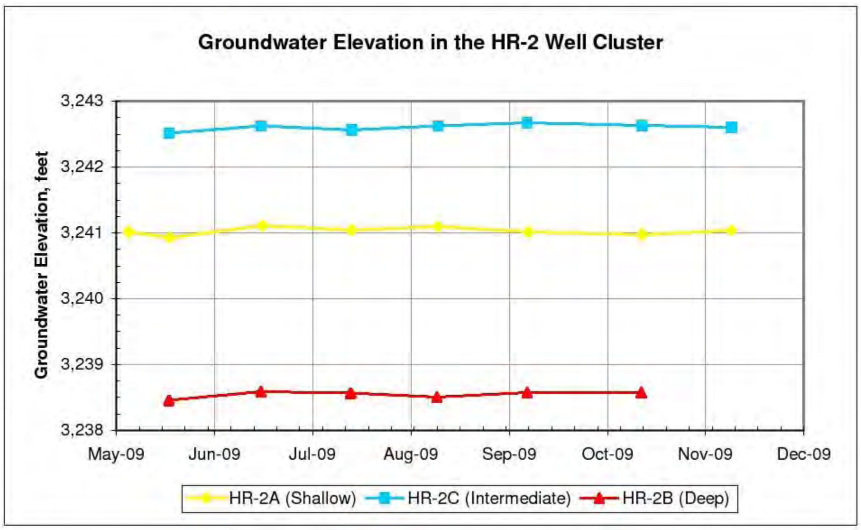


Figure G-4: Vertical Groundwater Elevation Gradients on the Hay Ranch Property

Groundwater elevation hydrographs published at the Inyo County Water Department's website (Inyo Co., 2010) for wells monitored in Rose Valley were reviewed to evaluate long-term trends in groundwater elevation. Over the 2-year model calibration period from November 2007 to November 2009, water levels in wells in Rose Valley generally changed less than 0.5 ft. Observations over the longer term are summarized as follows:

- The LADWP 816 well located at the north end of Rose Valley shows fluctuations of up to 5 ft between January 1995 and January 2010 with a relatively steady average level of approximately 3,438 ft.
- The Pumice Mine well (aka Cal Pumice) generally shows small fluctuations of up to 1 to 2 ft with a relatively steady average level of approximately 3,265.5 ft, except for a sudden unexplained 5 ft drop in December 2009.

- Water level monitoring data for the Hay Ranch North production well, Hay Ranch South production well, and Coso Ranch North well, Coso Junction Store #1 well between January 2003 and January 2010 indicate a generally upward trend of 1-1/2 to 2 ft.
- Rising water level trends of 1 to 1-1/2 ft were also observed in the Lego and G-36 wells on Navy property approximately 3-1/2 miles southeast of Coso Junction.
- Long term monitoring data were not available for the wells near the south end of the valley (Cinder Road, Red Hill, or Fossil Falls) or the wells on the Little Lake Ranch property.

The groundwater levels in the LADWP wells 2 miles south of the Haiwee Reservoir were consistently approximately 170 ft higher than groundwater levels in the closest monitored well to the south, Cal-Pumice, throughout the long term monitoring period, consistent with a surface water flow component or input from a groundwater basin at a different groundwater elevation potential (i.e., Owens Valley), and, the presence of a lower permeability zone between the LADWP property and the remainder of the valley. Groundwater levels in the LADWP wells were more variable than any other wells in the valley. The source of this variation is unknown. Water levels in Haiwee Reservoir and the flow rate in the LADWP aqueduct rose during the time water levels were monitored for the 2007 pumping test while groundwater levels in the LADWP wells fell; positive correlation between rising reservoir levels and groundwater elevation would be expected if seepage from the reservoir strongly influenced groundwater levels. The absence of correlation between reservoir levels and groundwater levels in the LADWP wells suggests varying rates of groundwater influx from Owens Valley may be the cause of groundwater level fluctuations at the north end of Rose Valley. The cause of the apparent rising water level trend in the central part of the valley is unknown but could reflect changes in recharge along the margins of the valley and/or long term recovery from agricultural pumping on the Hay Ranch property in the 1970's.

G2.3.3. Aquifer Properties

The transmissivity of the upper portion of the alluvial deposits was previously estimated to range from 9,000 to 69,800 gpd/ft (1,200 to 9,330 ft^2/day) based on data presented in the Rockwell Report (1980). Based on 24-hour pumping tests conducted in the Hay Ranch wells, GeoTrans (2003) concluded that the transmissivity of the Rose Valley aquifer near Hay Ranch was approximately 10,000 ft^2/day and estimated that the horizontal hydraulic conductivity was approximately 20 ft/day. GeoTrans concluded that they had insufficient data to estimate aquifer storage properties.

Based on a 14-day pumping test conducted in the southern production well on the Hay Ranch property and monitored in wells throughout the valley, GEOLOGICA (2008) estimated the transmissivity and horizontal hydraulic conductivity of the aquifer were approximately 14,750 ft^2/day and 24 ft/day, respectively. The vertical hydraulic conductivity of the alluvial aquifer in central Rose Valley was estimated to be 0.01 ft/day using a Neuman "Beta" coefficient of 0.01 from the aquifer testing type curve match and an aquifer thickness of 600 ft. The storage coefficient applicable to early time response and saturated soil below the water table was found to be 0.001.

The City of Los Angeles Department of Water & Power (LADWP) conducted a short-term pumping test on property they own at the north end of Rose Valley in the spring of 2009 (LADWP, 2009). Well V817 was pumped at a rate of 1.84 cubic feet per second (cfs) for 6.5 days. The pumping test resulted in 270 feet of drawdown in the pumping well, 48 feet of drawdown in monitoring well V816 located 197 feet west of the pumping well, and no drawdown in other nearby wells. LADWP concluded that the observed response indicated a small zone of influence and a deep cone of depression. LADWP estimated an average transmissivity of 1,340 ft^2/day and a storage coefficient of 0.004 using pumping test data for the aquifer near well V817.

G2.4. Surface Water

The average annual precipitation in Rose Valley ranges from 5 to 7 inches while the area's annual evapotransporation rate is estimated to be on the order of 65 inches (CWRCB, 1993). Consequently, surface water bodies in the Rose Valley area consist of perennial springs sustained by groundwater flow, ephemeral streams and washes that mainly flow in the winter, and a groundwater-fed lake (Little Lake) and nearby ponds. Surface water features of interest are shown on **Figure G-1** and discussed below.

G2.4.1. Haiwee Reservoir

The South Haiwee Reservoir is located at the north end of Rose Valley approximately 6 miles north of Coso Junction, CA. The crest of the south Haiwee Dam is located at an elevation of approximately 3,766 ft MSL. Because of seismic stability concerns, the water level in the reservoir is currently limited to a maximum elevation 3,742 ft MSL. During construction of the dam, a trench was reportedly excavated to a depth of up to 120 ft below ground surface, until it tagged basalt bedrock, and backfilled with clay to seal the base of the dam (LADPS, 1916); however, the remainder of the reservoir is unlined. Weiss (1979) estimated that underflow from Haiwee Reservoir contributed approximately 600 acre-ft of water per year to the Rose Valley groundwater basin.

G2.4.2. Springs

Several springs are located in or near Rose Valley as follows:

- **Rose Spring –** Rose Spring is reportedly (USGS Topographic Map) located in the Haiwee Geothermal Leasing Area approximately two miles south and west of the South Haiwee Reservoir at an elevation of approximately 3,640 feet amsl. A table of spring discharge data presented in Rockwell (1980) indicated that the spring was flowing in November 1975 but did not list discharge rates data for the spring. While the Rose Spring was reportedly sampled by the USGS in the early 1970's, no discharge has been observed from the spring in recent years. During a biological reconnaissance survey conducted on April 5, 2008, no surface water was observed. A concrete storage structure lies below the spring; however, water pipes that once fed the structure are no longer functioning (MHA 2008). When flowing, the spring apparently drains shallow groundwater in alluvial sediments south of the reservoir. Due to its higher elevation and lack of discharge, the Rose Spring is not believed to be directly connected to the Rose Valley groundwater aquifer system.

- **Tunawee Canyon Spring –** Tunawee Canyon Spring is located in Tunawee Canyon approximately four miles northwest of the town of Coso Junction at approximately 5,200 feet amsl. Several springs are identified in the upper reaches of Tunawee Canyon on the USGS topographic map of the area. Tunawee Canyon Spring is likely sustained by high elevation precipitation infiltration in the Sierra Nevada Mountains to the west. Rockwell (1980) reported discharge rates of 1.6 to 15 gallons per minute (2.6 to 24 acre-feet/yr) from the spring in November 1975.

- **Davis Spring –** The Davis Spring is located on the Davis Ranch, approximately two miles west of Coso Junction. The Davis Spring is located on the west central side of Rose Valley at Portuguese Bench at an elevation of approximately 3,870 feet amsl. The estimated groundwater discharge rate from the Davis Spring was reported to be approximately 7 acre-feet per year (ac-ft/yr) on an annualized basis in November/December 2007 (MHA 2008), and approximately 9 ac-ft/yr in October/November 2009 (Inyo Co. 2009). The Davis Spring discharge point is located more than 600 feet higher than the groundwater table in the Rose Valley aquifer east of the Davis property at Coso Junction. Spring flow is sustained by high elevation precipitation infiltration in the Sierra Nevada Mountains west of the Davis property. Discharge from the spring that is not used on the Davis property infiltrates back into the ground, after which it percolates downward to recharge the alluvial aquifer. Due to its higher elevation, the Davis Spring is not believed to be directly connected to the Rose Valley groundwater aquifer system. Differences in the stable isotopic composition of the discharge from Davis Spring and Rose Valley waters support the conclusion that the source of Davis Spring is separate from Rose Valley groundwater (MHA, 2008)

- **Sacatar and Little Lake Canyon Springs –** Rockwell (1980) presents data from sampling springs in Sacatar Canyon and Little Lake Canyon in February 1979. The springs were reportedly located at elevations of 4,950 and 3,650 ft amsl, respectively. Sacatar Spring reportedly flowed at a rate of 1 to 5 gallons per minute (1.6 to 8 acre-feet/yr) in November 1975. No flow rate data were identified for Little Lake Canyon Spring. Both springs are located in bedrock outcrops above and west of Rose Valley; and, as a result are not believed to be directly connected to the Rose Valley groundwater aquifer system.

- **Little Lake Fault and Coso Springs –** The Little Lake Fault Spring and Coso Spring are located at the south end of Rose Valley. Little Lake Fault Spring is located on the west side of US 395 approximately one mile south of Little Lake. Coso Spring is located on the east side of US 395, on the Little Lake Ranch property, approximately ¼ mile south of Little Lake. No data have been identified regarding the groundwater discharge rate from the Little Lake Fault Spring. Because it is located in close proximity to Little Lake, Coso Spring is discussed further in the “Little Lake” section below.

G2.4.3. Lakes, Ponds, and Other Surface Water Features

Little Lake, is a perennial lake located at the south end of Rose Valley, to the south of the Haiwee Geothermal Leasing Area, approximately seven miles south of the town of Coso Junction (**Figure G-1**). The majority of Little Lake is located within the Little Lake Ranch, which is a 1,200 acre privately-owned recreational preserve owned and managed by Little Lake Ranch, Inc. Ten acres at the southeast corner of Little Lake is owned by the BLM and includes a visitor overlook. The property includes the approximately 90-acre Little Lake, two smaller perennial ponds, a "siphon well", several other ponds that reportedly contain water intermittently, and adjacent wetland habitat. Little Lake is reportedly 3 to 5 feet deep (MHA 2008); the depths of the other ponds are unknown. The depth and area of the lake have been enhanced by the construction of a low dike along its southern perimeter; consequently, the water level in the lake is regulated by the rate of groundwater inflow into the lake and the setting of a discharge weir located at the south end of the lake.

Because the Little Lake Ranch property is located in a desert area that receives little rainfall, the surface water features and riparian habitat on the property are heavily dependent on an uninterrupted supply of groundwater to maintain surface water flow rates and to sustain plant growth. As a requirement of the approval of the Hay Ranch groundwater diversion project, Inyo County is currently monitoring surface water discharge rates at three locations on the property including the Little Lake Outlet, Coso Spring, and a surface water collection ditch called the North Culvert as well as water levels in Little Lake, several wells on the property (Inyo Co., 2009), and additional wells throughout Rose Valley.

G2.5. Conceptual Groundwater Water Budget

The Rose Valley groundwater system is primarily recharged by mountain front recharge derived from precipitation and snowmelt that falls at higher elevation in the Sierra Nevada front range. The south sloping groundwater table observed at the north end of Rose Valley indicates groundwater enters Rose Valley from Owens Valley to the north and/or from seepages losses from the south Haiwee Reservoir. This inflow is incorporated into the model.

Some precipitation recharge likely occurs in the Coso Range on the east side of the valley but was conservatively neglected for the current modeling effort. The U.S.G.S. (2009) estimated that the recharge from the Coso range might be on the order of 310 to 630 acre-ft/yr, based on analysis using what they termed an "uncalibrated" regional recharge basin characterization model. Also, perhaps as much as 250 acre-ft/yr of groundwater may enter southeastern Rose Valley as upwelling from the Coso geothermal system based on proportions of chloride and stable isotopes in groundwater in southeastern Rose Valley, but was conservatively neglected in this analysis. Leakage from the LADPW aqueducts that traverse Rose Valley was assumed to be a negligible component of total groundwater inflow to the basin.

Currently, the principal groundwater outflow components consist of groundwater underflow and surface water discharges to the Indian Wells Valley to the south, and evapotranspiration from Little Lake and phreatophytic vegetation on the Little Lake Ranch property. Because of the dry climate, essentially all of the precipitation falling on Rose Valley is lost to evapotranspiration. However, because the groundwater table is located 40 or more feet below ground surface over all but the southern tip of the valley, evapotranspiration does not factor into the groundwater budget except on the Little Lake Ranch property. On the Little Lake Ranch property, groundwater rises to the surface through springs, and sustains the 90-acre lake and several ponds. In this area, evaporation from the lake and ponds and transpiration from riparian plants are significant. Inflow and outflow components of the groundwater budget for Rose Valley are discussed in more detail below.

G2.5.1. Simulated Groundwater Inflow Components

Principal inflow components consist of mountain front recharge, groundwater inflow from Owens Valley to the north and/or seepage from Haiwee Reservoir.

- **Mountain Front Recharge –** Precipitation recharge in the Sierra Nevada range west of Rose Valley is the principal source of groundwater to the Rose Valley basin. Due to the rain shadow effect caused by the Sierra Nevada's, the precipitation rate in the Coso Range on the east side of Rose Valley is low. To be conservative, it was assumed that the evapotranspiration potential exceeded potential precipitation recharge throughout Rose Valley and the Coso Range. Methodologies to directly measure mountain front recharge are poorly defined; typically groundwater recharge from precipitation is estimated as a percentage of total recharge.

  Brown and Caldwell (2006) concluded that precipitation rates in the Rose Valley area range from about 6 inches per year (in/yr) on the valley floor to up to 20 in/yr at the crest of the Sierra Nevada range and that only precipitation falling at elevations above 4,500 ft results in groundwater recharge. In the mountains, precipitation rate (including rainfall and snow melt) is strongly dependent on altitude. Danskin (1998) established an empirical relationship between precipitation rate and altitude based on precipitation and snow records collected routinely for more than 50 years in 20 survey stations along the western side of Owens Valley. Using the empirical relationship developed in the Danskin report, Brown and Caldwell estimated that the average precipitation rate for the elevation ranging from 4,500 ft to 6,500 ft was 10 in/yr, increasing to 15 in/yr for parts of the watershed above 6,500 ft. Using a geographic information system (GIS), to evaluate the contribution from areas of varying elevation in the Sierras west of Rose Valley, Brown and Caldwell estimated that the total precipitation volume that could potentially recharge the Rose Valley groundwater basin was approximately 42,000 acre-ft/yr.

  For the purposes of the initial evaluation of potential impacts of groundwater development at Hay Ranch, they further assumed that only 10 % (4,200 acre-ft/yr) of the potential mountain front precipitation recharge actually reaches Rose Valley. Danskin (1998) used a value equivalent to 6% of Sierra Nevada range precipitation for the mountain front recharge component of the numerical groundwater flow model developed to evaluate groundwater development in Owens Valley. Williams (2004) estimated that mountain front precipitation recharge in Indian Wells Valley amounted to approximately 8% of precipitation in the Sierra Nevada range to the west. However, Williams noted that the Maxey-Eakin Method for estimating precipitation recharge in the Sierra Nevada range conservatively neglects areas receiving less than 8 in/yr of precipitation; consequently, higher recharge rates are possible. Because the mountain front precipitation recharge rate as assumed for the Brown and Caldwell groundwater flow model yielded reasonable calibration results in the steady state model, a recharge rate of approximately 4,200 acre-ft/yr was also used in this study.

- **Groundwater Inflow/Seepage from the North –** As noted previously, Weiss (1979) estimated seepage losses from the Haiwee Reservoir to be on the order of 600 acre-ft/yr. Previous investigators (Bauer, 2002; Brown and Caldwell, 2006) and GEOLOGICA's review of groundwater elevation contour patterns in the north end of Rose Valley indicate that groundwater inflow from southern Owens Valley and/or seepage losses from the south Haiwee Reservoir recharge the Rose Valley groundwater basin at the north end of the valley. Using a steady-state numerical groundwater flow model of the Rose Valley groundwater basin, Brown and Caldwell (2006) estimated the groundwater influx from the north to be approximately 788 acre-ft/yr, which is similar to the estimate of Weiss (1979). Recalibration of the numerical groundwater flow model for the 2008 Hay Ranch EIR indicated a slightly higher groundwater inflow rate from the north (Owens Valley/Haiwee Reservoir) of 890 acre-ft/yr.

G2.5.2. Simulated Groundwater Outflow Components

Principal groundwater outflow components from Rose Valley consist of discharge to the Indian Wells Valley from the Little Lake area and an area in the southeast part of the valley, east of Red Hill, and evapotranspiration in the Little Lake area. Limited groundwater extraction was identified in Rose Valley.

- **Groundwater Discharge from Southeastern Rose Valley –** Brown and Caldwell (2006) estimated that approximately 2,050 acre-ft/yr of groundwater discharges from Rose Valley in the southeast part of the valley (southeast of Navy well 18-28) as underflow to Indian Wells Valley. Williams (2004) concluded that existing estimates of recharge to the Indian Wells Valley significantly underestimated interbasin transfers and referenced an estimate of groundwater underflow from Rose Valley to Indian Wells Valley of 10,000 acre-ft/yr developed by Thompson (1929). Recalibration of the numerical groundwater flow model for Rose Valley indicated an underflow rate from Rose Valley to Indian Wells Valley in this area of 850 acre-ft/yr. This is less than half the value of 2,050 acre-ft/yr assigned to this term in the Brown and Caldwell (2006) numerical modeling analysis. This difference is discussed in the model calibration section.

- **Groundwater Discharge at Little Lake –** Groundwater discharge by several processes in the Little Lake area is the dominant outflow component from Rose Valley. The processes operating at Little Lake include:

- Evaporation from the lake surface;
- Transpiration from phreatophyte plants on the property;
- Discharge from Coso Spring;
- Discharge from the Little Lake Weir; and
- Discharge from the Little Lake Siphon well.

Bauer (2002) estimated that evaporation from the Little Lake water surface consumes approximately 500 acre-ft/yr based on a lake surface area of 75-90 acres and evaporation rate of 80 in/yr. Plant communities identified on the Little Lake Ranch property were described as akalai desert (saltbush scrub), palustrine (pond) and lacustrine (lake) wetlands, and riparian (creek) habitat. Beginning in 2000, Little Lake Ranch, Inc., conducted various projects intended to restore or enhance 90 acres of lacustrine wetlands, 10 acres of palustrine emergent wetlands, about 6 acres of palustrine/riparian habitat (1.6 mile long creek corridor), and an additional 220 acres of wetland and upland habitat, and 1 acre of wetland and associated upland habitat was acquired. As a result of shallow groundwater in this area, plant communities on and near the Little Lake Ranch property have greater access to groundwater than occurs elsewhere in the valley. GEOLOGICA (2008) estimated that transpiration processes in the Little Lake area could consume up to 700 acre-ft of groundwater per year. The domestic well by the ranch house, several irrigation wells, and the former Little Lake Hotel well are not believed to extract significant quantities of groundwater. All of the groundwater discharged in the Little Lake area that is not evaporated or transpired by plants reportedly infiltrates back into the ground on the property and continues as groundwater underflow to Indian Wells Valley (no surface water flow leaves the property). Because of considerable uncertainty in actual evapotranspiration rates, and the relative contribution of groundwater underflow, overland flow, and evaporation from ponds and other surface water features further south on the ranch property, groundwater consumption on the Little Lake Ranch property was calculated in the 2010 version of the numerical model using evapotranspiration cells to represent evaporation from Little Lake and drain cells to represent discharge to Indian Wells Valley and all other consumptive uses of groundwater on the property.

- **Existing Extraction Wells –** Groundwater in Rose Valley is used for domestic drinking water supply, limited irrigation, light industrial processes, and, at the south end of the valley, for maintenance of riparian habitat in the Little Lake area. The Draft EIR for the Hay Ranch Water Extraction and Delivery System Project (MHA 2008) estimated that approximately 40 acre-ft/yr of groundwater production from wells occurs in Rose Valley. As many as 30 domestic wells are believed to extract relatively small quantities of groundwater for domestic uses and small scale irrigation in the Dunmovin area. Several wells at Coso Junction including a well at the Coso Junction Ranch, Coso store, and the CalTrans rest area produce water for drinking, irrigation, or light industrial purposes. The Coso Ranch North well and northern Coso Junction Store well (Coso Junction #1) are not being used at present. Rockwell (1980) reported that irrigation pumping at the Rose Valley Ranch (now referred to as the Hay Ranch) started in 1975, and averaged approximately 3,000 acre-ft/yr. In 1979 the Rose Valley Ranch reportedly pumped approximately 3,130 acre-ft/yr of groundwater from the two wells on the property for alfalfa irrigation. Alfalfa farming ceased sometime in the early 1980's. No significant agricultural irrigation, or groundwater extraction for any other purpose, has occurred in the valley since that time. Wells on the Navy property in Rose Valley including the Lego well, well G-36, and well 18-28 are not being pumped.

Groundwater extraction is specified in several existing wells in Rose Valley in the steady-state model including:

- Domestic supply in the Dunmovin area is represented in the groundwater flow model with a single well pumping at a steady rate of 8.5 acre-ft/yr based on estimates from the Rockwell (1980) hydrologic study.
- Water supply for the Coso Junction store and CalTrans rest stop is represented in the groundwater flow model with a single well pumping at a steady rate of 17 acre-ft/yr.
- Irrigation and light industrial supply at the Coso Junction Ranch property is represented in the groundwater flow model with a single well pumping at a steady rate of 17 acre-ft/yr.

The same steady state groundwater extraction rates were specified in the transient model. In addition, two intervals of pumping from the LADWP's V817 well in March 2009 (of 1-1/2 days and 6-1/2 days) and pumping for 14 days from the Hay Ranch south well in late November 2007 were simulated in the transient calibration model.

G2.5.3. Groundwater Budget

The groundwater elevation monitoring data suggest that groundwater inflows have equaled or slightly exceeded groundwater outflows from the Rose Valley groundwater basin in the past five years. Assuming that groundwater inflows equal outflows, that is, that steady state conditions prevail, the resulting conceptual Rose Valley groundwater budget is tabulated in the table below. Some of these components are estimated based on independent studies (e.g. Mountain Front Recharge) and some values are derived from the model after adjustments for model calibration (e.g. groundwater underflow from Rose Valley to Indian Wells Valley). Values from the 2008 version of the Rose Valley numerical groundwater flow model are also listed for comparison purposes:

Table G-2: Rose Valley Groundwater Budget

Budget Components	Values Cited in the Literature	2008 Model		2010 Model	
		Flow Rate acre-ft/yr	Simulation Package used in Model	Flow Rate acre-ft/yr	Simulation Package used in Model
Groundwater Inflow					
Mountain Front Recharge from	2,040-	4,197	Well (Specified	4,197	Well (Specified

west	4,070(5)		Flux)		Flux)
Recharge from Coso Range	310-630(5)	0	--	0	--
Groundwater Underflow from the North	0(5) 600(6) 788(1)	898	Constant Head	898	Well (Specified Flux)
Total Inflow		**5,095**		**5,095**	
Groundwater Outflow					
Existing extraction wells		38	--	42	Well
Groundwater underflow to Indian Wells Valley exiting from southeastern Rose Valley	2,050(1)	848	General Head	2,102	General Head
Evaporation from Little Lake	500(2)	462	Evapo-transpiration	416	Evapo-transpiration
Phreatophyte and Riparian plant transpiration on Little Lake Ranch property	700(7)	--	--	--	--
Groundwater Discharge through Little Lake Gap to Indian Wells Valley	0(5) 3,300(3) 10,000(4)	3,747	General Head	2,537	Drain
Total Outflow		**5,097**		**5,097**	

Source:
1) Brown & Caldwell (2006)
2) Bauer (2002)
3) Williams (2004)
4) Thompson (1929)
5) U.S.G.S. (2009)
6) Weiss (1979)
7) GEOLOGICA (2008)

G3. NUMERICAL MODEL DEVELOPMENT

Brown and Caldwell (2006) developed a three-dimensional, numerical model of the Rose Valley groundwater basin which was then revised, and recalibrated, by GEOLOGICA for the Hay Ranch Groundwater Extraction Project EIR (GEOLOGICA, 2008), and, revised and recalibrated, by GEOLOGICA for the current study. Groundwater flow evaluations were conducted using the U.S.G.S. MODFLOW computer code (McDonald and Harbaugh, 1988) implemented in the Groundwater Vistas graphical environment (Version 5, Environmental Simulations, 2007). The revised model incorporates new groundwater elevation data and lithologic information from monitoring well drilling and logging conducted for the Hay Ranch Monitoring Project (Inyo Co. 2009, 2010), as well as time-drawdown data from a 6-1/2-day pumping test conducted on the LADWP property in March 2009.

G3.1. Overview of Model Revisions

The numerical groundwater flow model of Rose Valley modified for Hay Ranch Groundwater Extraction Project EIR (GEOLOGICA, 2008), aka, the Rose Valley Model, was revised for the current study to better represent the structure of the local aquifer system, and to address comments from various sources regarding model input parameters, boundary conditions, calibration, and sensitivity analysis. Specific revisions are summarized below:

- **Northern Inflow Boundary –** The 2008 version of the Rose Valley Model utilized a Constant Head Boundary condition along the northern edge of the model domain to represent groundwater inflow from Owens Valley, seepage losses from the South Haiwee Reservoir, and mountain front recharge at the far north end of the valley. Several reviewers noted that the groundwater flux calculated by MODFLOW for a Constant Head Boundary could be artificially high if groundwater extraction was specified too close to the boundary. For the current study, the Constant Head Boundary nodes were removed from the model and replaced with specified flux (well) cells to limit groundwater inflow in this area to specified rates based on the water budget analysis discussed in Section G.2.5.1.
- **Southern Outflow Boundary –** The 2008 version of the Rose Valley Model utilized a General Head Boundary condition along the southern edge of the model domain near Little Lake to represent groundwater outflow from the Rose Valley aquifer to the Indian Wells valley to the south. Several reviewers commented that under conditions of extreme aquifer drawdown, the General Head Boundary nodes could allow the simulation code to force water to enter the model along the southern boundary, which is implausible in the conceptual model for the site. In addition, the U.S.G.S. (2009) noted that the close proximity of the General Head Boundary nodes to the evapotranspiration nodes specified to represent evaporation from Little Lake could make the model unstable. The General Head Boundary nodes were replaced with Drain nodes, which only allow outflow, and moved approximately 2,000 feet to the south to provide additional separation from Little Lake.

- **Model Layering Scheme –** The 2008 version of the Rose Valley Model was subdivided into 4 model layers, with the two uppermost layers representing alluvial deposits, and the two lower layers representing the Coso Lake Bed and Coso Sand members, respectively. Several reviewers commented that the representation of the Coso Lake Bed and Coso Sand geologic units in the model exaggerated the amount of groundwater available for extraction. Consequently, to ensure a conservative evaluation of impacts from groundwater extraction in the valley, the two lower model layers were removed from the model. It should be noted that the revised model, comprised of two model layers, only approximately represents groundwater conditions in the north central part of the valley around the Hay Ranch property where recent drilling and lithologic logging activity suggests that there may be three groundwater-bearing zones, which would require, at a minimum, three model layers to represent in greater detail. Revising the model to represent this condition was beyond the scope of this study and impractical with available hydrogeologic data.

- **Location of Mountain Front Recharge –** The U.S.G.S. (2009) noted that the presence of springs east of the Sierra Nevada mountain front suggests that there is a lateral barrier to groundwater flow (on the western edge of the model domain) that would limit the direct infiltration of mountain front recharge such that most, if not all, of the mountain-front recharge should be simulated in model-layer 1. Consequently, mountain-front recharge simulated using specified flux cells was limited to model-layer 1 in the revised model rather than being distributed across the deeper model layers as was done previously.

- **Lack of Transient Calibration –** Several reviewers commented that the 2008 version of the Rose Valley Model was only calibrated to steady-state conditions which may unconservatively represent conditions during pumping. To address this concern, a transient calibration was conducted using water level data collected in Rose Valley during the two year period from November 2007 to November 2009. In addition, the model was calibrated to time-water level data collected during pumping tests conducted in September/October 2007 on the Hay Ranch property and March 2009 on the LADWP property. The accuracy of the transient model calibration was further assessed by conducting a model confirmation run using time-water level data from the first nine days of intermittent pumping for the Hay Ranch Groundwater Transfer Project beginning in late December 2009.

- **Uncertainty in Aquifer Storage Properties –** Because insufficient data were available to estimate aquifer specific yield, the 2008 version of the Rose Valley Model used a range of values (10, 20, and 30%) for groundwater resource development scenarios that were not used in the model calibration process. The groundwater development scenarios used in the current development impact analysis utilize the final calibrated specific yield value estimated from the transient model calibration. In addition, sensitivity analysis was conducted to assess the sensitivity of the transient model calibration to uncertainty in specific yield.

- **Excessive Model Error near LADWP Wells –** The reviewer for the LADWP noted that the 2008 version of the Rose Valley Model underpredicts groundwater elevation at the LADWP's wells at the north end of the valley by nearly 120 ft. Using data from the pumping test conducted on that property in March 2009 to adjust local aquifer properties, the recalibrated model reduces the error in simulated groundwater elevation at this location to less than 3 ft.

- **Model Grid Spacing –** To further improve the accuracy of the model, the maximum grid spacing was reduced from ¼ mile (1,320 ft) to 1/8 mile (660 ft). In addition, the model grid was refined to a minimum spacing of approximately 220 ft near the Hay Ranch property where new monitoring wells were recently installed to allow better representation of response to pumping.

G3.2. Model Domain and Finite Difference Grid

The model domain covers approximately 132 square miles, extending up to 8.25 miles in the east-west direction and up to 16 miles in the north-south direction (**Figure G-1**). The model domain extends from the groundwater divide near the south Haiwee Reservoir on the north to the Little Lake Gap area to the south, and is bounded by impermeable boundaries representing the Sierra Nevada Mountains on the west and by Coso Range to the east. Consistent with the representation developed in the 2006 and 2008 numerical models of Rose Valley, the southern edge of the active portion of the model grid extends to just beyond the south edge of Little Lake; consequently, Coso spring, the Little Lake Ranch siphon well, and palustrine and riparian wetland areas south of Little Lake are not explicitly represented in the model.

The model domain was discretized into 137 rows, 71 columns, and 2 layers. The maximum cell size of the grid is 1/8 mile in both length and width, representing a 10-acre area. The model grid was refined to a minimum spacing of approximately 220 ft near the Hay Ranch property where new monitoring wells were recently installed to allow better representation of response to pumping. No flow (inactive) model cells were specified along the east and west margins of the model domain to represent the shape of the aquifer within basin fill deposits.

G3.2.1. Model Layer Configuration

Three model layers were originally used to represent the aquifer system in the 2006 version of the Rose Valley groundwater model. As part of the 2008 recalibration process, GEOLOGICA subdivided the uppermost model layer into two layers to better represent the semi-confined behavior of the aquifer, resulting in a four-layer model. The location of the contact between layers 1 and 2 was specified as being just below the bottom depth of shallower wells in the valley (including Cal-Pumice, Coso Store #1 and #2, and the Lego, G-36, and 18-28 wells) which is on the order of 400 ft bgs. The uppermost two layers (layers 1 and 2) were configured to represent: debris flows and debris avalanche in the Dunmovin Hill in the northern part of Rose Valley; the recent alluvial deposits in the center of Rose Valley, and interbedded volcanic deposits and alluvium in the south and southeast part of Rose Valley. The lower two layers were intended to represent the Coso Lake Bed and Coso Sand members, respectively. As noted in Section G3.1, the two lower model layers were removed from the current version of the Rose Valley model to more conservatively represent potential impacts from groundwater extraction.

Model layer 1 is specified as unconfined with transmissivity determined by MODFLOW as the product of horizontal hydraulic conductivity and current saturated thickness and storage represented using specific yield. Layer 2 is configured as a confined, but variable transmissivity unit in MODFLOW with transmissivity calculated as the product of horizontal hydraulic conductivity and the layer thickness at that location and storage represented using a confined aquifer storativity value.

Model layers 1 and 2, together, were constructed to have variable thickness and spatial extent. The basis for specifying layer thickness and the bottom elevation of each of layers is described in Brown and Caldwell (2006). Total model thickness from land surface ranges from 150 ft within Little Lake Gap to approximately 800 ft near the Hay Ranch property.

G3.2.2. Model Boundary Conditions

The active portion of the model domain is bounded on the west and east by by inactive cells representing igneous and metamorphic rocks of the Sierra Nevada and Coso Range which are presumed to be impermeable. Groundwater discharge to Indian Wells Valley in the southeast part of Rose Valley (east of Red Hill) through fractured basalt flows and/or basalt flows overlying alluvial deposits was represented using a head dependent boundary condition. Model cells that represent bedrock areas form the inactive portion of the model domain and also serve as no-flow boundaries. Boundary conditions specified in Layers 1 and 2 are depicted in Figures G-a and G-b, respectively.

- **No Flow Boundaries/Inactive Cells –** The location of no flow boundaries, and thereby, inactive cells in the model domain were similar to those specified in the 2008 model with the exception that after the model grid spacing was refined, the shape of the southern model boundary was smoothed to better conform to the estimated extent of alluvial deposits in that area. **Figure G-5** shows the location/configuration of inactive model cells.

- **Specified Flux Boundaries –** Specified flux boundary cells in model layer 1 were used to represent mountain front recharge derived from precipitation and snowmelt that falls on the Sierra Nevada on the west side of the model grid, and, groundwater inflow from the north and seepage from the South Haiwee Reservoir along the northern model boundary. The flow rates for the specified flux cells were set to constant annualized rates based on the groundwater budget developed for the Hay Ranch EIR (Geologica, 2008) and discussed in **Section G2.5**. Sensitivity analyses, discussed in **Section G-3.3.3**, were conducted to evaluate the sensitivity of the steady-state and transient model calibration results to the magnitude of the northern boundary inflow and western boundary inflow.

- **Evapotranspiration –** Surface water evaporation from Little Lake and evapotranspiration from phreatophyte plants around the lake was represented using the MODFLOW Evapotranspiration (ET) package with ET cells specified in model layer 1 over the approximate footprint of the lake. The extinction depth for the ET cells was set to 15 ft below ground surface, the same value as was used in the 2006 model, and consistent with the value used in the USGS model of Owens Valley (Danskin, 1998). Bauer (2002) estimated the surface water evaporation rate from Little Lake to be approximately 500 acre-ft per year, presumably when the lake is at its maximum depth. The relationship between lake level and surface area is unknown, presumably, at lower water levels the lake covers less area and may lose less water to evaporation. MODFLOW reduces the calculated evapotranspiration loss in proportion to the groundwater table depth below ground surface; no evapotranspiration occurs when the groundwater table is at or below the extinction depth (15 ft), half as much evapotranspiration is calculated when the groundwater table is located at half the extinction depth (7.5 ft) below ground surface. The evapotranspiration rate was adjusted during model calibration to yield a total evapotranspiration loss of approximately 500 acre-ft per year in the steady state model, consistent with the 2006 model.

- **General Head Boundary** – Groundwater outflow to Indian Wells Valley from the southeast part of Rose Valley near well 18-28 was simulated using general head boundary (GHB) cells specified in model layer 2. GHB cells in MODFLOW allow groundwater inflow or outflow from the model at a rate dependent on the difference between groundwater elevation in the model and a specified elevation and a conductance assigned to the general head boundary cell; however, the groundwater elevation in the GHB cell is calculated by MODFLOW during a simulation, not fixed like a Constant Head boundary cell. Brown and Caldwell used groundwater elevations measured in the Lego Well in Rose Valley and historical water level elevations measured in the Indian Wells Valley (presented in Bloyd and Robson, 1971) to estimate the flow across this boundary. The conductance and groundwater elevation in the GHB cells were adjusted during this model calibration process to better simulate groundwater elevations observed in the southeast part of Rose Valley.

- **Drain Nodes –** The groundwater outflow to Indian Wells Valley in the Little Lake area was represented using MODFLOW Drain nodes specified in Model Layer 1, at the south end of the model grid near Little Lake (**Figure G-5**). This is a departure from the treatment of this groundwater outflow term in the 2008 model in which General Head Boundary cells were used to represent groundwater discharge from the south end of Rose Valley.

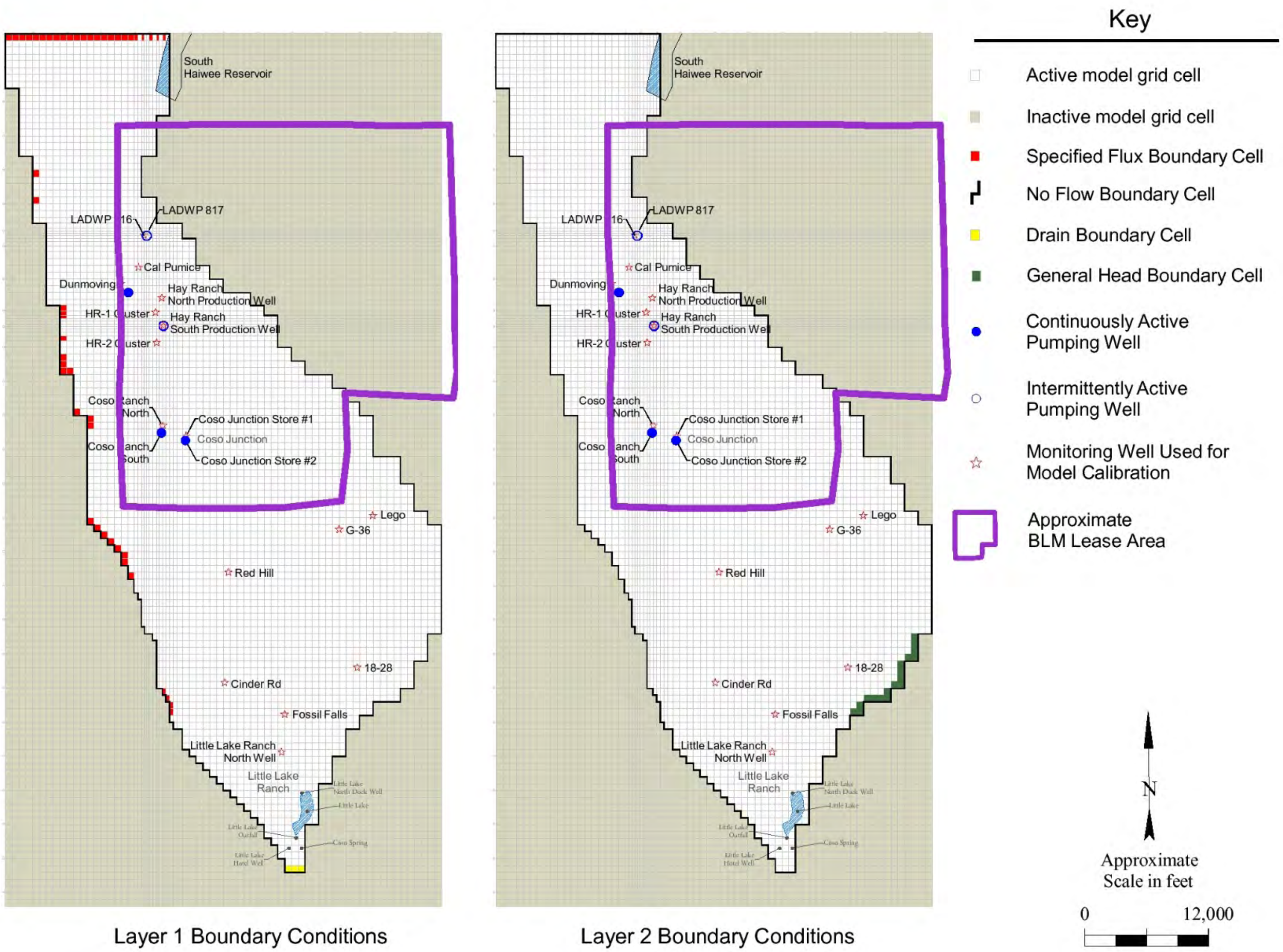


Figure G-5: Model Boundary Conditions – Layers 1 and 2

G3.2.3. Initial Aquifer Parameters

Initial values for key aquifer parameters including horizontal hydraulic conductivity (Kh), vertical hydraulic conductivity (Kz), water table specific yield (Sy), and aquifer storativity (Ss) were specified based on the final calibrated values used in the 2008 version of the Rose Valley model (GEOLOGICA, 2008). Initial Kh values ranged from 0.55 foot per day (ft/day) in the north end of the model grid (from well V816 north), to 24 ft/day in the central portion of the grid, to 200 ft/day in the southern end of the model domain near Little Lake Ranch. Initial Kz values ranged from 0.05 ft/day in the north end of the model grid (from well V816 north), to 0.019 ft/day in the central portion of the grid, to 20 ft/day in the southern end of the model domain near Little Lake Ranch. A uniform storativity value of 1×10^{-7}/ft was used throughout the model domain in accordance with the 2008 version of the model. An initial specific yield value of 0.1 (10%) which was the lowest specific yield value used in groundwater resource development evaluations for the Hay Ranch EIR (RMT, 2008) was used in initial calibration efforts.

G3.3. Model Recalibration

Recalibration of the 2008 version of the numerical model of groundwater flow conditions in Rose Valley was conducted in an iterative process which consisted of calibrating a steady-state model to groundwater elevations observed in Rose Valley at the beginning of November 2007, followed by calibration of a transient model to groundwater elevations observed in wells monitored in the valley between November 2007 and November 2009. The transient model used the same aquifer parameters as the steady-state model, with the exception that it included aquifer storage coefficients that are not used in a steady-state model. The transient model was linked to the steady-state model in that it used the final groundwater elevations from the steady-state model as initial groundwater elevations for the transient simulations. In addition to water level data from the Hay Ranch Monitoring Program (Inyo Co., 2009, 2010), the transient model used time-drawdown data from a 14 day pumping test conducted on the Hay Ranch property in November 2007 (GEOLOGICA, 2008) and 1-1/2 and 6-1/2 day pumping tests conducted on the LADWP property in March 2009 (LADWP, 2009). During the model calibration process, model input parameters were iteratively adjusted until a visual best fit was observed between simulated groundwater elevations and observed groundwater levels during the calibration period, and, the summed squared error between observed and simulated elevations was minimized. Parameters adjusted included:

- Horizontal and vertical hydraulic conductivity;
- Aquifer storativity and specific yield;
- General Head Boundary elevation and conductance;
- Drain elevation and conductance.

G3.3.1. Final Calibrated Model Parameters

Final parameter values are listed in **Table G-3**. The spatial distributions of calibrated parameter values are illustrated on **Figures G-6** and **G-7**. The main changes in aquifer parameter values in the revised model compared to the 2008 model were in the horizontal hydraulic conductivity in the north and central parts of the model grid, vertical hydraulic conductivity in the central part of the grid, storativity values in the central and northern part of the grid, and specific yield throughout the model domain.

Horizontal hydraulic conductivity at the north end of the model grid including, and north of the LADWP property, was set to 0.55 ft/day in the 2008 model, yielding an aquifer transmissivity in that area of approximately 500 ft^2/day. However, a pumping test conducted by LADWP (2009) on their property in March 2009 indicated higher transmissivity in the area on the order of 1,340 ft^2/day. Horizontal hydraulic conductivity in this area was increased to 2 ft/day during the model calibration process, yielding a significantly better fit between observed and simulated steady-state groundwater elevation. An apparent low permeability zone was identified between the Cal Pumice well and LADWP wells 816 and 817, based on the presence of very high groundwater elevation gradients in that area (see **Figure G-3**). Horizontal hydraulic conductivity was decreased in that region in model layers 1 and 2 in an iterative fashion to improve the match between simulated and observed groundwater elevations north of this region.

Table G-3: Summary of Final Calibrated Parameter Values

Parameter	Parameter Value	Units
Northern Boundary Kh	2	ft/day
Northern Boundary Kz	0.02	ft/day
V816 to Pumice Well Kh	0.24	ft/day
V816 to Pumice Kz	0.024	ft/day
Hay Ranch Transition Kh	7.5	ft/day
Hay Ranch Transition Kz	0.75	ft/day
Central Valley Kh L1	50	ft/day
Central Valley L1 Kz	0.001	ft/day
Central Valley Kh L2	12.8	ft/day
Central Valley L2 Kz	0.01	ft/day
Southeastern Kh	100	ft/day
Southeastern Kz	10	ft/day
Volcanics Kh	1	ft/day
Volcanics Kz	0.1	ft/day
Little Lake Kh	112.5	ft/day
Little Lake Kz	11.25	ft/day
Southeast General Head Boundary Elevation	3,140	ft
Southeast General Head Boundary Conductance	367	ft2/day
Little Lake Drain Boundary Elevation	3,110	ft
LittleLake Drain Boundary Conductance	6.60E+05	ft2/day
Northern Boundary Specified Flux	107,088	cfd
Sierra Recharge	500,560	cfd
Northern Sy	0.035	-

Northern Ss	3.50E-06	1/ft
Central Sy	0.1	-
Central Ss	1.50E-06	1/ft
Southern Sy	0.1	-
Southern Ss	3.50E-06	1/ft

Lithologic logging data made available by construction of two sets of clustered monitoring wells on the Hay Ranch property in 2009 (SGSI, 2009a, 2009b, and 2009c) revealed more strongly anisotropic soils in the area than previously estimated. Soils in the upper 200 feet of the soil column were gravelly, while soils below that depth were found to be more fine-grained. In addition, two distinct clay horizons were identified in both clustered boring locations that SGSI concluded would function as aquitards. These two clay aquitards cannot be represented explicitly in the two-layer numerical model. The hydraulic effect of the shallow high permeability gravel horizon overlaying less permeable sands and silts at depth was represented by assigning a higher horizontal hydraulic conductivity (50 ft/day) in the central portion of model layer 1 and lower horizontal hydraulic conductivity (12.8 ft/day) in model layer 2. The hydraulic effect of the two clay aquitards was represented by assigning low vertical hydraulic conductivities to model layers 1 and 2 of 0.001 and 0.01 ft/day, respectively, effecting vertical anisotropy ratios of 50,000 to 1 and 1,280 to 1. Elsewhere in the model, higher vertical anisotropy ratios of 10 to 1, more typical of natural sediments absent low permeability aquitards, were used.

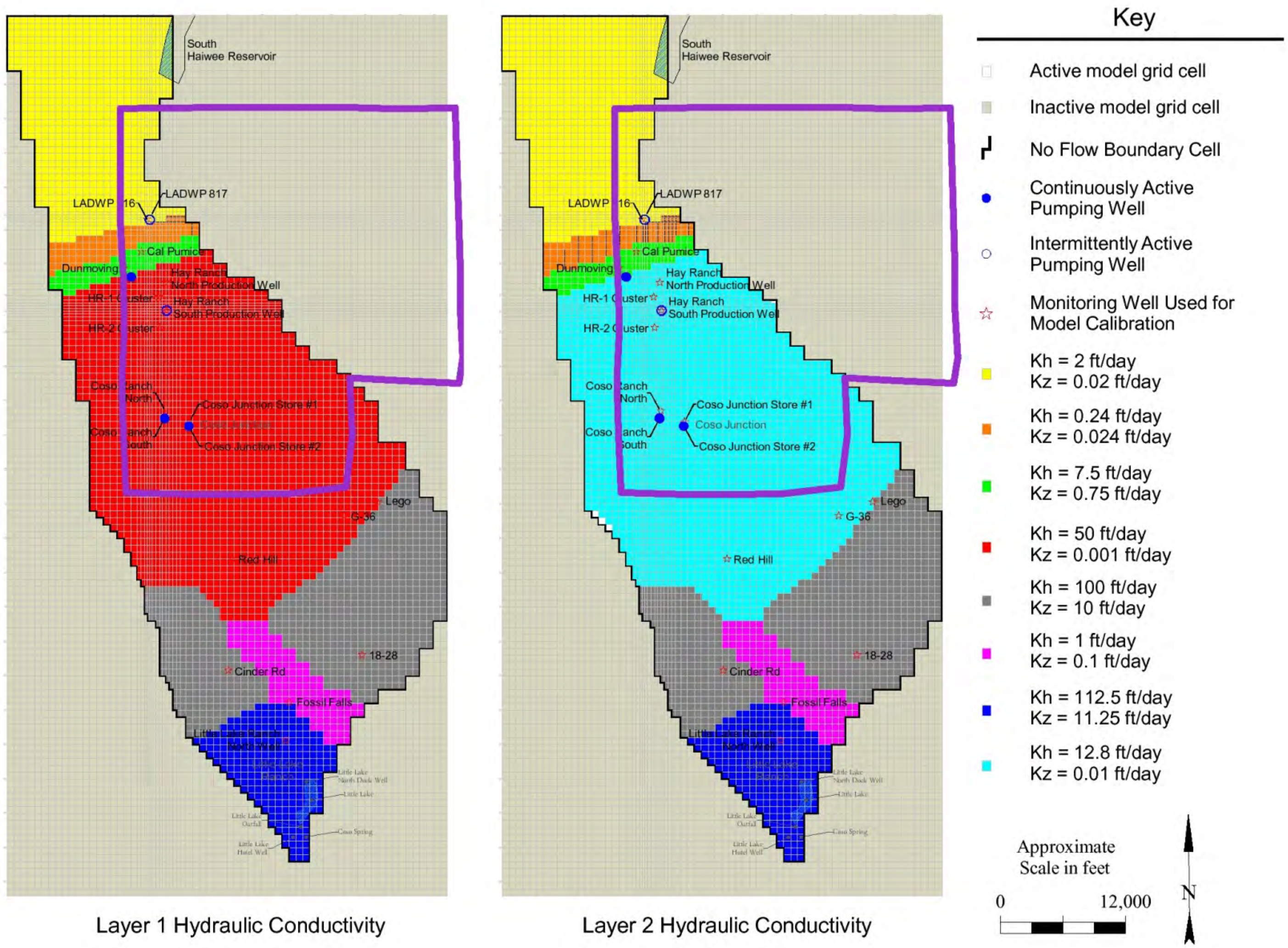


Figure G-6: Hydraulic Conductivity Distribution – Layers 1 and 2

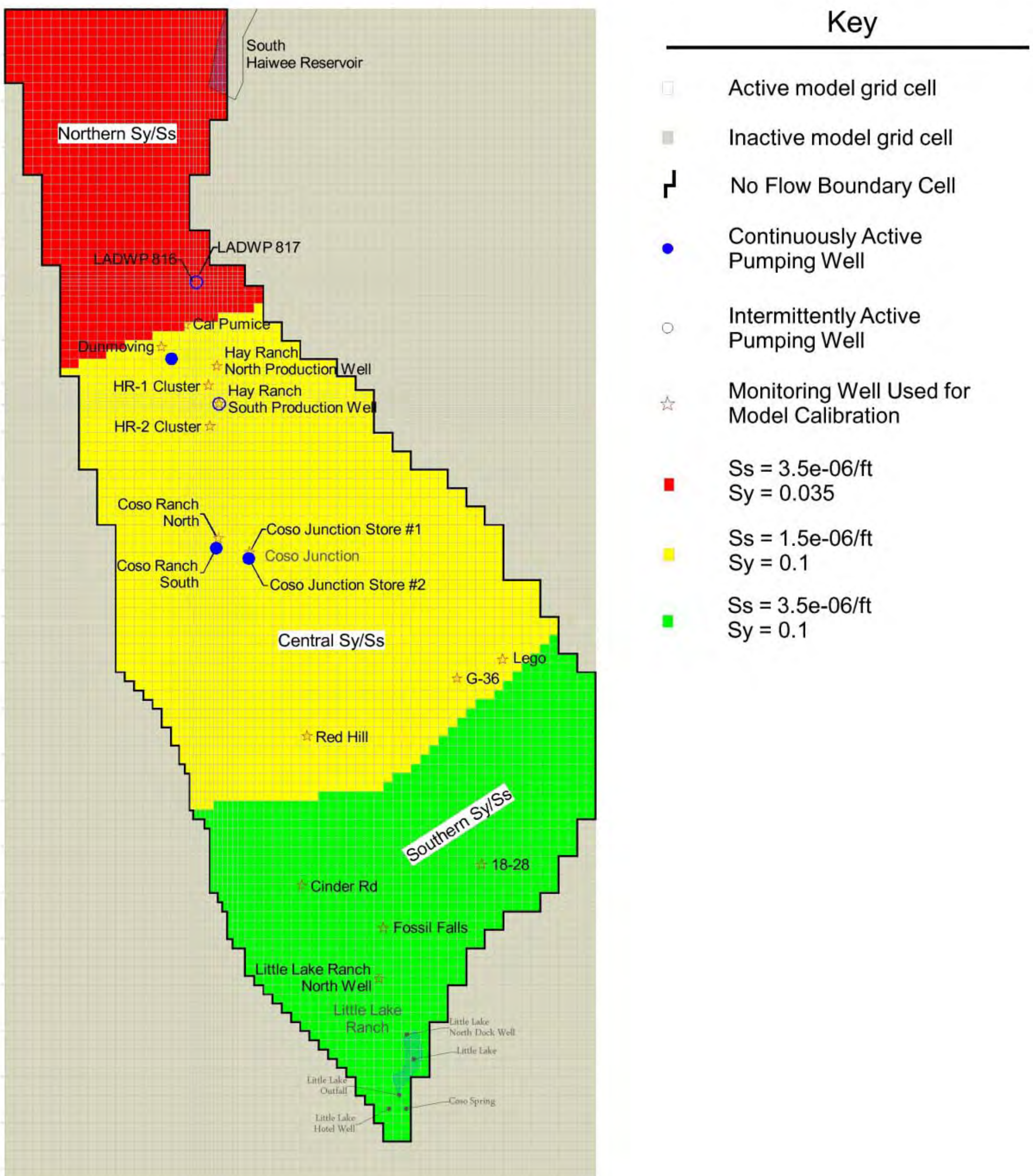


Figure G-7: Storage Property Distribution – Layers 1 and 2

For the 2010 model calibration, the model domain was subdivided into three subregions, north, central, and southern as depicted in **Figure G-7** for the specification of aquifer storage properties. Then specific yield and aquifer storativity were iteratively adjusted during the transient model calibration process until a best fit was obtained between simulated and observed groundwater elevations.

G3.3.2. Calibrated Model Accuracy

The accuracy of the model calibration efforts was evaluated by comparison of simulated groundwater elevations and groundwater elevations observed in November 2007.

- **Steady-State Model – Figure G-8** presents a plan view map comparing simulated groundwater elevation contours versus groundwater elevations observed in November 2007. **Table G-4** below summarizes simulated versus observed groundwater elevations at 10 selected monitoring well locations for the 2008 and 2010 steady-state model calibrations, respectively.
-

Table G-4: Steady-State Model Calibration Summary

Well Name	Observed Groundwater Elevation, ft	2008 Model		2010 Model	
		Simulated Groundwater Elevation, ft	Calibration Residual Difference	Simulated Groundwater Elevation, ft	Calibration Residual Difference
LADWP V816	3434	3326.0	108	3431.1	2.9
Cal-Pumice	3266	3247.9	18.1	3253.4	12.6
Hay Ranch North	3245	3243.8	1.2	3244.6	0.4
Hay Ranch South	3241	3242.2	-1.2	3241.2	-0.2
Coso Ranch North	3232.7	3231.0	1.7	3232.1	0.6
Coso Junction #1	3229.3	3227.1	2.2	3228.2	1.8
Navy Lego	3200.5	3203.3	-2.8	3197.3	3.2
Navy G-36	3199.6	3203.3	-3.7	3198.8	0.8
Navy 18-28	3188.2	3182.2	6.0	3182.4	5.6
Little Lake Ranch North	3158.95	3158.1	0.8	3158.7	0.3
Steady-State Calibration Statistics					
Residual Mean			13.0		2.8
Res. Std. Dev.			32.2		3.7
Sum of Squared Residuals			12069		212.3
Abs. Res. Mean			14.6		2.8
Minimum Residual Difference			-3.7		-0.2
Maximum Residual Difference			108		12.6
Range in Target Values			275		275
Std. Dev./Range			0.12		0.013

The calibration residuals for the 2010 model show considerable improvement at the north end of the valley on the LADWP property where the difference between observed and simulated groundwater elevation decreased from 108 ft in the 2008 model to less than 3 ft in the 2010 model. Calibration residuals for the remaining observation wells were generally lower in the 2010 model and except for the Cal-Pumice well, north of the Hay Ranch property, and the Navy 18-28 well in the southeast end of the valley, are less than 4 ft.

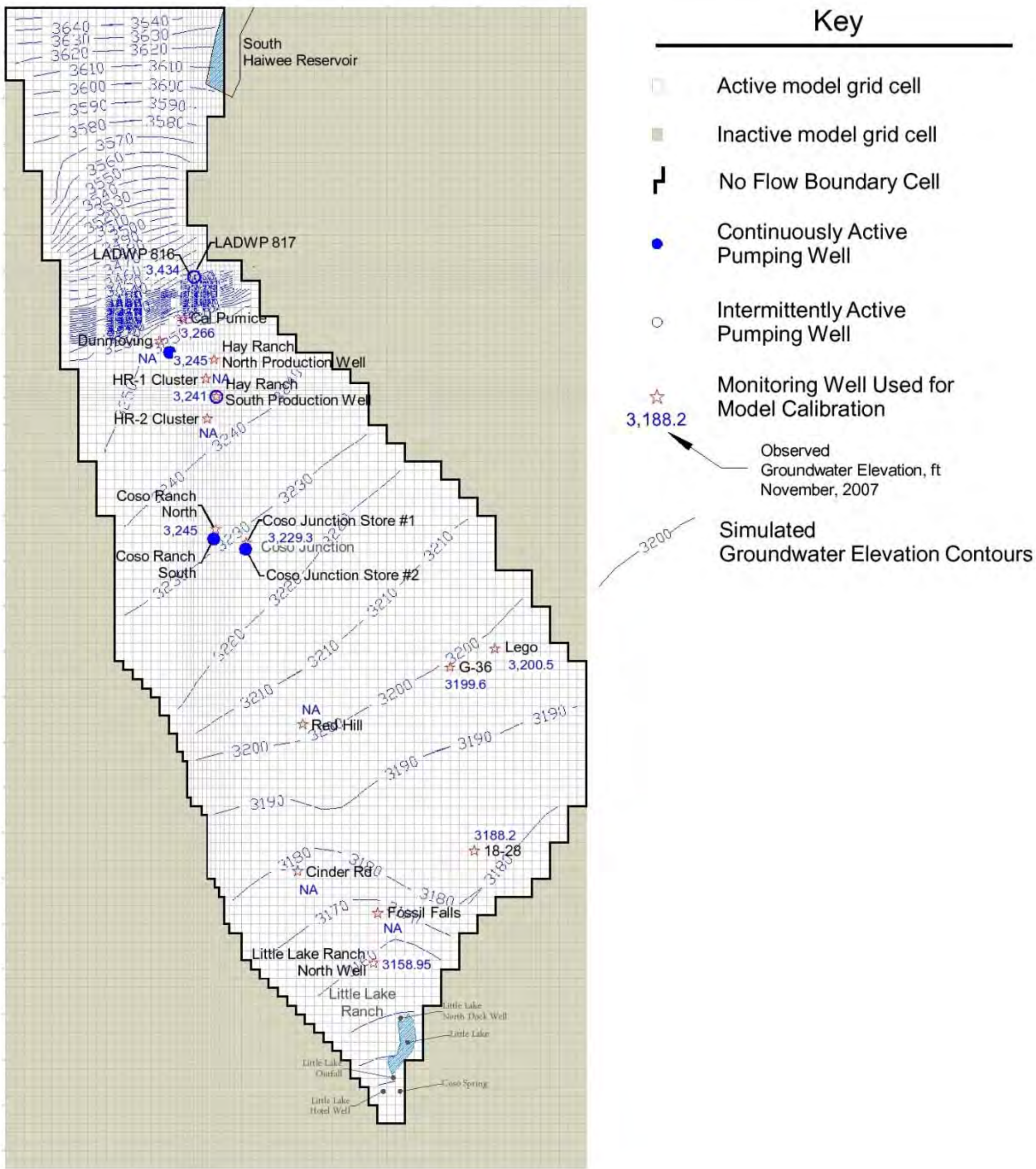


Figure G-8: Steady-State Model Calibration Results

- **Transient Model** – Figures G-9-1 through G-9-5 depict simulated versus observed groundwater elevation in fourteen selected monitoring wells in Rose Valley. **Table G-5** summarizes calibration statistics calculated by Groundwater Vistas for the 2010 transient model calibration.

Table G-5: Transient Model Calibration Statistics	
Residual Mean	1.3
Res. Std. Dev.	3.4
Sum of Squared Residuals	18075.7
Abs. Res. Mean	1.7
Minimum Residual Difference	-15.3
Maximum Residual Difference	13.7
Range in Target Values	290.6
Std. Dev./Range	0.012

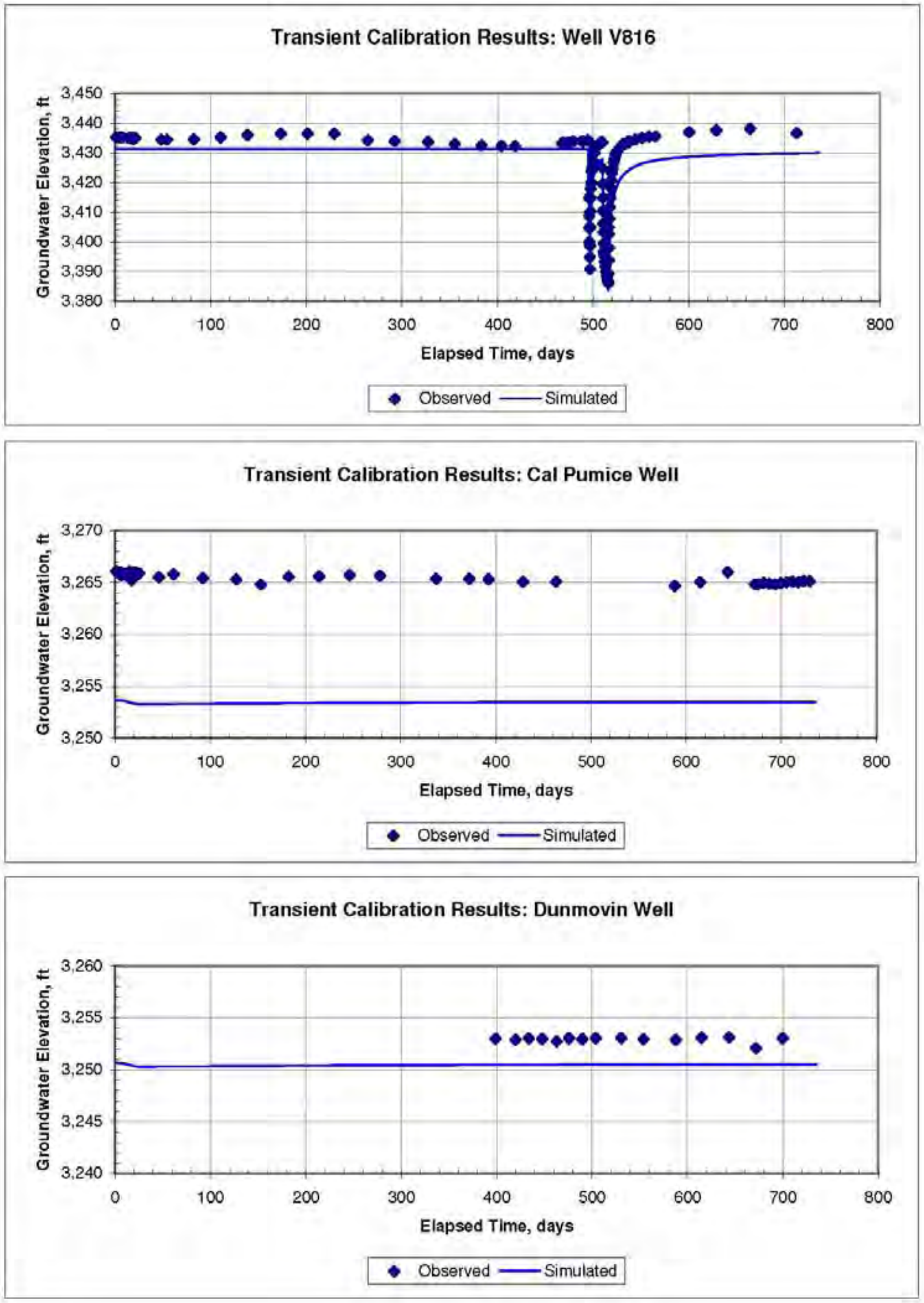


Figure G-9-1: Transient Calibration Results

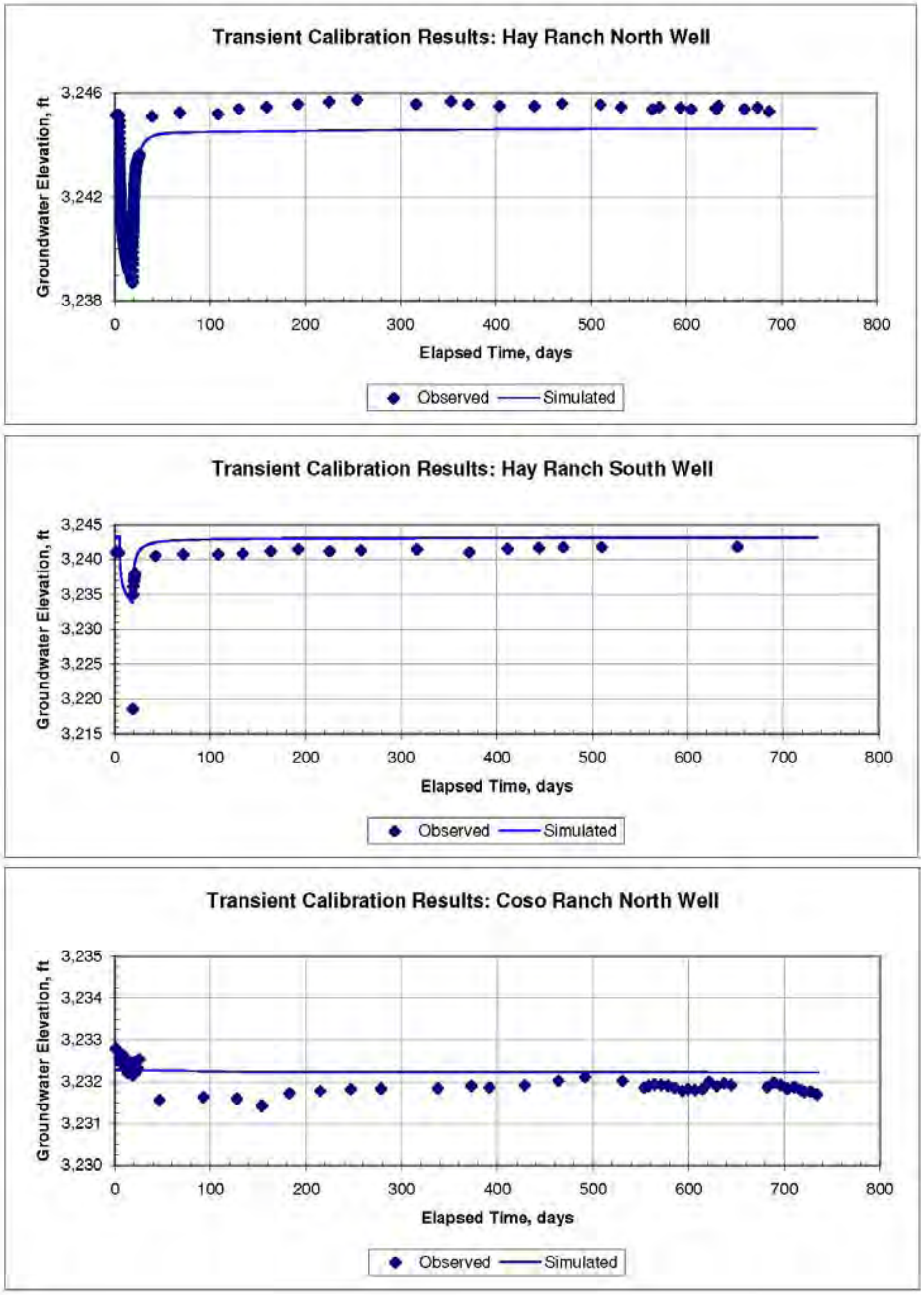
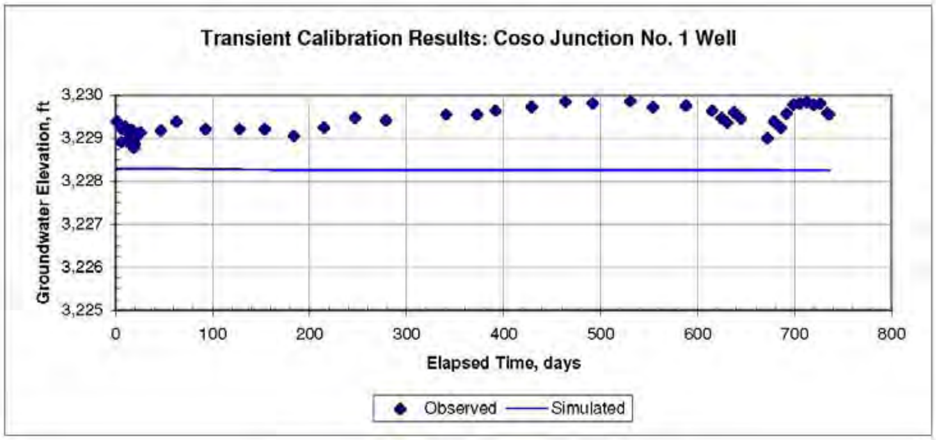
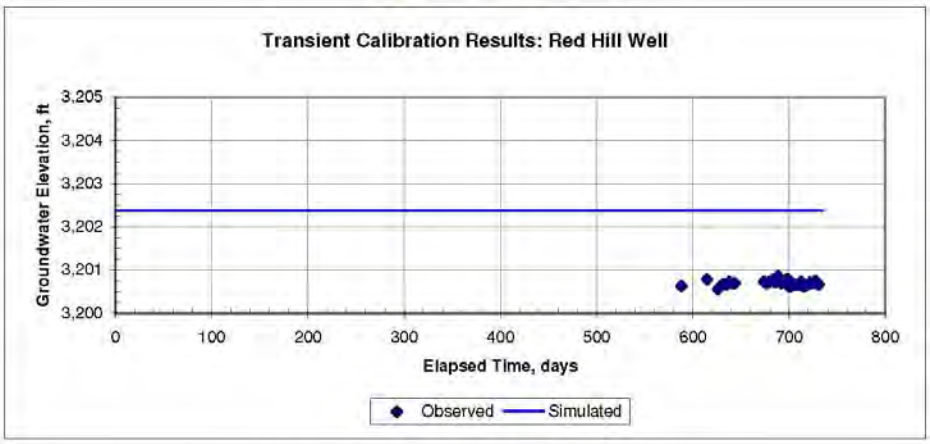


Figure G-9-2: Transient Calibration Results (continued)





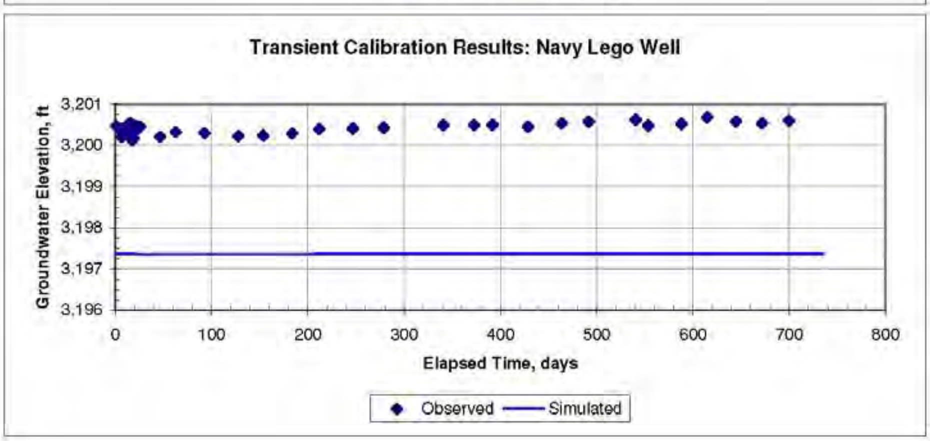


Figure G-9-3: Transient Calibration Results (continued)

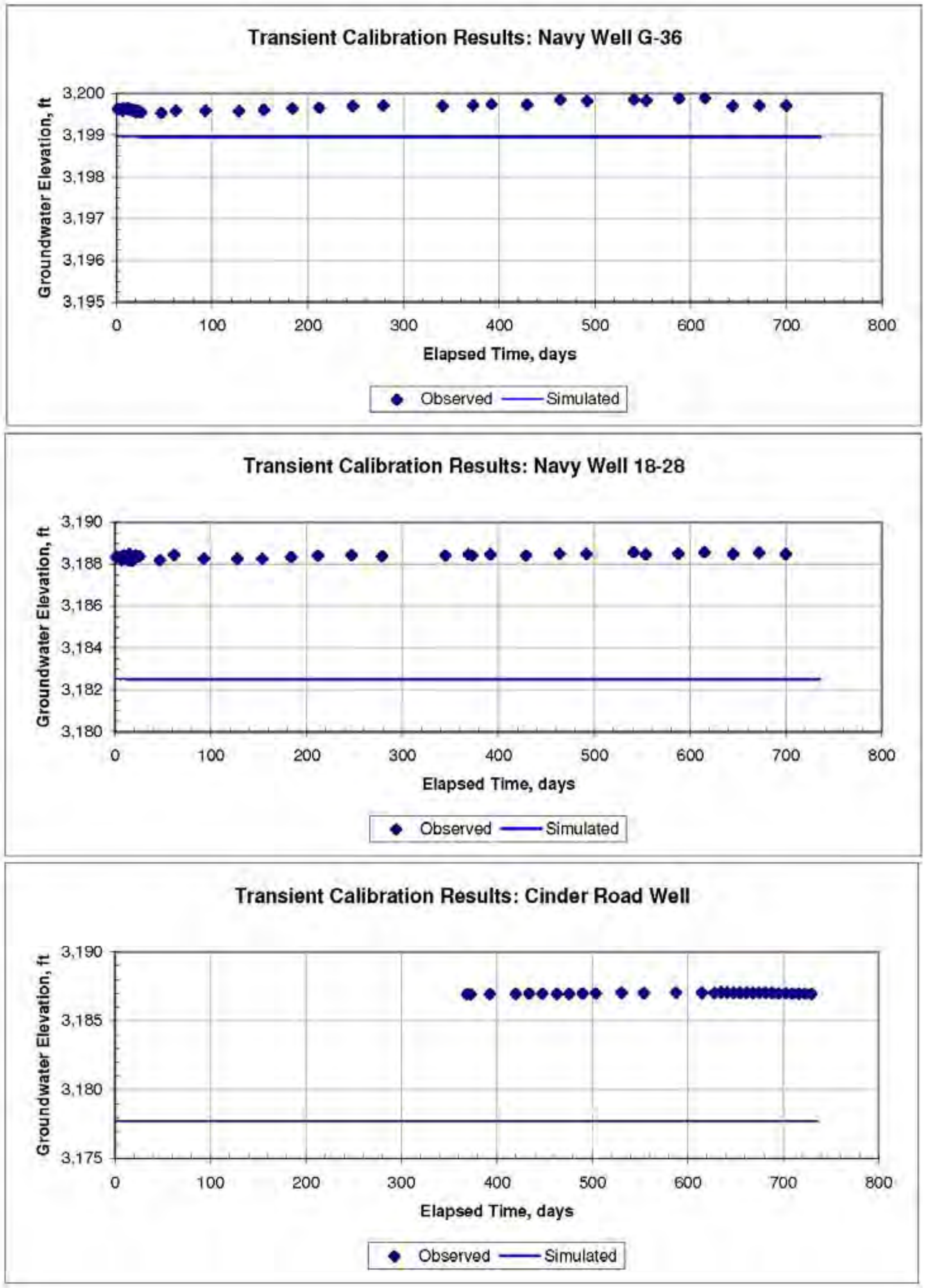


Figure G-9-4: Transient Calibration Results (continued)

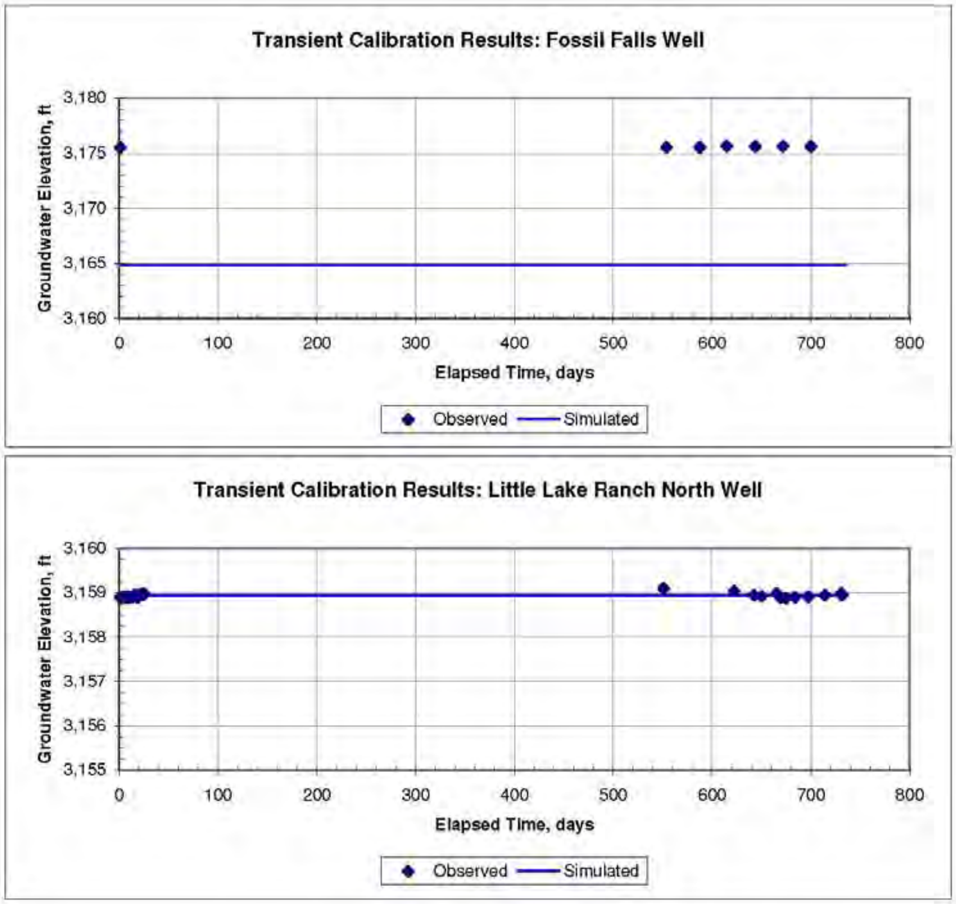


Figure G-9-5: Transient Calibration Results (continued)

As illustrated in **Figure G-9**, the transient model generally provides a good fit between simulated and observed groundwater levels in key areas of the model – the Little Lake Ranch property, the Hay Ranch property, Coso Junction, and the LADWP property. The transient model underestimates groundwater elevation in the southern part of valley, north of the Little Lake Ranch property and south of Coso Junction at the locations of the Cinder Road, Fossil Falls, and Navy 18-28 wells by 6 to 10 ft. This may be an indication of groundwater inflow from outside the valley that is not accounted for in the model.

G3.3.3. Parameter Sensitivity Analysis

Input parameter sensitivity analysis was conducted to evaluate the sensitivity of the fit between observed and simulated groundwater elevation values in the steady-state and transient model calibration runs to uncertainty in the model input parameters. Parameters tested, the range of parameter values used for sensitivity analysis, and estimated parameter sensitivity reported as the Sum of Squared Residual Differences between observed and simulated groundwater elevations at selected monitoring wells are summarized in **Table M-6**, and graphically depicted in **Figures G-5** and **G-6** for the steady-state and transient calibration models, respectively.

Table M-6: Summary of Individual Parameter Sensitivity Analysis Results

		Parameter Values for Sensitivity Analysis				Steady-State Model Sensitivity Analysis Results			Transient Model Sensitivity Analysis Results		
						Sum of Residual Squared Differences			Sum of Residual Squared Differences		
Parameter	Final Calibrated Parameter Value	Multiplier	Low Value	High Value	Units	Residual from Lower Parameter Value	Residual from Higher Parameter Value	Residual from Final Parameter Value	Residual from Lower Parameter Value	Residual from Higher Parameter Value	Residual from Final Parameter Value
Northern Boundary Kh	2	+/-25%	1.5	2.5	ft/day	233	216	224	2.34E+04	1.77E+04	1.87E+04
Northern Boundary Kh/Kz	10% (0.02)	+/-10	0.002	0.2	-	215	220	224	1.83E+04	1.79E+04	1.87E+04
V816 to Pumice Well Kh	0.24	+/-10%	0.216	0.26	ft/day	409	722	224	3.76E+04	4.44E+04	1.87E+04
V816 to Pumice Kh/Kz	10% (0.024)	+/-10	0.0024	0.24	-	211	238	224	1.79E+04	1.95E+04	1.87E+04
Hay Ranch Transition Kh	7.5	+/-25%	5.6	9.4	ft/day	159	271	224	1.56E+04	2.11E+04	1.87E+04
Hay Ranch Transition Kh/Kz	10% (0.75)	+/-10	0.075	7.50	-	224	230	224	2.13E+04	1.90E+04	1.87E+04
Central Valley Kh L1	50	+/-10%	45	55.00	ft/day	168	408	224	2.13E+04	3.06E+04	1.87E+04
Central Valley L1 Kh/Kz	0.2% (0.001 ft/day)	+/-10	0.0001	0.010	-	234	221	224	1.98E+04	1.91E+04	1.87E+04
Central Valley Kh L2	12.8	+/-10%	11.52	14.08	ft/day	177	301	224	1.78E+04	2.32E+04	1.87E+04
Central Valley L2 Kh/Kz	0.2% (0.01 ft/day)	+/-10	0.001	0.10	-	215	212	224	1.91E+04	1.87E+04	1.87E+04
Southeastern Kh	100	+/-25%	75.0	125.0	ft/day	228	496	224	3.44E+04	3.70E+04	1.87E+04
Southeastern Kh/Kz	10% (10)	+/-10	1	100.0	-	210	226	224	1.82E+04	1.88E+04	1.87E+04
Volcanics Kh	1	+/-25%	0.75	1.25	ft/day	217	231	224	1.84E+04	1.90E+04	1.87E+04
Little Lake Kh	112.5	+/-25%	84.4	140.6	ft/day	353	630	224	2.81E+04	4.38E+04	1.87E+04
Little Lake Kh/Kz	10% (11.25)	+/-10	1.13	112.5	-	206	227	224	1.75E+04	1.89E+04	1.87E+04
Southeast General Head Boundary Elevation	3,140	+/-10 ft	3,130	3,150	ft	401	177	224	4.74E+04	2.33E+04	1.87E+04
Southeast General Head Boundary Conductance	367	+/-25%	275.3	458.8	ft2/day	205	559	224	2.70E+04	3.95E+04	1.87E+04
Little Lake Drain Boundary Elevation	3,110	+/-10 ft	3,100	3,120	ft	401	212	224	2.92E+04	1.64E+04	1.87E+04
LittleLake Drain Boundary Conductance	6.60E+05	+/-25%	5.0E+05	8.3E+05	ft2/day	223	224	224	1.87E+04	1.87E+04	1.87E+04
Northern Boundary Specified Flux	107,088	+/-10%	96,379	117,797	cfd	890	350	224	5.44E+04	2.53E+04	1.87E+04
Sierra Recharge	500,560	+/-10%	450504	550616	cfd	1320	419	224	9.92E+04	5.25E+04	1.87E+04
Northern Sy	0.035	0.01 - 0.1	0.01	0.1	-	--	--	--	3.05E+04	2.38E+04	1.87E+04
Northern Ss	3.50E-06	+/-10	3.50E-07	3.50E-05	1/ft	--	--	--	1.87E+04	1.87E+04	1.87E+04
Central Sy	0.1	0.01 - 0.2	0.01	0.2	-	--	--	--	1.97E+04	1.87E+04	1.87E+04
Central Ss	1.50E-06	+/-10	1.50E-07	1.50E-05	1/ft	--	--	--	1.96E+04	2.16E+04	1.87E+04
Southern Sy	0.1	0.01 - 0.2	0.01	0.2	-	--	--	--	1.87E+04	1.87E+04	1.87E+04
Southern Ss	3.50E-06	+/-10	3.50E-07	3.50E-05	1/ft	--	--	--	1.87E+04	1.87E+04	1.87E+04

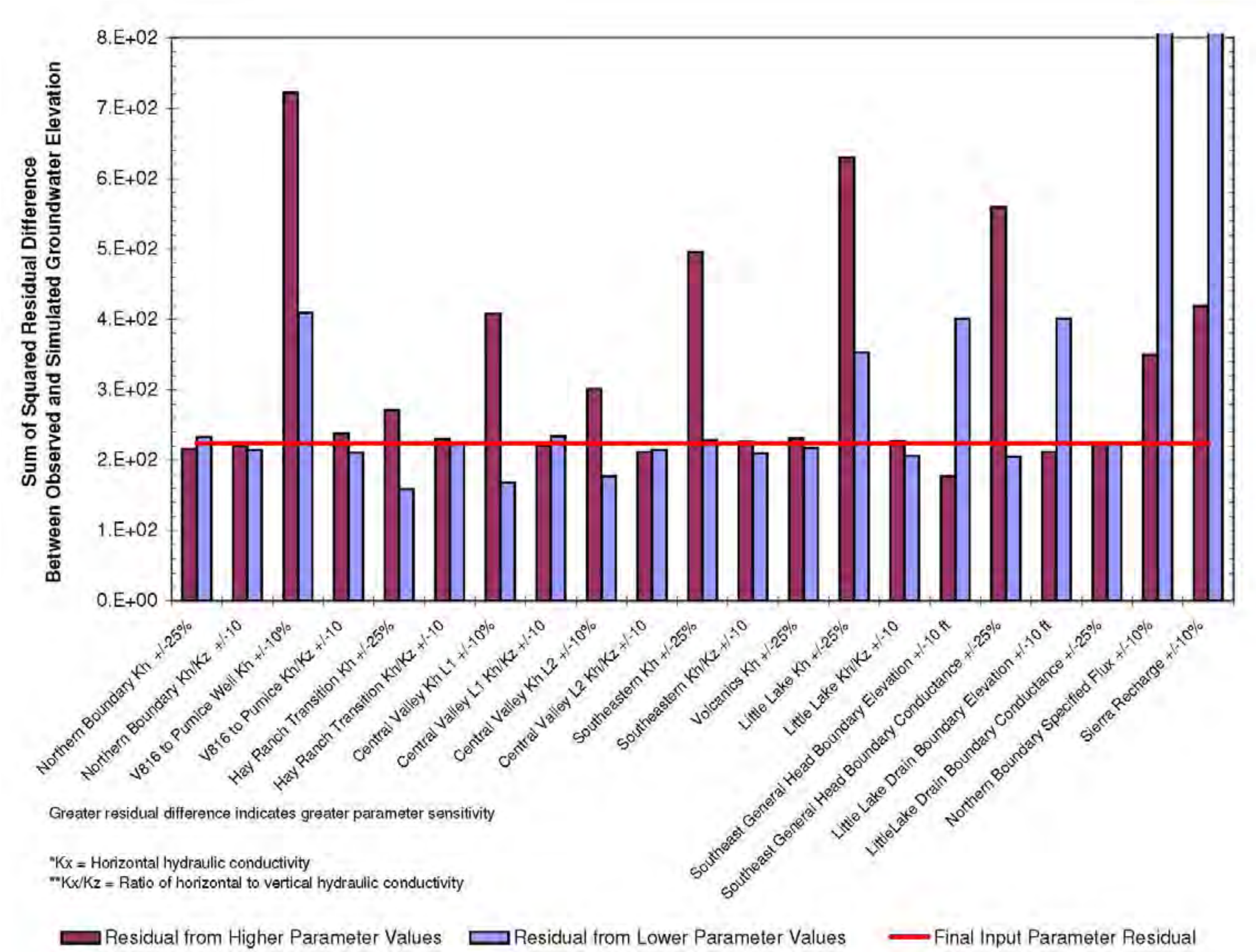


Figure G-10: Summary of Steady-State Model Recalibration Input Parameter Sensitivity Analysis

- **Steady-State Model Sensitivity to Input Parameters –** The steady-state model was found to be most sensitive to specified flux parameters including the flux across the northern boundary of the model (Northern Boundary Specified Flux) and recharge from the Sierra Nevada mountain range (Sierra Recharge on Figure G-10). The steady-state model is relatively highly sensitive to the horizontal hydraulic conductivity (Kh) in the low permeability region between the LADWP property and Pumice Mine well (V816 to Pumice Mine Kh on Figure G-10), central valley horizontal hydraulic conductivity in layer 1, and Little Lake are horizontal hydraulic conductivity, and then the elevations specified for the drain cells and general head boundary cells in the south and southeast portions of the model grid.

- **Transient Model Sensitivity to Input Parameters –** The transient model was also found to be most sensitive to specified flux parameters including the flux across the northern boundary of the model (Northern Boundary Specified Flux) and recharge from the Sierra Nevada mountain range (Sierra Recharge on Figure G-11). The transient model was similarly sensitive to horizontal hydraulic conductivity in generally the same regions as the steady-state model. Neither model was very sensitive to vertical hydraulic conductivity, however, most of the monitoring well data is from wells screened near the water table, or wells that essentially fully penetrate the aquifer, so there is insufficient monitoring data to fully assess this parameter. Likewise, the transient model is relatively insensitive to aquifer storage properties. This is also mostly an artifact of the data available to calibrate the model which consists of three short pumping periods in the LADWP and Hay Ranch wells, with relatively steady water levels in the rest of Rose Valley the remainder of the calibration period (November 2007 to November 2009).

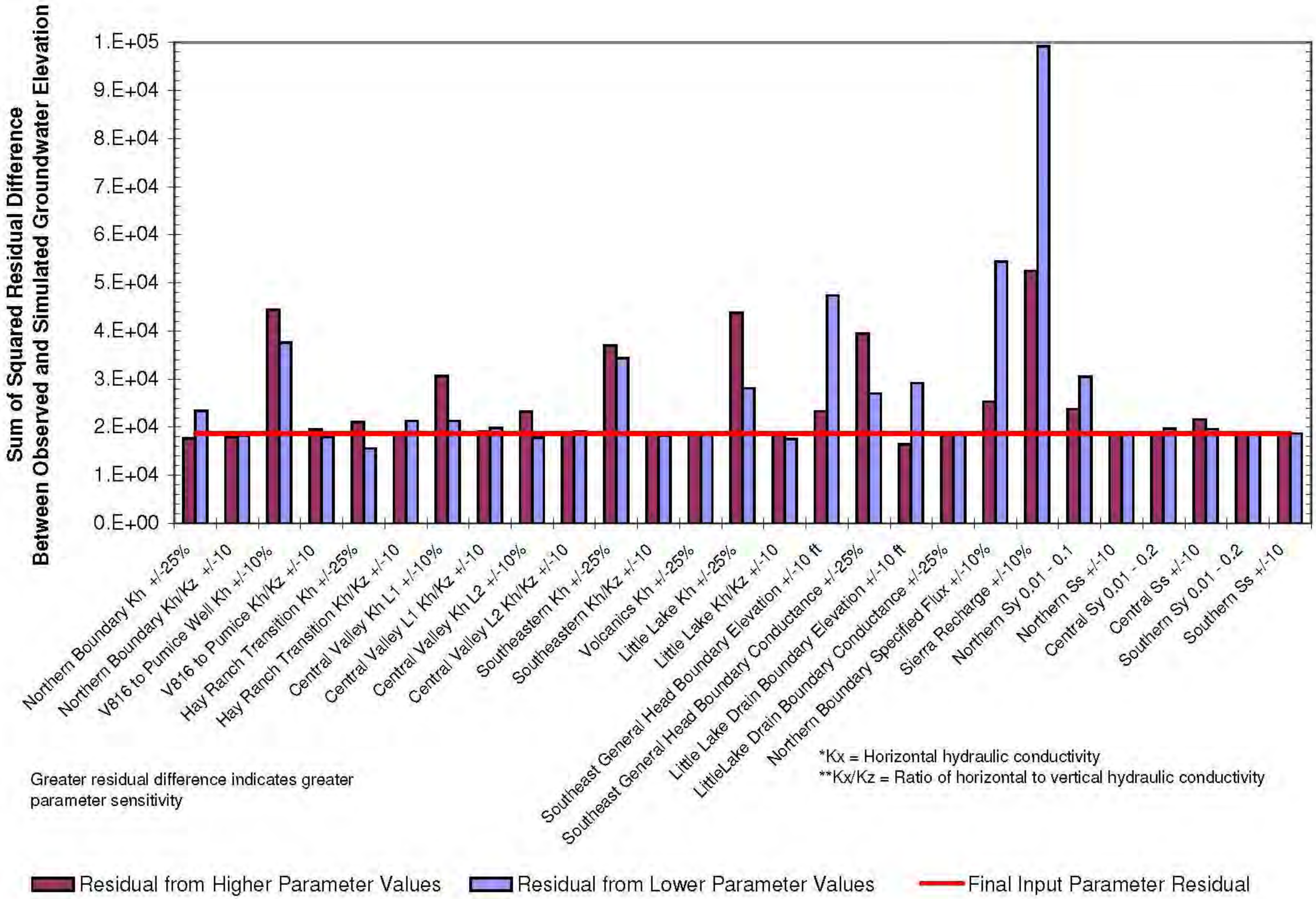


Figure G-11: Summary of Transient Model Recalibration Input Parameter Sensitivity Analysis

G4. GROUNDWATER DEVELOPMENT IMPACT EVALUATION

This section describes procedures used to evaluate potential impacts of groundwater development associated with development of geothermal resources within the Haiwee Geothermal Leasing Area. Groundwater impacts associated with short-term groundwater extraction for well drilling, dust control, and minor operations and maintenance are unlikely to persist, or extend more than a short distance from wells used to supply these purposes. However, based on the analysis presented in the Hay Ranch Groundwater Extraction Project EIS (RMT, 2008), long-term groundwater extraction to support geothermal reservoir development has significant potential for impacting groundwater resources in Rose Valley. In the course of operation of a typical geothermal power plant, high temperature fluids are extracted from the geothermal reservoir, piped through a generator set to generate electricity, and then cooled and condensed for reinjection into the reservoir. During the cooling cycle, a portion of the extracted fluid is lost by evaporation, consequently, more fluid is extracted from the geothermal reservoir on an annual basis than is available to re-inject, leading to a gradual decline in reservoir pressures, and a concomitant loss in electrical generating capacity.

Haizlip (2010) estimated that the water required to provide 100% injection of produced geothermal fluids (aka zero net withdrawal by mass from the reservoir) is equivalent to the fluid lost during power generation under the proposed development scenarios and is approximately 1,450 gallons per minute (gpm), or as much as 2,340 acre-ft per year (ac-ft/yr) for a typical 30 MWe dual flash geothermal power plant. This estimate assumes that 100% of the fluid lost during evaporative cooling would be made-up and reinjected along with the condensate and waste brine by the addition of locally produced. Reinjection of less water than is produced from the geothermal reservoir may result in a gradual reduction in reservoir pressures and/or geothermal fluid yield, and as a consequence result in a gradual reduction in the quantity of steam available to generate power from the initial wells. However, most geothermal reservoirs have experienced pressure decline, most geothermal reservoir pressure decline is managed by a combination of injection and make-up drilling. With new wells and injection management, many geothermal reservoirs have produced for decades without 100% injection.

The rate of pressure decline would presumably be reduced with greater rates of injection. The rate of reduction in geothermal fluid availability with declining reservoir pressure is dependent on reservoir properties, the degree of development relative to the size and sustainable yield of the geothermal reservoir, and the rate of natural recharge of the geothermal reservoir. As these characteristics have not been determined for the Rose Valley geothermal lease area, the water needed to mitigate reservoir decline was estimated to provide zero net withdrawal from the reservoir.

For the Haiwee Geothermal Leasing Area EIS, the assumption was made that up to two 30 MWe dual geothermal power plants would be constructed within the Haiwee Action Area. As no specific development plans have been identified as yet, the main purpose of the analysis described below was to assess whether or not groundwater extraction to augment geothermal fluid injection, and thus bolster geothermal reservoir pressures, could be conducted at any location(s) within the Haiwee Action Area. Based on the unique hydrogeologic setting of Rose Valley, and existing groundwater uses, potential impacts from long-term groundwater extraction can be broadly classified into two categories: impacts to existing water supply wells related to possible increased depth to groundwater or reduced well yield; and, impacts to the sensitive surface water features at the Little Lake Ranch property at the south end of the valley.

G4.1. Evaluation Procedures

Transient groundwater flow simulations were conducted to evaluate the impacts of potential long-term groundwater extraction to augment geothermal fluids. Input parameters from the recalibrated transient numerical model of Rose Valley described in Section G3 were used to run a series of simulation scenarios to forecast potential impacts on groundwater elevation and groundwater quantity. Starting groundwater elevations and boundary conditions were set equal to the final values from the transient calibration model representing groundwater elevations in Rose Valley in November 2009. Pumping from existing domestic, commercial and light industrial supply wells was specified as described for the transient calibration model. Pumping on the LADWP and Hay Ranch properties was not simulated in these analyses. A timeline for the LADWP groundwater development project to capture seepage from the South Haiwee Reservoir has not been established. Pumping for the Hay Ranch Groundwater Extraction Project began in December 2009 (Harrington, 2010) at an initial rate of approximately 700 gpm (1,130 acre-ft/yr); however, a schedule for implementation of the planned operation at 1,859 gpm (3,000 acre-ft/yr) allowed by the Conditional Use Permit for the project has not been established. Consequently, the following discussion pertains to groundwater extraction for the geothermal development project, only.

The cumulative impact of multiple groundwater development projects is more or less additive, that is, if one extraction well causes ten feet of drawdown at a particular location, two wells will likely produce double that amount of drawdown. The timing of cumulative impacts will of course be dependent on the pumping schedule for individual projects, the location of the individual extraction wells relative to sensitive receptors, and the extraction rate of each extraction well. The cumulative impact resulting from augmenting geothermal reservoir pressures, and conducting either or both the LADWP's proposed seepage capture project and the Hay Ranch Groundwater Extraction Project are not evaluated here, but can reasonably be assumed to be greater than the impacts of any individual project.

Because of the unique hydrogeologic conditions that exist in Rose Valley, previous studies (RMT, 2008) found that some amount of groundwater table drawdown resulting from long-term groundwater extraction may persist for a period after pumping is stopped, and, that for locations more distant from the extraction well, the time of maximum drawdown effects may occur after the active pumping period for a project ends. Therefore, drawdown impact forecasts were conducted with varying numbers of extraction wells (one or two) and several different locations (north or south in the Haiwee Action Area) to assess potential impacts of different potential development scenarios. In addition, 200 year long numerical simulations were conducted to assess the magnitude of maximum impacts and their timing relative to the active extraction period.

Two groundwater development scenarios associated with geothermal development were considered:

G4.1.1. Scenario 1 – Extraction to Replace 100% of Lost Fluid

For this scenario, numerical groundwater flow model simulations were conducted to evaluate the potential groundwater resource impacts that might develop in the event that groundwater was extracted to provide water to support injection at rates comparable to 100% of the average annual geothermal fluid loss rate. Extraction was assumed to occur continuously for the 30 year geothermal project lifespan. Several sub-scenarios were evaluated including:

- Extraction from one well at a rate of 2,340 acre-ft/yr to support one 30 MWe dual flash geothermal power plant at the north end of the proposed BLM geothermal lease area, approximately 3 miles from north of Coso Junction (1 plant north);
- As above, but from an extraction well at the south end of the proposed BLM geothermal lease area, approximately 1-1/4 miles south of Coso Junction (1 plant south);
- Extraction from two wells at a total rate of 4,680 acre-ft/yr to support two 30 MWe dual flash geothermal power plants at the north end of the proposed BLM geothermal lease area, approximately 3 miles north of Coso Junction (2 plants north);
- As above, but from two extraction wells located at the south end of the proposed Haiwee Action Area, approximately 1-1/4 miles south of Coso Junction (2 plants south).

G4.1.2. Scenario 2 – Sustainable Extraction at Rate Unlikely to Impact Little Lake

For this scenario, numerical groundwater flow model simulations were conducted to evaluate the groundwater extraction rate that could be sustained for a geothermal project lifespan without causing excessive drawdown or capturing groundwater needed to support surface water features and riparian habitat at the south end of Rose Valley on the Little Lake Ranch property. This criterion was adapted from the Hay Ranch Groundwater Extraction Project Hydrologic Monitoring and Mitigation Plan (HMMP), RMT (2008) which determined that drawdown from groundwater extraction in Rose Valley could not be allowed to cause a greater than 10% reduction in groundwater flow towards the Little Lake Ranch property to avoid causing significant and potentially irreversible impacts to surface water features on the property. For this evaluation, numerical simulations were conducted in iterative fashion to evaluate the maximum groundwater extraction rate that could be sustained for a 30 year project life, without causing a greater than 10% reduction in groundwater flow towards the Little Lake Ranch property. Two sub-scenarios were evaluated including:

- Groundwater extraction at the north end of the Haiwee Action Area, approximately 3 miles north of Coso Junction; and,
- Groundwater extraction at the south end of the Haiwee Action Area, approximately 1-1/4 miles south of Coso Junction.

G4.2. Potential Drawdown Impacts

G4.2.1. Predicted Impacts from Pumping at Full Augmentation Rate

The predicted drawdown impacts of pumping at the full rate needed to augment a geothermal reservoir due to operation of one (1) or two (2) 30 MWe power plants are illustrated in **Figures G-12** and **G-13**, respectively. **Figure G-14** illustrates potential impacts of groundwater development to augment the geothermal reservoir on groundwater flow available to the surface water features at the Little Lake Ranch property at the south end of the valley.

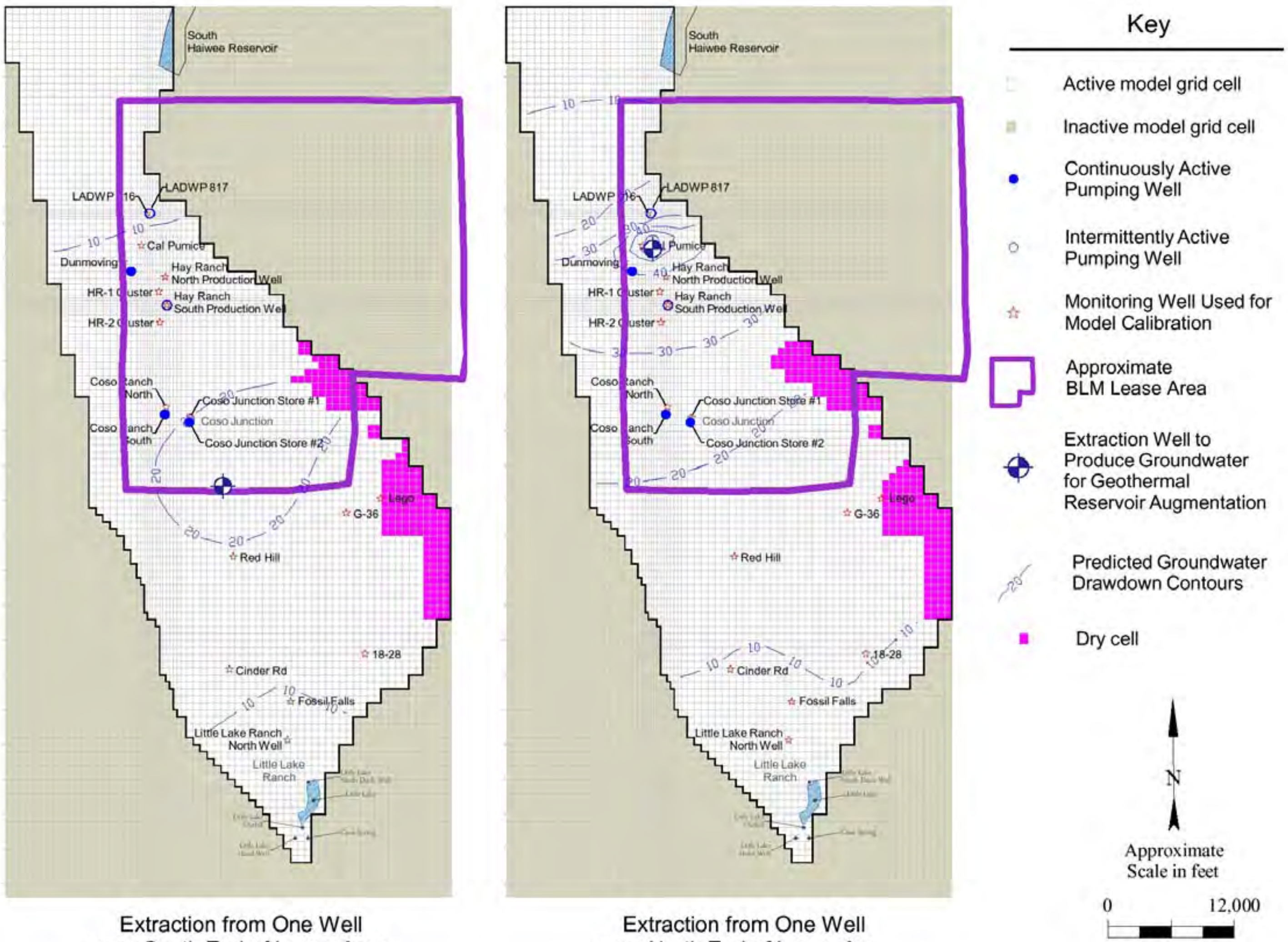
In the north and central parts of Rose Valley, the primary impact to existing or proposed water wells is the reduction in water levels (drawdown) resulting from extraction for geothermal reservoir augmentation. The magnitude of potential impacts depends on the amount of extraction and the location of extraction relative to the property of interest. The drawdown induced by wells operated to support geothermal reservoir augmentation could make some wells unusable without deepening and increase well lift, and thereby increase energy costs for pumping, or reduce well yields. Predicted drawdown near the LADWP property at the north end of the valley may be as little as 10 ft for a single geothermal augmentation well situated at the south end of the Haiwee Action Area, which is predicted to increase to as much as 40 ft if two geothermal augmentation wells were situated at the north end of the Haiwee Action Area.

Predicted drawdown near the Dunmovin community, which has a number of private domestic supply wells, was similarly predicted to range from over 10 ft for a single geothermal augmentation well situated at the south end of the Haiwee Action Area, to greater than 70 ft if two geothermal augmentation wells were situated at the north end of the Haiwee Action Area. Well construction details for wells in the Dunmovin area are not available, but the latter impact scenario would likely impact a number of wells in that area.

Predicted drawdown near Coso Junction, which has several currently active water supply wells, was predicted to range from approximately 20 ft for a single geothermal augmentation well situated at the south end of the Haiwee Action Area, to greater than 50 ft if two geothermal augmentation wells were situated at the south end of the Haiwee Action Area (map not shown). Wells serving the Coso Junction Store (Coso Junction #2) and the Coso Ranch (Coso Ranch South) might not need to be deepened as a result of these impacts, but would likely experience greater pumping costs due to increased lift requirements, and possibly reduced yield.

The effects of simultaneous groundwater extraction on the Hay Ranch property for the Hay Ranch Extraction and Delivery System project to augment geothermal reservoir recovery at the Coso Geothermal Field are not considered in this forecast; however, pumping effects would be additive, consequently greater impacts would occur if both projects extracted groundwater in Rose Valley.

Groundwater extraction to support geothermal reservoir augmentation could also reduce the amount of groundwater available to sustain surface water features on the Little Lake Ranch property. As shown on Figure G-14, all of the scenarios evaluated in which continuous pumping at rates of 1,450 gpm or 2,340 acre-ft/yr from each well for 30 years, result in a reduction in groundwater flow towards Little Lake. The reduction in groundwater flow is greater for two wells (supporting two geothermal power plants) and greater for extraction wells located closer to Little Lake. However, in all cases, the predicted reduction in groundwater flow exceeds the threshold of 10 percent identified as protective of Little Lake surface water features in the Hay Ranch Groundwater Extraction Project Hydrologic Monitoring and Mitigation Plan (HMMP) prepared by MHA (2008).   That is, supplying groundwater for 100% injection (zero net withdrawal) requiring operation of one geothermal reservoir augmentation well for the 30 year project life would likely reduce groundwater flow to Little Lake by greater than 10 percent potentially causing adverse impacts to surface water features on the property.



Extraction from One Well near South End of Lease Area

Extraction from One Well near North End of Lease Area

Figure G-12: Potential Drawdown from Pumping One Well for Geothermal Augmentation at 2,340 acre-ft/yr

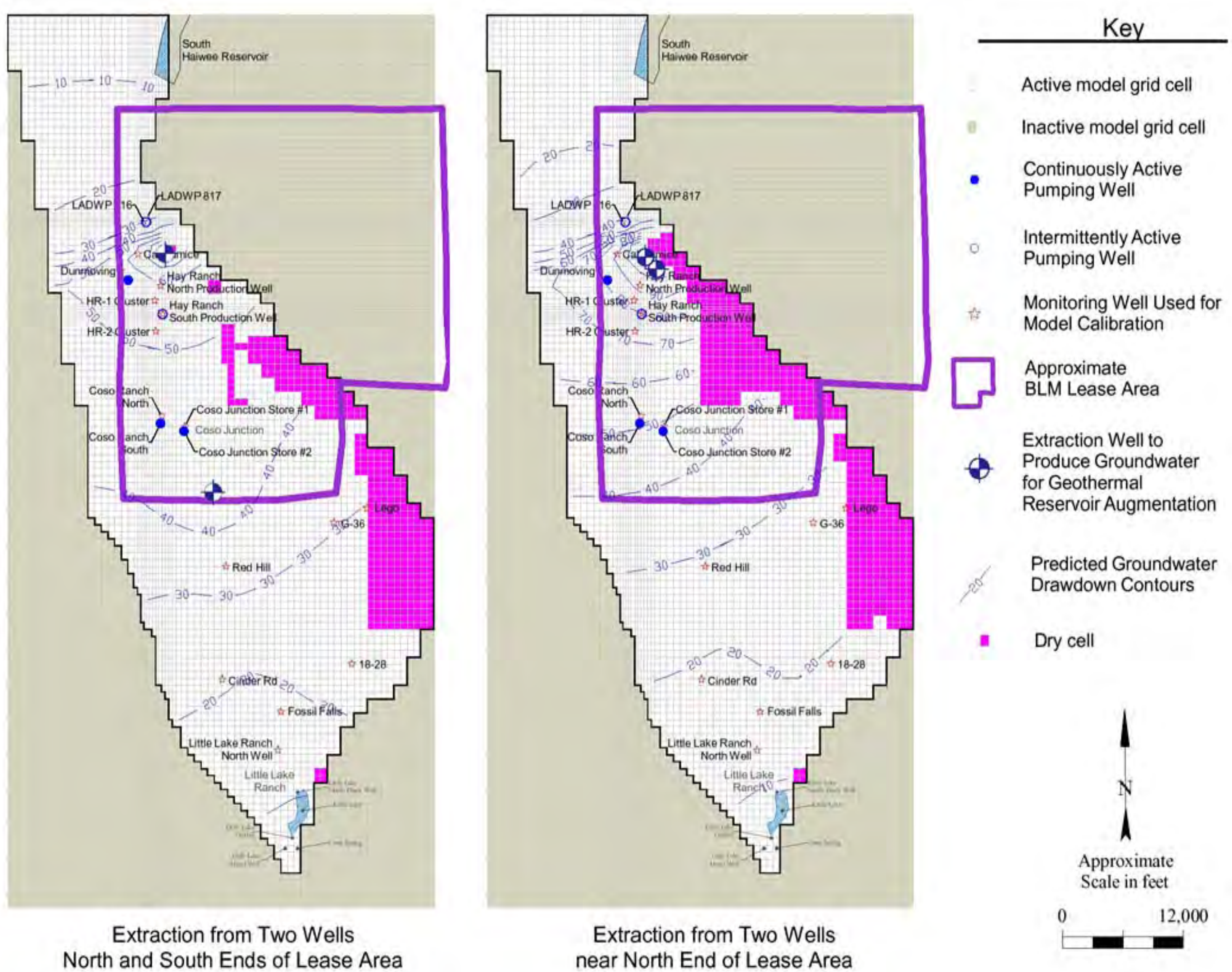


Figure G-13: Potential Drawdown from Pumping Two Wells for Geothermal Augmentation at 4,680 acre-ft/yr

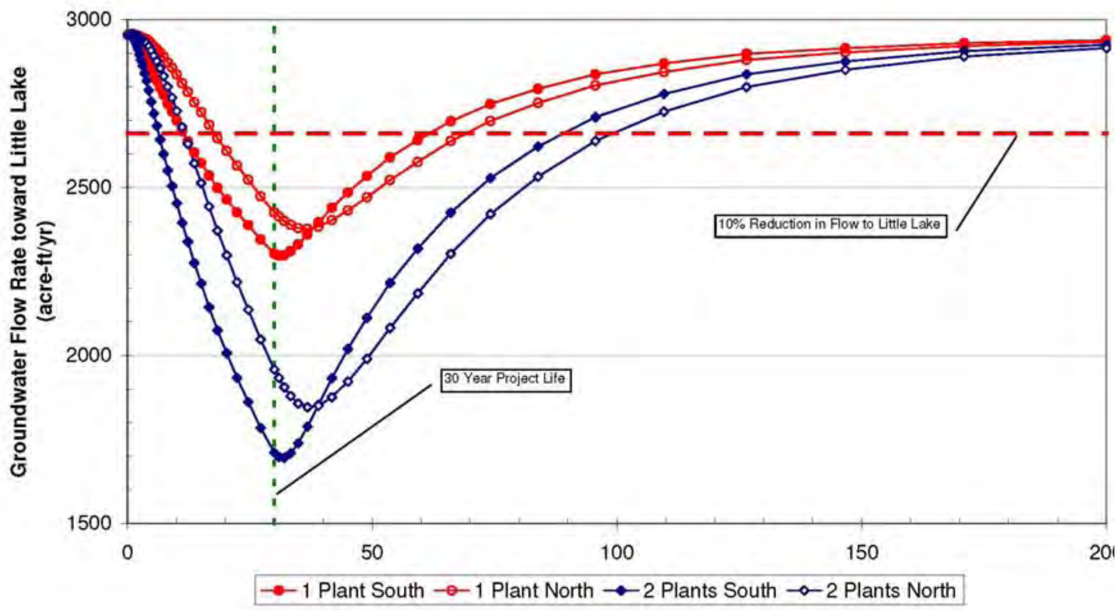


Figure G-14: Potential Reduction in Groundwater Flow to Little Lake from Pumping for 100% Geothermal Augmentation

G4.2.2. Predicted Impacts from Pumping at Reduced Augmentation Rate

For Scenario 2, simulation runs were conducted to forecast the potential impacts of pumping at reduced rates designed to provide some water for geothermal reservoir augmentation but specifically intended to reduce the risk of adverse impacts to surface water features at Little Lake. As discussed in Section G4.1.2, several simulation scenarios were conducted to forecast potential impacts. These evaluations indicated that pumping from a single extraction well located at the northern end of the Haiwee Action Area would have the least potential for impacting Little Lake, while pumping from an extraction well located at the southern end of the Haiwee Action Area would likely have greater impact. The model simulations indicated that pumping at a rate of 625 gpm or 1,000 acre-ft/yr from a well located near the southern end of the Haiwee Action Area could be sustained for 30 years without reducing groundwater flow towards Little Lake by more than 10 percent. However, the same simulation indicated that the maximum predicted drawdown at the Little Lake Ranch North well, located near the north end of the Little Lake Ranch property could exceed 3.5 ft approximately 30 years after the start of pumping at that rate, which exceeds the Maximum Acceptable Drawdown threshold of 0.4 feet established for this well in the Hay Ranch HMMP. A simulation scenario with a single groundwater extraction well located at the northern end of the Haiwee Action Area indicated that a pumping rate of approximately 715 gpm or 1,150 acre-ft/yr could be sustained for 30 years without reducing groundwater flow towards Little Lake by more than 10 percent. However, the same simulation indicated that the maximum predicted drawdown at the Little Lake Ranch North well, located near the north end of the Little Lake Ranch property could exceed 3.5 ft approximately 30 years after the start of pumping at that rate, which also exceeds the Maximum Acceptable Drawdown threshold of 0.4 feet established for this well in the Hay Ranch HMMP. Consequently, lower pumping rates may be required to meet both the groundwater flow and drawdown thresholds established in the Hay Ranch HMMP for protection of surface water features at Little Lake. As was noted in the previous section, the effects of other major groundwater development projects in Rose Valley, including the Hay Ranch Groundwater Extraction and Transfer project and the LADWP's proposed Haiwee Reservoir seepage capture project are not included in this analysis; however, the effects of additional pumping are expected to be additive, with greater impact resulting from higher combined pumping rates or pumping durations.

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APPENDIX H

Scoping Report

February 2010

Haiwee Geothermal Leasing Area Scoping Report

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United States Department of the Interior
Bureau of Land Management

Haiwee Geothermal Leasing Area Scoping Report

Inyo County, California

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REVISION HISTORY		
DATE	REVISED BY	REVISION
12-18-09	K. Cadavona	Rev 0
03-02-12	P. Godfrey	Rev1

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1.0 INTRODUCTION

The Department of the Interior, Bureau of Land Management (BLM) is proposing the leasing of geothermal resources within the Haiwee Geothermal Leasing Area located in Inyo County, California for geothermal exploration, development, and utilization. The proposed action is to: 1) open or close leasing of 22,460 acres of BLM-managed lands; 2) approve or reject pending lease applications for 4,460 acres; and 3) amend the California Desert Conservation Area (CDCA) Plan to allow Haiwee Geothermal Leasing Area lands to be leased under the authority of the Geothermal Steam Act of 1970, as amended (30 U.S.C. 1001 *et seq*.).

The Haiwee Geothermal Leasing Area is approximately 13 miles south of Olancha, California, to the east of the Inyo National Forest, west of the China Lake Naval Weapons Center, and south of the South Haiwee Reservoir. The Haiwee Geothermal Leasing Area encompasses a total of 24,320 acres. The BLM manages 22,460 acres (4,460 acres containing three pending applications for non-competitive leasing and 18,000 acres of lands for competitive leasing), the State Lands Commission manages 640 acres (Section 16), and 1,220 acres are privately owned. The BLM-managed lands considered for geothermal leasing are located in the Mount Diablo Meridian and occupy the following 37 sections that are illustrated in Figure 1:

Township 21 South, Range 37 East, Sections 11-14, 23-26, 35-36
Township 21 South, Range 38 East, Sections 7-10, 15, 17-22, 27-34
Township 22 South, Range 37 East, Sections 1-2, 11-12
Township 22 South, Range 38 East, Sections 5-8

The approval to issue geothermal leases represents a commitment of resources that may have indirect environmental impacts for subsequent exploration, development, and production. The BLM will prepare an Environmental Impact Statement (EIS)/Proposed Plan Amendment in compliance with the National Environmental Policy Act (NEPA) to identify, analyze, and disclose potential environmental effects of leasing geothermal resources.

Scoping must be conducted both internally with appropriate BLM staff, and externally with interested and potentially affected public, agencies, tribes, and organizations (40 CFR 1501.7). This Scoping Report summarizes the public scoping effort, and documents issues and concerns expressed during scoping of the Haiwee Geothermal Leasing Area Draft EIS/Proposed Plan Amendment.

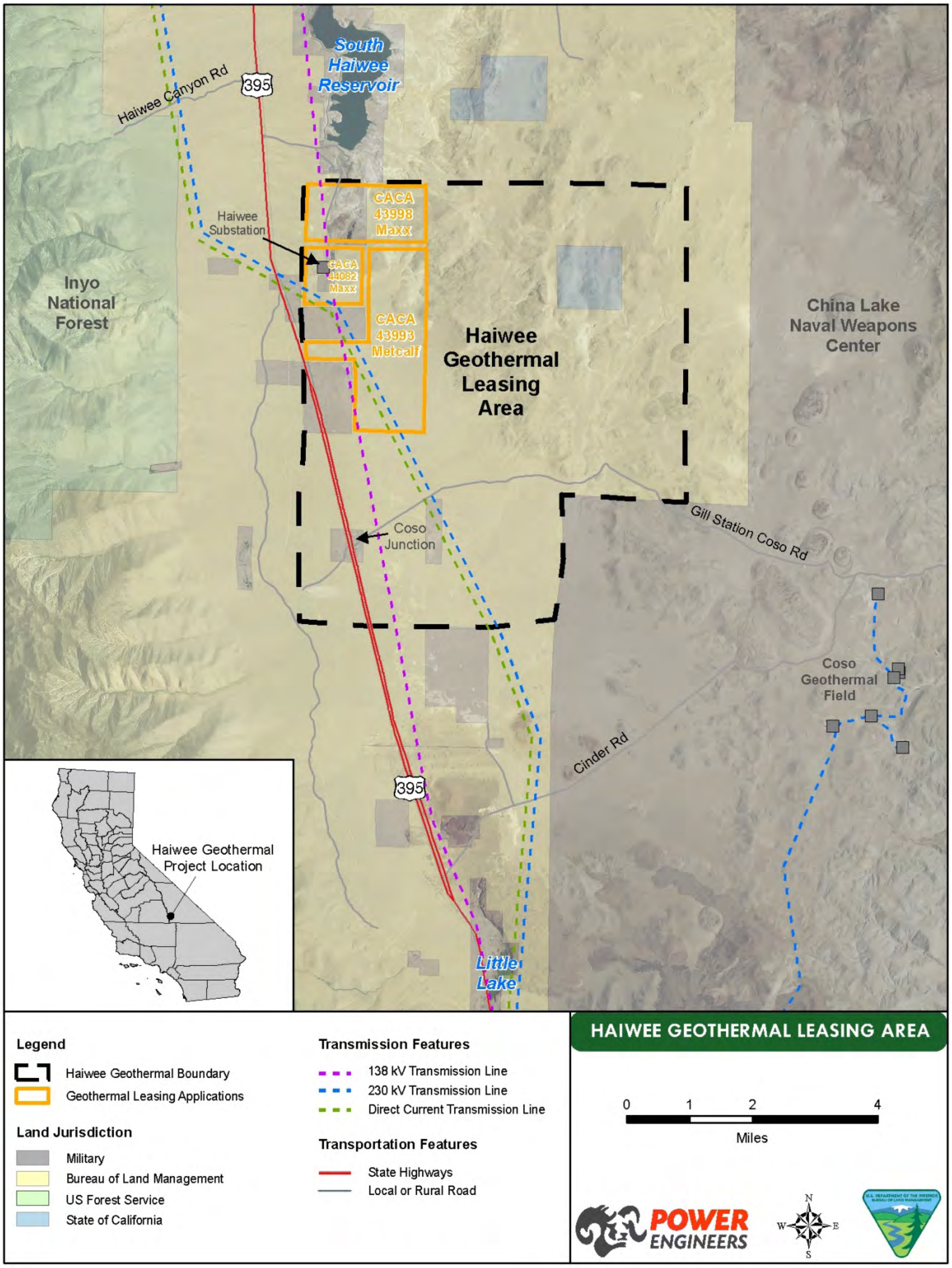

Figure 1 Haiwee Geothermal Leasing Area Map

2.0 SCOPING

Scoping is an early and open process for determining the scope of issues to be addressed, identifying the significant issues, and allowing regulatory agencies and the public an opportunity to comment on the proposed action (40 CFR 1501.7).

2.1 NOTICE OF INTENT

To comply with NEPA 40 CFR 1508.22, on September 11, 2009, the BLM published a Notice of Intent (NOI) to prepare an EIS for the Haiwee Geothermal Leasing Area in the *Federal Register*, Volume 74, Number 175 (See Appendix A). The *Federal Register* is the official daily publication for rules, proposed rules, and notices of federal agencies and organizations.

The NOI initiated the public scoping period for the EIS/Plan Amendment and described the Haiwee Geothermal Leasing Area and plan amendment, alternatives, and environmental review process. It also identified preliminary issues and concerns, and contacts. The notice served as an invitation for other federal agencies to provide comments on the scope and content of the EIS/Plan Amendment and requested all comments be received by October 13, 2009.

2.2 NEWS RELEASES

The BLM distributed three news releases to agency representatives, elected officials, Native American Tribes, the media, or interested parties and organizations. The news releases and associated distribution lists are found in Appendix B. The September 11, 2009 news release announced the times and locations of the public scoping meetings in Lone Pine, Bishop and Ridgecrest, California. It also listed issues to be analyzed in the EIS, and contact information. A second news release was issued on October 1, 2009 announcing the addition of the Death Valley scoping meeting date, time, and location. A third news release was issued on July 28, 2011 to clarify and affirm that three pending lease applications would be analyzed in the EIS.

2.3 SCOPING MEETINGS

The BLM conducted four public scoping meetings from October 13 to 20, 2009 in Lone Pine, Bishop, Ridgecrest and Death Valley, California, with a total of 32 attendees. Table 1 lists the dates, locations, and number of attendees for each of the meetings. The scoping meetings provided an opportunity for the BLM to share information regarding the Haiwee Geothermal Leasing Area, plan amendment, and the decision-making processes, and to listen to public and agency views on the range of issues and alternatives to be considered during the preparation of the Draft EIS/Plan Amendment.

The meetings began with a brief presentation by the BLM discussing the Haiwee Geothermal Leasing Area and alternatives, geothermal resources, and the environmental review process. A copy of the presentation and information boards may be found in Appendix C. A question and answer session followed to allow agency representatives, elected officials, Native American Tribes, interested parties and organizations to ask questions and provide comments. A list of topics discussed at each of the meetings and the court reporter transcripts may be found in Appendix D.

Table 1 Scoping Dates and Locations

Date	Location	Number of Attendees
Tuesday, October 13, 2009 5:30 – 9:00 p.m.	Boulder Creek RV Resort 2550 S. Hwy 395 Lone Pine, CA	7
Wednesday, October 14, 2009 5:30 - 9:30 p.m.	Eastern Sierra Fairgrounds Home Economics Bldg Sierra Street & Fair Drive Bishop, CA	12
Thursday, October 15, 2009 5:30 - 9 p.m.	Kerr-McGee Center 100 W. California Ave Ridgecrest, CA	10
Tuesday, October 20, 2009 10:00 a.m. to 1:30 p.m.	Timbisha Shoshone Tribal Office 900 Indian Village Rd Death Valley, CA	3

2.3.1 Scoping Handouts

All attendees were given a scoping package that contained a fact sheet, map, and comment form. The fact sheets informed the public about the proposed action, geothermal resources, the purpose and need for the Haiwee Geothermal Leasing Area EIS, and the environmental review process, and provided contact information. Copies of the following were also made available: Notice of Intent, news releases, Haiwee Geothermal Leasing Area Specifications and Acreage, and Geothermal Resource Leasing Regulations (43 CRF 3200). Attendees also received notification of the extension of the scoping period to November 9, 2009 to allow commenters and attendees at the Death Valley scoping meeting sufficient time for commenting. Appendix E contains copies of all the scoping handouts.

3.0 CONSULTATION AND COORDINATION

3.1 NATIVE AMERICAN TRIBES

The BLM will use the NEPA commenting process to satisfy the requirements for public involvement process for Section 106 of the National Historic Preservation Act (16 U.S.C. 470f) as provided for in 36 CFR 800.2(d)(3). Native American Tribal consultations will be conducted and Tribal concerns will be given due consideration, including impacts on Indian trust assets.

On October 7, 2009, the BLM sent letters via certified mail to the following Native American Tribes inviting them to participate in the scoping and consultation process: Bishop Paiute Tribe, Big Pine Paiute Tribe, Ft. Independence Paiute Tribe, Lone Pine Paiute-Shoshone Tribe, and Timbisha Shoshone Tribe. The letter discussed the Haiwee Geothermal Leasing Area and location, NEPA process, scoping locations, and contact information. Appendix F contains a representative letter to the Tribes.

3.2 AGENCIES

Approximately 200 federal, state, and local agencies were sent news releases inviting them to the Haiwee Geothermal Leasing Area scoping meetings (see Section 2.2). The news release also identified preliminary issues and concerns for the project, as well as contact information.

3.3 ELECTED OFFICIALS

Inyo County Supervisors were sent scoping letters inviting them to participate in the scoping process for the Haiwee Geothermal Leasing Area. The letter also describing the proposed action, NEPA process, scoping, preliminary resource management issues and concerns, and schedule. A representative copy of the letter may be found in Appendix H and Table 2 lists the recipients and their districts.

Table 2 Inyo County Supervisors and Representative Districts

Inyo County Board of Supervisors	Representative District
Linda Arcularius	District 1
Susan Cash	District 2
Beverly Brown	District 3
Marty Fortney	District 4
Richard Cervantes	District 5

4.0 SCOPING COMMENT SUMMARY

BLM received 14 comment letters and numerous oral comments during the scoping meetings. Copies of the comment letters may be found in Appendix I. A list of topics discussed at each of the meetings and the court reporter transcripts may be found in Appendix D. To assist the BLM, comments were summarized and categorized by resource issue (see Appendix J) to determine the scope and significant issues that will be analyzed in the Draft EIS. A summary of the comments is provided below.

Purpose and Need

The public was concerned about the potential impacts of geothermal exploration, development, and utilization. They requested that the reasonable foreseeable development scenario be included in the purpose and need section and that it identify suitable and non-suitable locations for geothermal resources. The public and agencies inquired about the anticipated amount of generation, the power plant type and lifespan, and cooling methods. Many commenters requested the quantity of water needed, and its source, be identified. It was also suggested that the water amounts required for each phase and the water needs for the various power plant cooling designs be described. To address potential cumulative impacts, the identification of mitigation measures and establishment of mitigation funds was also requested.

A discussion of the Plan Amendment to the CDCA Plan in regards to the Geothermal Programmatic EIS and Haiwee Geothermal Leasing Area was requested. The public, agencies, organizations, and Native American Tribes were also interested in the relationship of the Haiwee Geothermal Leasing Area to the Deep Rose Geothermal Exploration Project and the three pending lease applications, as well as the connection to Coso Geothermal Fields.

The public, agencies, organizations, and Native American Tribes were concerned about the level of environmental analysis for the EIS and questioned if additional analysis would occur for specific projects in the Haiwee Geothermal Leasing Area.

Alternatives

It was recommended that a reasonable range of alternatives, including the no action alternative, be analyzed. An organization suggested a smaller leasing area be considered to avoid sensitive wildlife species and their habitats. It was suggested that alternative designs of geothermal facilities and conservation of geothermal resources be considered. Some examples are a geothermal power plant that would eliminate or vastly reduce water needs, or a means to capture and treat wastewater. It was suggested that alternative sources of water be identified, such as the Ridgecrest Treatment Plant, the Los Angeles Department of Water and Power, the Indian Wells Water Basin, construction of new water entrapment programs, and conservation and recycled water. There was also concern regarding the lack of a competitive bidding process for leasing of government lands for other renewable energy development, such as solar and wind, and multiple uses of the land.

Air Quality

Consideration of potential impacts caused by windborne dust and pollution, carbon dioxide emissions, and impacts to air quality in Rose Valley, were recommended. It was also suggested that any contributions to non-attainment areas be addressed, and greenhouse gases and global warming be analyzed.

Biological Resources

There is concern for the potential loss of water resources in Rose Valley and the potential impacts it may cause to habitat and vegetation, especially to the Little Lake Ranch property, wetlands adjacent to U.S. Highway 395, and the Habitat Project at Little Lake. There is also concern regarding water level impacts to surface flora and fauna. A baseline study was requested to analyze the potential impacts of surface water to a functional ecosystem. Analysis of riparian habitats, sensitive natural communities, natural springs, and artesian wells throughout the Rose Valley was also suggested.

The Haiwee Geothermal Leasing Area is within the Mohave Ground Squirrel Habitat Management Area and the Rose Valley Habitat Management Area. There is concern over the loss of habitat, the availability of suitable habitat compensation, and the compatibility of geothermal leasing and associated activities within the habitat management area. Of particular concern are the Mohave Ground Squirrel and Desert Tortoise. A member of the public also requested that impacts to vegetation, animals, and insects be addressed. Coordination with the California Department of Fish and Game was requested.

Cultural Resources

The Haiwee Geothermal Leasing Area is an intersection of more than one tribe’s territory and there is concern regarding the involvement of all interested tribes and the potential for cultural differences. A member of the public requested that a qualified archaeologist identify interested tribes for the proposed action, and actively solicited for comments, with personal contact and formal notices. It was also recommended that the archaeologist also collect and analyze comments from those tribes.

The Native American Tribes requested additional involvement. They are concerned about the Section 106 Consultation process, extraction of resources from the land, and what types of benefits the Tribes would obtain from the proposed action. Some local tribes requested additional information regarding geothermal leasing of lands to the Tribes. The Timbisha Shoshone Tribe was especially concerned about the connections or impacts to the Coso Hot Springs, and the water table depth.

The Tribes were also concerned that the new power plants would require transmission lines and these facilities could prohibit access and conflict with Native American values. They noted that impacts affecting Native American values are not amenable to mitigation and may involve desecration or sacrilegious treatment of spiritually important sites.

Geothermal Resources

Organizations requested that the existence of the geothermal resource, and its size and composition, be identified. It was also questioned if the Haiwee Geothermal Leasing Area was within a known geothermal resource area (KGRA), such as Coso, and if viable geothermal resources were present. It was requested that the amount of electrical production from geothermal resources be based upon the size and extent of the reservoir. It was requested that the preservation of the geothermal reservoirs and long-term management be addressed. Commenters also requested the identification of the different types of fluids that are contained in a GeoReservoir (both liquid and steam) and the fluids re-injected.

The public was concerned about the seismic activity in the area and questioned if geothermal exploration and development contributed to increased seismic activity. They questioned if injection of water into the rocks would contribute to fracturing. United States Geological Survey (USGS) coordination was also requested.

The public was concerned that depletion of underground water basins and surface flows may have a profound effect upon soil erosion, loss of topsoil, and the capability of the surface to sustain life, and they requested examination of potential soil subsidence in Rose Valley. It was requested that potential impacts on geologic resources and seismic issues related to high-pressure injection of fluids directly into fault zones be addressed. If water cooling towers (WCTs) are utilized, the public requested that the dramatic loss of heated liquids from evaporation be addressed.

There was concern regarding potential impacts to the Coso Geothermal Power Plant and operations, as well as the Coso Hot Springs. The public, agencies, organizations, and Native American Tribes were interested in the Deep Rose Geothermal Exploration Project and the three pending lease applications (CACA 43998 Maxx, CACA 44082 Maxx, and CACA 43993 Metcalf). They inquired about the cumulative impacts of numerous geothermal projects (existing and future) in close proximity to the Haiwee Geothermal Leasing Area.

Hazards and Hazardous Materials

There was concern regarding the potential for hazardous substance generation by future development in the Haiwee Geothermal Leasing Area, and treatment and disposal of substances. An analysis of wastewater and emission hazards to the public, and potential impacts from heat emissions, was requested.

Land Use / Agriculture / Recreation

The Haiwee Geothermal Leasing Area is within or in close proximity to a number of desert management plans—the California Desert Conservation Area (CDCA), the Northern and Eastern Mojave (NEMO) Plan, and the West Mojave (WEMO) Plan. The public, agencies, organizations, and Native American Tribes are concerned about the relationship of these plans to the Haiwee Geothermal Leasing Area and potential land use conflicts.

The Haiwee Geothermal Leasing Area contains motorized recreational roads and the public is concerned about access and potential impacts to recreation. They also requested mitigation for loss of roads from the NEMO planning decision. There is also concern regarding agricultural operations in Rose Valley and the potential impacts to water well owners.

Noise and Electromagnetic Fields (EMF)

An organization requested evaluation of noise generation from development in the Haiwee Geothermal Leasing Area, noise levels, and potential impacts to workers and surrounding wildlife.

Public Health & Safety

The public is concerned about potential impacts to human health and safety, and requested that the potential for wastewater and emission hazards to the public be analyzed.

Socioeconomics

Inyo County inquired about the potential for creation of jobs and revenue generation for the County. Concern arose regarding the CDCA Plan causing delays to geothermal leasing and potential impacts to the County's economy. The County requested consideration of the potential impacts to population and housing, and potential for socioeconomic impacts or adverse impacts to the Coso Geothermal Power Plant.

Traffic and Transportation

The California Department of Transportation was concerned about potential highway transportation issues to US 395, such as highway access points for facilities, and transport of construction materials and workforce.

Utilities & Public Services

The public questioned if adequate electrical transmission was available to transfer the geothermal energy to the load centers, and inquired about plans to upgrade existing transmission lines or construct a substation.

Visual Resources

The Rose Valley contains a number of recreational uses, and there is concern regarding visual impacts from the construction of structures and geothermal facilities.

Water Resources

The public, agencies, organizations, and Native American Tribes are concerned about the increasing scarcity of water in California, especially in Rose Valley. Most of the comments received inquired about the water needs for geothermal energy development and production, and questioned the source and amount of water appropriations. They requested that local and imported water sources for injection, the natural replenishment and adequacy of the water supply, and inter-basin water transfers in the vicinity be addressed.

The Rose Valley residents are very concerned about any potential reductions to water resources and the protection of watersheds, water rights, and nearby public lands. The owners of Little Lake Ranch, a 1,200 acre property located on the southern end of the Rose Valley, utilize the property for wildlife habitat and wildlife-oriented recreation, including hunting, fishing, and wildlife viewing. The propertyincludes a navigable body of water known as "Little Lake," ponds, and wetlands. Owners of Little Lake Ranch property requested potential impacts to subsurface water, aquifers, wetlands, water table depth, Little Lake, downstream ponds, creeks, wetlands, water wells, and natural springs be addressed. They requested consideration of water withdrawals impacts to arid environments that would affect many desert species, from fish to bighorn sheep to rare plants that depend on the water resources. The analysis of potential adverse impacts to BLM-administered lands at Little Lake, specifically to the Little Lake Watchable Wildlife Areas, was requested.

The public inquired about the presence of a connection between the GeoReservoir and the water basins, and requested evaluation of potential impacts to the use and consumption of the GeoReservoirs on local water basins. The Native American Tribes are also concerned about the close proximity of the Coso Hot Springs to the Haiwee Geothermal Leasing Area, and potential impacts to the hot springs. There was concern for the short- and long-term impacts of water extractions. It was requested that long-term pumping studies be completed prior to issuance of any permits.

Cumulative Effects

Many commenters were concerned about the cumulative impacts from existing and proposed geothermal projects, Deep Rose and Coso Geothermal Fields. There was also concern regarding large-scale operations in the vicinity of the Haiwee Geothermal Leasing Area, such as LADWP operations, Owens Lake Dust mitigation, water exports by Coso Hay Ranch, and livestock grazing. They are especially concerned about the increasing scarcity of water in California and the needs for groundwater extraction by these projects. The public is concerned that the development scenario is relatively small and may underestimate potential cumulative impacts and future projects and development. Cumulative effects should include an inventory and analysis of the following: wetlands (all springs and seeps), regional hydrology, vegetation, wildlife, rare plant and animal species, geology, aesthetic/scenic values, recreation, and dust generation.

In addition to geothermal energy development, an evaluation of potential cumulative impacts of future permitting for solar and wind energy development was requested. A commenter also requested identification of a menu of mitigation measures to be utilized at specific triggers to address potential cumulative impacts.

BLM also has a number of management plans in the desert (i.e., CDCA, NEMO, and WEMO) and the public questions how these plans would affect the proposed action.

Other Comments

The Native American Tribes, Inyo County planners, and local agencies requested additional coordination and notification of the Haiwee Geothermal Leasing Area. There was also concern regarding the *Federal Register* notice containing non-functional website links and the different scoping period end dates on the press releases. A commenter also questioned BLM’s ability and capacity to manage and monitor geothermal activity without impacting its other responsibilities.

A comment was received that questioned a lease applicant’s experience and knowledge of geothermal resource exploration and development, and financial capability.

Consideration of previous studies, reports, evidence, and comments prepared for projects, such as the Coso Project, was suggested. An organization also requested production of public records in connection with the Haiwee Geothermal Leasing Area.

5.0 SUMMARY OF FUTURE STEPS IN THE PLANNING PROCESS

Comments received during the public scoping period will be considered during the preparation of the Draft EIS. Although the public scoping period has ended (November 9, 2009), the BLM welcomes comments throughout the environmental review process. The release of the Draft EIS/Draft Plan Amendment is expected to commence in spring of 2010 and begin the 90-day comment period. Shortly after the release, the public will also have the opportunity to attend formal public meetings. The Final EIS/Proposed Plan Amendment is expected in fall of 2010, and the BLM anticipates issuance of a Record of Decision in winter 2010.

Table 3 Haiwee Geothermal Leasing Area EIS Timeline

Scoping • Scoping Comments due November 9, 2009	Fall 2009
Draft Environmental Impact Statement/Draft Plan Amendment • Publish Notice of Availability • 90-day comment period • Formal Public Meetings	Summer 2010
Final Environmental Impact Statement/Proposed Plan Amendment • Publish Notice of Availability • 30-day protest period • 60-day Governor's Consistency Review	Fall 2010
Record of Decision	Winter 2010

APPENDIX A: FEDERAL REGISTER

Dated: September 8, 2009.

Rhea Suh,

Assistant Secretary—Policy, Management and Budget.

[FR Doc. E9–21930 Filed 9–10–09; 8:45 am]

BILLING CODE P

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[LL91310000EI]

Notice of Intent To Prepare an Environmental Impact Statement for the Proposed Leasing of National System of Public Lands for Geothermal Resource Development in the Haiwee Geothermal Leasing Area Located in Inyo County, CA and To Amend the California Desert Conservation Area Plan of 1980

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice of Intent.

SUMMARY: In compliance with the National Environmental Policy Act of 1976 (NEPA), as amended, and section 202 of the Federal Land Policy and Management Act of 1976 (FLPMA), as amended, the Bureau of Land Management (BLM) Ridgecrest Field Office intends to prepare an Environmental Impact Statement (EIS) to analyze the proposed leasing of approximately 22,060 acres of BLM-managed public lands for geothermal exploration, development, and utilization in the Haiwee Geothermal Leasing Area located in Inyo County, California. The leasing of public lands for geothermal resources will require an amendment to the California Desert Conservation Area (CDCA) Plan of 1980. Comments are being solicited to help identify significant issues or concerns related to the proposed action, determine the scope of issues, and identify and refine alternatives to the proposed action. The BLM will also use and coordinate the NEPA commenting process to satisfy the requirements for public involvement in section 106 of the National Historic Preservation Act.

DATES: This Notice initiates the public scoping process for the EIS and plan amendment. Comments on issues may be submitted in writing until October 13, 2009. The date(s) and location(s) of the public scoping meetings will be announced at least 15 days in advance through local news media, newspapers and the BLM Web site at: *http://www.blm.gov/ca/st/en.html*. In order to be included in the Draft EIS, all comments must be received prior to the close of the scoping period or 15 days after the last public meeting, whichever is later. We will provide additional opportunities for public participation upon publication of the Draft EIS.

ADDRESSES: You may submit comments related to Geothermal Leasing in the Haiwee Geothermal Leasing Area located in Inyo County, California by any of the following methods:

- *Web site: http://www.blm.gov/ca/st/en.html.*
- *E-mail: John_Dalton@ca.blm.gov.*
- *Fax:* (951) 697–5299.
- *Mail:* Bureau of Land Management, California Desert District Office, Attn: John Dalton, Haiwee Geothermal Leasing Area Coordinator, 22835 Calle San Juan De Los Lagos, Moreno Valley, California 92553.

FOR FURTHER INFORMATION CONTACT: John Dalton at (951) 697–5311, *John_Dalton@ca.blm.gov.*

SUPPLEMENTARY INFORMATION: The BLM has received three noncompetitive geothermal lease applications for 4,460 acres of public land within the Haiwee Geothermal Leasing Area in Inyo County, California. In addition, the BLM identified approximately 17,600 acres of public lands, also within the Haiwee Geothermal Leasing Area and adjacent to the three geothermal lease applications, which will be considered for competitive geothermal leasing under 43 CFR 3203.10(e). The proposed action is to amend the CDCA Plan to allocate project area lands as open or closed to consideration for geothermal leasing, with appropriate stipulations necessary to maintain and protect other resource values and uses, and to develop a Reasonably Foreseeable Development Scenario for geothermal resources development under the authority of the FLPMA and the Geothermal Steam Act of 1970, as amended (30 U.S.C. 1001 *et seq.*). Individual lease issuance decisions and parcels to be included in a sale will be considered in a manner consistent with the final plan as amended, as subsequent implementation decisions. The public lands being considered for geothermal leasing in the Haiwee Geothermal Leasing Area are located in sections 11–14, 23–26, 35, and 36 in Township 21 South, Range 37 East, sections 7–10, 15, 17–22, 27–34 in Township 21 South, Range 38 East, in sections 1 and 2 in Township 22 South, Range 37 East, and sections 5–8 in Township 22 South, Range 38 East, all within the San Bernardino and Base Meridian. Total acreage being considered for geothermal leasing is approximately 22,060 acres.

Alternatives thus far identified for evaluation in the EIS will include the following:

1. Proposed action.
2. No action alternative (not leasing the lands for geothermal exploration, development, and utilization).
3. Leasing fewer than the proposed 22,060 acres of public land.

The principal issues identified thus far for consideration in the EIS include Native American concerns; potential land use conflicts including recreation; cumulative impacts considering existing, proposed, and potential geothermal projects in the area; and potential impacts on cultural resources, wildlife, visual resources, and surface and groundwater resources. The EIS will also address other issues such as geology, mining, geothermal resources, vegetation, threatened or endangered species, air quality, noise, transportation, human health and safety, and social and economic issues, as well as any issues raised during the scoping process.

The BLM will identify issues to be addressed in the Plan, and will place them into one of three categories:

1. Issues to be resolved in the plan.
2. Issues to be resolved through policy or administrative action.
3. Issues beyond the scope of this plan.

The BLM will provide an explanation in the plan as to why we placed an issue in category two or three. The public is also encouraged to help identify any management questions and concerns that should be addressed in the Plan. The BLM will work collaboratively with interested parties to identify the management decisions that are best suited to local, regional, and national needs and concerns.

The following Planning Criteria will be utilized during production of this document:

- The plan will be completed in compliance with FLPMA, NEPA, and all other relevant Federal law, Executive Orders, and management policies of the BLM.
- Where existing planning decisions are still valid, those decisions may remain unchanged and be incorporated into the plan amendment.
- The plans will recognize valid existing rights.
- Native American Tribal consultations will be conducted in accordance with policy and Tribal concerns will be given due consideration. The planning process will include the consideration of any impacts on Indian trust assets.

• Consultation with the State Historic Preservation Officer will be conducted throughout the planning process.

• Consultation with U.S. Fish and Wildlife Service will be conducted throughout the planning process, as necessary.

By this notice, the BLM is complying with requirements in 43 CFR 1610.2(c) to notify the public of potential amendments to land use plans, predicated on the findings of the EIS. The BLM will utilize and coordinate the NEPA commenting process to satisfy the public involvement process for section 106 of the National Historic Preservation Act (16 U.S.C. 470f) as provided for in 36 CFR 800.2(d)(3). Native American Tribal consultations will be conducted in accordance with policy, and Tribal concerns will be given due consideration, including impacts on Indian trust assets. Federal, State, and local agencies, as well as individuals, organizations, or tribes that may be interested or affected by the BLM's decision on this project are invited to participate in the scoping process and, if eligible, may request or be requested by the BLM to participate as a cooperating agency.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Jack Hamby,

Acting District Manager.

[FR Doc. E9–21928 Filed 9–10–09; 8:45 am]

BILLING CODE 4310–40–P

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[LLNVC0100000.L91310000.EJ0000. LXSIGEOT0000; MO4500008734; NVN 087795; 09–08807; TAS: 14X5575]

Notice of Intent To Prepare an Environmental Impact Statement for the Salt Wells Energy Projects, Churchill County, NE

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice of Intent.

SUMMARY: The Bureau of Land Management (BLM) Stillwater Field Office, Carson City, Nevada, intends to prepare an Environmental Impact Statement (EIS) for the Salt Wells Energy Projects proposed by Sierra Pacific Power Company (Sierra), Ormat Technologies, Inc. (Ormat), and Vulcan Power Company (Vulcan) that are located in Churchill County, Nevada. Three separate projects are proposed that could result in seven 30–60 megawatt (MW) geothermal power plants with 47 associated wells, pipelines and other facilities near Fallon, Nevada, and a 22-mile, fifty-foot-wide Right-of-Way (ROW) for a new transmission line with substations to support the existing and new Fallon geothermal power plants. The study area encompassed by the three projects together covers approximately 537 total acres. This notice announces the beginning of the scoping process and solicits input on the identification of issues.

DATES: The public scoping period will close November 10, 2009. Any public meetings associated with the public scoping will be announced through the local news media and the BLM Web site: *www.blm.gov/nv/st/en/fo/carson_city_field.html* at least 15 days prior to each event. Additional formal opportunities for public participation in the EIS process will be provided through comment upon publication of the draft document.

ADDRESSES: Written comments may be submitted by any of the following methods:

• *Mail:* BLM Stillwater Field Office, Attn: Salt Wells Energy Projects, 5665 Morgan Mill Road, Carson City, NV 89701.

• *Fax:* (775) 885–6147.

• *E-mail: saltwells_eis@blm.gov.*

Documents pertinent to this proposal may be examined at the Carson City District Office, 5665 Morgan Mill Road, Carson City, NV.

FOR FURTHER INFORMATION CONTACT: Desna Young (775) 885–6078; or e-mail *saltwells_eis@blm.gov.*

SUPPLEMENTARY INFORMATION: The BLM Stillwater Field Office received separate proposed geothermal utilization plans and applications for facilities construction permits from Ormat and Vulcan, and an electric transmission right-of-way (ROW) application from Sierra, for proposed energy projects covering a combined area of approximately 537 acres in the Salt Wells area about 15 miles east of Fallon, Nevada. Vulcan proposes the development of up to six geothermal power plants and facilities. Ormat proposes the development of one geothermal power plant and associated facilities. Sierra proposes 22 miles of above-ground electrical transmission lines, electrical substations, and switching facilities. The BLM determined that because of similar timing, geographic area, and type of action, the BLM will analyze the three proposals in one EIS. The BLM will issue a separate record of decision at the end of the process for each proposed project. The BLM will use information from this scoping process with the utilization plans and ROW proposals to facilitate public involvement and to identify the alternatives to be studied. All lands within the project area are already under lease. The proposed facilities would be sited on a combination of private property and public land managed by the BLM and the U.S. Bureau of Reclamation (BOR). Several proposed well sites are located on Federal geothermal leases in the Carson Lake and Pasture area, currently open to leasing and managed by the BOR, although these lands have been proposed to be transferred to the Nevada State Department of Wildlife. These activities are consistent with the applicable 2001 Carson City Consolidated Resource Management Plan as amended by the 2008 Record of Decision and Resource Management Plan Amendments for Geothermal Resource Leasing in the Western United States. The Fallon Naval Air Station is adjacent to the leased areas in Salt Wells. The Navy has concerns both related to its own geothermal resource program and also related to preserving its airspace for training, and community encroachment issues. The Ormat project proposal includes the construction and operation of a 40 MW binary air-cooled geothermal power plant, 20 geothermal production and injections wells, pipelines, a substation, connection lines to the proposed Sierra transmission line, and access roads on approximately 90 acres of land. BLM has already completed a July 2008 Environmental Assessment in the Ormat Carson Lake Geothermal Exploration Project EA (EA–NV–030–07–006) and has approved 11 of the wells estimated to be necessary for Ormat's project. The Vulcan project proposal is to construct up to six 30–60 MW binary or double-flash geothermal power plants and associated facilities on approximately 160 acres of land, which could require an estimated 27 geothermal production and injection wells. Each site includes production and injection wells, pipelines, a substation, connection lines to the proposed Sierra transmission line, and access roads. Twenty of these wells have already been approved via two Environmental Assessments for ten

APPENDIX B: NEWS RELEASES

U.S. Department of the Interior
Bureau of Land Management
News Release

For Immediate Release: September 11, 2009 CA-CDD-09-69
Contact: Stephen Razo 951-697-5217; email: srazo@ca.blm.gov

Public Meetings Scheduled for Proposed Geothermal Project

Three public meetings are scheduled in October to gather public comments on proposed geothermal exploration and development on public lands managed by the Bureau of Land Management within the Haiwee area near Ridgecrest in Inyo County.

The meetings will be held at the following dates, times and locations:
1) Tuesday, Oct. 13, 5:30 pm to 9 pm, Boulder Creek RV Resort, 2550 S. Hwy 395, Lone Pine;
2) Wednesday, Oct. 14, 5:30 pm to 9:30 pm, Ea Sierra Fairgrounds, Home Economics Bldg, Bishop;
3) Thursday, Oct. 15, 5:30 pm to 9 pm, Kerr-McGee Center, 100 W. California Ave, Ridgecrest.

BLM staff will present a brief overview of the proposed project. Following the presentation, BLM will accept public comment, which will be recorded by a court reporter. The timeframe of comments will be determined by the number of individuals who register to speak. Comments received throughout the public process will be considered during preparation of the draft environmental impact statement (EIS).

Written comments should be submitted by October 16, 2009, to the Bureau of Land Management, California Desert District Office, Attn: John Dalton, Haiwee Geothermal Leasing Coordinator, 22835 Calle San Juan De Los Lagos, Moreno Valley, California 92553.

Total acreage being considered for geothermal leasing is approximately 22,060 acres.

Issues already identified to be analyzed in the EIS include hydrology; Native American concerns; cumulative impacts considering existing, proposed, and potential geothermal projects in the area; potential impacts on cultural resources; potential effects on wildlife; potential land use conflicts including recreation; potential visual impacts; and potential impacts on surface water and groundwater resources. The EIS also will address issues such as geology, geothermal resources, vegetation, threatened or endangered species, air quality, noise, transportation, human health and safety and socioeconomics, as well as any issues raised during the public process.

For more information contact John Dalton at (951) 697-5311 or email: John_Dalton@ca.blm.gov. You may also contact Linn Gum, BLM Ridecrest Field Office assistant manager (760) 384-5450 or the BLM California planning and environmental coordinator (916) 978-4427.

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U.S. Department of the Interior
Bureau of Land Management
News Release

For Immediate Release: October 1, 2009 CA-CDD-10-01
Contact: David Briery (951) 697-5220 or Stephen Razo (951) 697-5217

Additional Public Meeting Scheduled for Proposed Geothermal Project

An additional public meeting to gather comments on the proposed geothermal exploration and development on public lands managed by the Bureau of Land Management (BLM) within the Haiwee area near Ridgecrest in Inyo County has been scheduled for Death Valley.

The meetings will be held at the following dates, times and locations:
1) Tuesday, Oct. 13, 5:30 – 9:00 p.m., Boulder Creek RV Resort, 2550 S. Hwy 395, Lone Pine;
2) Wednesday, Oct. 14, 5:30 - 9:30 p.m., Ea Sierra Fairgrounds, Home Economics Bldg, Bishop;
3) Thursday, Oct. 15, 5:30 - 9 p.m., Kerr-McGee Center, 100 W. California Ave, Ridgecrest;
4) Tuesday, Oct. 20, 10:00 a.m. to 1:30 p.m., Timbisha Shoshone Tribal Office, 900 Indian Village Rd, Death Valley.

BLM staff will present a brief overview of the proposed project. Following the presentation, BLM will accept public comment, which will be recorded by a court reporter. The timeframe of comments will be determined by the number of individuals who register to speak. Comments received throughout the public process will be considered during preparation of the draft environmental impact statement (EIS).

Written comments should be submitted by October 16, 2009, to the BLM California Desert District Office, Attn: John Dalton, Haiwee Geothermal Leasing Coordinator, 22835 Calle San Juan De Los Lagos, Moreno Valley, CA 92553.

Total acreage being considered for geothermal leasing is approximately 22,060 acres.

Issues already identified to be analyzed in the EIS include hydrology; Native American concerns; cumulative impacts considering existing, proposed, and potential geothermal projects in the area; potential impacts on cultural resources; potential effects on wildlife; potential land use conflicts including recreation; potential visual impacts; and potential impacts on surface water and groundwater resources. The EIS also will address issues such as geology, geothermal resources, vegetation, threatened or endangered species, air quality, noise, transportation, human health and safety and socioeconomics, as well as any issues raised during the public process.

For more information contact John Dalton at (951) 697-5311 or email: John_Dalton@ca.blm.gov. You may also contact Linn Gum, BLM Ridecrest Field Office assistant manager (760) 384-5450 or the BLM California planning and environmental coordinator (916) 978-4427.

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

News Release

For Immediate Release: July 28, 2011 CA-CDD-11-57
Contact: David Briery, (951) 697-5220 or Stephen Razo, (951) 697-5217

BLM to Analyze Geothermal Lease Proposals in Inyo County

The Bureau of Land Management (BLM) will analyze three geothermal lease proposals on public lands that are within the Haiwee Geothermal Leasing Area (HGLA) in southwestern Inyo County, northwest of Ridgecrest, Calif.

The BLM is currently writing a draft Environmental Impact Statement (EIS) to evaluate the HGLA, which includes an estimated 22,040 acres of BLM-managed federal lands. The EIS will analyze various alternatives in considering whether none, all, or part of the HGLA should be made available for geothermal exploration and development. In conjunction with this analysis, the BLM will evaluate the three pending lease proposals that total approximately 4,500 acres of federal mineral estate within the area.

The leasing area is east of the Inyo National Forest, west of the China Lake Naval Air Weapons Station, north of Little Lake, and south of the South Haiwee Reservoir.

As part of the ongoing HGLA analysis first announced in September 2009, issues raised during the public scoping process will be addressed. The BLM is also evaluating the potential environmental, social, and economic effects of proposed alternatives. The BLM will use this same EIS and CDCA plan amendment process to evaluate the impacts of the three pending geothermal lease applications.

Following the release of the draft EIS and possible CDCA plan amendment, there will be an opportunity for public comment on the three potential geothermal leases.

For more information contact Peter Godfrey, HGLA Project Manager, California Desert District Office at (951) 697-5385 or email: pgodfrey@blm.gov

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CITY PLANNING DEPT
KERN CITY PLANNING DEPT
APPLE VALLEY WATER DISTRICT
CA ASSOC RESOURCE CONSERVATION DISTRICT
CA BOARD OF EQUALIZATION
CA DEPT OF CORRECTIONS
CA DEPT OF FISH & GAME
CA DEPT OF FISH & GAME REGION 6
CA DEPT OF PARKS & RECREATION
CA DEPT OF TRANSPORTATION
CA DESERT PROTECTION LEAGUE
CA FEDERATION OF MINERALOGICAL SOCITIES
CA PARKS AND RECREATION
CA REG WATER QUALITY CONTOL BOARD
CA REGIONAL WATER CONTROL BRD
CA SECRETARY OF RESOURCES
CA STATE LANDS COMMISSION
CALIFORNIA DEPARTMENT OF FORESTRY
CALIFORNIA DEPARTMENT OF JUSTICE
CALIFORNIA DEPARTMENT OF PARKS AND RECREATION
CALIFORNIA DEPT OF FORESTRY
CALIFORNIA DIVISION OF OIL AND GAS
CALIFORNIA OFFICE OF HISTORIC PRESERVATION
CALIFORNIA STATE LANDS COMMISSION
COACHELLA VALLEY WATER DISTRICT
COMMUNITY SERVICES DISTRICT
DESCANSO RANGER DISTRICT
DESERT DISTRICT GRAZING BOARD
DESERT WATER AGENCY
ENVIRONMENTAL PROTECTION AGENCY
GARRY MEEKER INSURANCE AGENCY
IMPERIAL IRRIGATION DISTRICT
INDEPENDENT OIL PRODUCERS AGENCY
INDIAN WELLS VALLEY WATER DISTRICT
METROPOLITAN WATER DISTRICT
MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
NATIVE AMERICAN HERITAGE COMMISSION
OLIVENHAIN WATER DISTRICT
OTAY WATER DISTRICT
SALTON COMMUNITY SERVICES DISTRICT
SUNLINE TRANSIT AGENCY
TWENTYNINE PALMS WATER DISTRICT
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
US ARMY CORPS OF ENGINEERS
US ARMY ENGINEER DIST SUCCESS LAKE
US ARMY ENGINEER DISTRICT
US BORDER PATROL
US DEPT OF AG SOIL CONSERVATION SVC
US DEPT OF THE INTERIOR
US ECOLOGY
US ENVIRONMENTAL PROTECTION AGENCY REGION 9
US FISH & WILDLIFE SERVICE
US FISH & WILDLIFE SERVICE ENHANCEMENT
US FISH AND WILDLIFE SERVICE
US FOREST SERVICE
US FOREST SERVICE ANGELES NF
US FOREST SERVICE BIG PINES VISITOR CTR
US FWS KERN NWR
US FWS HAVASU NWR
USDA FOREST SERVICE
USFW REGIONAL DIRECTOR
VISTA IRRIGATION DISTRICT
TRIBAL HISTORIC PRESERVATION OFFICER, KERN VALLEY INDIAN COUNCIL
BEATTY TOWN BOARD
CALIFORNIA CONSERVATION CORPS POMONA CENTER
CAMP PENDLETON US MARINE CORP BASE
COLORADO RIVER BOARD OF CALIFORNIA
FLOOD CONTROL DISTRICT RIVERSIDE COUNTY
CLARK COUNTY COMPREHENSIVE PLANNING
COUNTY PLANNING COMMISSION TULARE COUNTY
IMPERIAL COUNTY AGRICULTURE COMMISSION
IMPERIAL COUNTY FISH AND GAME COMMISSION
IMPERIAL COUNTY PLANNING AND DEVELOPMENT SERVICES
DAGGETT COMM SERVICES DIST
DESERT FISHES COUNCIL
DESERT PROTECTION COUNCIL
DESERT PROTECTIVE COUNCIL
IMPERIAL COUNTY PLANNING DEPARTMENT
FISH GAME COMMISSIONER
INYO COUNTY PLANNING COMM
GOVERNOR'S OFFICE OF PLANNING AND RESEARCH

INYO COUNTY PLANNING DEPT
KERN COUNTY PLANNING DEPARTMENT
KERN COUNTY PLANNING COMMN DEVELOPMENT SERVICES
KERN COUNTY PLANNING DEPT
MONO COUNTY PLANNING DEPARTMENT
ORANGE COUNTY PLANNING DEPT
PLANNING COMMISSION RIVERSIDE COUNTY
SAN BERNARDINO COUNTY AGRI COMMISSIONER
SAN DIEGO COUNTY PLANNING AND LAND USE
INDIO PLANNING DEPT
BOARD OF SUPERVISORS KERN COUNTY
COUNTY OF LOS ANGELES
KERN CO WILDLIFE RESOURCES COMMISSION
KERN COUNCIL OF GOVTS
COUNTY ADMINISTRATION CENTER
COUNTY OF RIVERSIDE
COUNTY OF SAN BERNARDINO
COUNTY OF SAN DIEGO
ENVIRON ANALYSIS SECTION SAN BERNARDINO COUNTY
FOURWHEELERS OF ORANGE COUNTY
IMPERIAL COUNTY PARKS AND RECREATION
IMPERIAL COUNTY PARKS AND RECREATION
IMPERIAL COUNTY SHERIFF
IMPERIAL COUNTY SUPERVISOR
KERN COUNTY
KERN COUNTY BOARD OF TRADE
LAKESIDE PLANNING GROUP
KERN COUNTY FARM BUREAU
KERN COUNTY FIRE DEPT
MBR CA BOARD FORESTRY
MINE COUN
KERN COUNTY GENERAL SERVICES
KERN COUNTY PROSPECTORS
NEVADA COMMISSION ON TOURISM
NEWBERRY COMMUNITY SERV DIST
KERN COUNTY PUBLIC WORKS SOLID WASTE MGMT
OFF HIGHWAY MOTOR VEHICLE RECREATION COMMISSION
ORANGE CO PLANNING COMM
ORANGE CO SANITATION DIST
KERN COUNTY SHERIFFS DEPT
LA COUNTY SANITATION DIST
LOS ANGELES COUNTY
ORANGE COUNTY
PALO VERDE IRRIGATION DIST
PLANNING DEPT
PLANNING OFFICE
PLANS AND PROGRAMS AFFTC XP
REGIONAL WATER QUALITY CONTROL BOARD
RIDGECREST PLANNING COMMISSION
RIVERSIDE CO PLANNING COMMISSION
SAN BERNARDINO CO FISH GAME COMMISSION
RIVERSIDE COUNTY
RIVERSIDE COUNTY SHERIFF OFFICE
SAN BERNARDINO COUNTY
SAN BERNARDINO COUNTY COOPERATIVE EXTENSION
SAN BERNARDINO COUNTY DEPT OF REG PARKS
SAN BERNARDINO COUNTY DEPT OF WASTE MGT
SAN BERNARDINO COUNTY ENV ANALYSIS TEAM
SAN BERNARDINO COUNTY SERVICES AREA NO 29
SAN BERNARDINO COUNTY-DEPARTMENT OF AIRPORTS
SAN BERNARDINO COUNTY-DEPARTMENT OF PUBLIC WORKS-
SAN DIEGO COUNTY
SAN DIEGO COUNTY FIRE
SAN DIEGO COUNTY SHERIFF
SBCO CHIEF OF ENVIR DIVISION -- PLANNING
SOUTH DIST SECTYTREAS
STATE BOARD FOOD AG
STATE BOARD OF FOOD AG
SAN DIEGO COUNTY SHERIFFS DEPARTMENT
TLC LOS ANGELES COUNTY
TULARE COUNTY
CALIFORNIA INSTITUTE OF PUBLIC AFFAIRS
COACHELLA VALLEY ASSN OF GOVTS
DEPT OF ADMINISTRATION
DEPT OF AGRICULTURE
DEPT OF ENVIROMENTAL HEALTH
DEPT OF GEOLOGY
DEVELOPMENT DEPT
F D ARCH DEPT
FORESTRY DEPT

GOVERNMENT PUBLICATIONS DEPT
GOVT PUBLICATION SECTION
KERN CO FIRE DEPT
KERN CO HEALTH DEPT
NAVY PUBLIC WORKS CENTER
PUBLIC WORKS
SAN BERNARDINO CNTY DEPT ECONOMIV AND CMNTY DEV
TOIYABE NATIONAL FOREST
TULARE CO ASSN OF GOVTS
US ARMY COE
ARCHAEOLOGICAL INFO CENTER
BAKER COMMUNITY SERVICES DISRTICT
BUREAU OF LAND MANAGEMENT
CA HIGHWAY PATROL
CDFG
CDFG FIELD SUPERVISOR
CENTER FOR NATURAL LANDS MANAGEMENT
CNPS
CO OF ORANGE PARKS RECREATION
DEATH VALLEY NATIONAL PARK
ENVIRONMENTAL POLICY PROGRAM IPR
FEDERAL HIGHWAY ADMIN CENTRAL
FISH AND GAME COMM
FOREST SERVICE
L A DEPARTMENT OF WATER AND POWER
MOJAVE DESERT AQMD
NATIONAL PARK SERVICE
NATIONAL PARK SERVICE WESTERN REGION
NAVAL AIR WEAPONS STATION
PROVIDENCE MTN STATE REC AREA
SAN BERNARDINO CNTY
SAN BERNARDINO CO FARM BUREAU
SAN BERNARDINO CTY
SAN DIEGO CO FISH GAME ASSO
SAN DIEGO DEPARTMENT OF PARKS
SEQUOIA NATIONAL FOREST
STATE OF NEVADA
STATE OF NV DIVISION OF FORESTRY

Haiwee Geothermal Leasing Area
Elected Officials Contact List

EL CENTRO CITY COUNCIL
STATE ASSEMBLY DISTRICT 34
STATE ASSEMBLY DISTRICT 41
STATE ASSEMBLY DISTRICT 65
STATE ASSEMBLY DISTRICT 70
STATE ASSEMBLY DISTRICT 79
STATE SENATE DISTRICT 25
STATE SENATE DISTRICT 33
STATE SENATE DISTRICT 36
STATE SENATE DISTRICT 38
STATE SENATE DISTRICT 39
US CONGRESS 22ND DISTRICT
US HOUSE OF REPRESENTATIVES DIST 20
US HOUSE OF REPRESENTATIVES DIST 26
US HOUSE OF REPRESENTATIVES DIST 34
US HOUSE OF REPRESENTATIVES DIST 38
US HOUSE OF REPRESENTATIVES DIST 41
US HOUSE OF REPRESENTATIVES DIST 43
US HOUSE OF REPRESENTATIVES DIST 45
US HOUSE OF REPRESENTATIVES DIST 51
US SENATE
COUNCILMEMBER
IMPERIAL CO BOARD OF SUPERVISORS
KERN CO BOARD OF SUPERVISORS
LA JOLLA TOWN COUNCIL
ORANGE CO BOARD OF SUPERVISORS
RIVERSIDE CO BOARD OF SUPERVISORS
SAN BERNARDINO CO BOARD OF SUPERVISORS
SAN DIEGO CO BOARD OF SUPERVISORS
TULARE CO BOARD OF SUPERVISORS

Haiwee Geothermal Leasing Area
City Contact List

CITY MANAGER
CITY MANAGERS ASSOCIATION
CITY MUNICIPAL MUSEUM
CITY OF AGOURA HILLS
CITY OF ALHAMBRA
CITY OF ANAHEIM
CITY OF ARCADIA
CITY OF ARTESIA
CITY OF AZUSA
CITY OF BALDWIN PARK
CITY OF BANNING
CITY OF BARSTOW
CITY OF BARSTOW PLANNING DEPT
CITY OF BEAUMONT
CITY OF BELL
CITY OF BELL GARDENS
CITY OF BELLFLOWER
CITY OF BEVERLY HILLS
CITY OF BIG BEAR LAKE
CITY OF BISHOP
CITY OF BLYTHE
CITY OF BRADBURY
CITY OF BREA
CITY OF BUENA PARK
CITY OF BURBANK
CITY OF CALEXICO
CITY OF CALIPATRIA
CITY OF CARSON
CITY OF CERRITOS
CITY OF COALINGA
CITY OF CORONADO
CITY OF COSTA MESA
CITY OF CUDAHY
CITY OF CULVER CITY
CITY OF CYPRESS
CITY OF DEL MAR
CITY OF DESERT HOT SPRINGS
CITY OF DOWNEY
CITY OF DUARTE
CITY OF EL CENTRO
CITY OF EL SEGUNDO
CITY OF FARMERSVILLE
CITY OF FONTANA
CITY OF FOUNTAIN VALLEY
CITY OF FULLERTON
CITY OF GARDENA
CITY OF GRAND TERRACE
CITY OF HAWAIIAN GARDENS
CITY OF HAWTHORNE
CITY OF HEMET
CITY OF HERMOSA BEACH
CITY OF HIDDEN HILLS
CITY OF HOLTVILLE
CITY OF HUNTINGTON BEACH
CITY OF HUNTINGTON PARK
CITY OF IMPERIAL
CITY OF IMPERIAL BEACH
CITY OF INDIO
CITY OF INGLEWOOD
CITY OF IRVINE
CITY OF IRWINDALE
CITY OF LA CANADAFLINTRIDGE
CITY OF LA HABRA
CITY OF LA MIRADA
CITY OF LA PALMA
CITY OF LA QUINTA
CITY OF LAGUNA BEACH
CITY OF LAKE ELSINORE
CITY OF LAKEWOOD
CITY OF LAWNDALE
CITY OF LEMON GROVE
CITY OF LOMITA
CITY OF LOS ALAMITOS
CITY OF LYNWOOD
CITY OF MANHATTAN BEACH
CITY OF MAYWOOD
CITY OF MONTEBELLO
CITY OF MORENO VALLEY
CITY OF NATIONAL CITY
CITY OF NEEDLES
CITY OF NEWPORT BEACH
CITY OF NORCO
CITY OF ORANGE
CITY OF PAHRUMP
CITY OF PALM DESERT
CITY OF PALM SPRINGS

CITY OF PALOS VERDES ESTATES
CITY OF PARAMOUNT
CITY OF PERRIS
CITY OF PICO RIVERA
CITY OF PLACENTIA
CITY OF POMONA
CITY OF POWAY
CITY OF RANCHO MIRAGE
CITY OF RANCHO PALOS VERDES
CITY OF REDLANDS
CITY OF REDONDO BEACH
CITY OF RIVERSIDE
CITY OF ROLLING HILLS
CITY OF ROLLING HILLS ESTATES
CITY OF ROSEMEAD
CITY OF SAN BERNARDINO
CITY OF SAN CLEMENTE
CITY OF SAN DIEGO
CITY OF SAN DIMAS
CITY OF SAN GABRIEL
CITY OF SAN JACINTO
CITY OF SAN JUAN CAPISTRANO
CITY OF SAN MARCOS
CITY OF SAN MARINO
CITY OF SANTA ANA
CITY OF SANTA FE SPRINGS
CITY OF SANTA MONICA
CITY OF SEAL BEACH
CITY OF SIERRA MADRE
CITY OF SIGNAL HILL
CITY OF SOUTH GATE
CITY OF SOUTH PASADENA
CITY OF STANTON
CITY OF TEMPLE CITY
CITY OF TORRANCE
CITY OF TULARE
CITY OF TUSTIN
CITY OF TWENTYNINE PALMS
CITY OF UPLAND
CITY OF VICTORVILLE
CITY OF VILLA PARK
CITY OF VISTA
CITY OF WALNUT
CITY OF WEST COVINA
CITY OF WHITTIER
CITY OF YORBA LINDA
LANCASTER CITY HALL
VICTORVILLE CITY HALL
CITY OF RAMONA PUBLIC LIBRARY
TOWN OF APPLE VALLEY
TOWN OF YUCCA VALLEY

Haiwee Geothermal Leasing Area
Native American Tribes Contact List

CHEMEHUEVI TRIBE
FORT MOJAVE INDIAN TRIBE
FT MOJAVE INDIAN TRIBE
TRIBAL COUNCIL CHAIR, BIG PINE PAIUTE TRIBE OF THE OWENS VALLEY
TRIBAL COUNCIL CHAIR, BISHOP PAIUTE TRIBE
TRIBAL COUNCIL CHAIR, FORT INDEPENDENCE PAIUTE TRIBE
TRIBAL COUNCIL CHAIR, LONE PINE PAIUTE-SHOSHONE TRIBE
TRIBAL COUNCIL CHAIR, TIMBISHA SHOSHONE TRIBE
AGUA CALIENTE BAND OF CAHUILLA INDIANS
AUGUSTINE BAND OF MISSION INDIANS
BUREAU OF INDIAN AFFAIRS
CABAZON BAND OF MISSION INDIANS
CAMPO BAND OF MISSION INDIANS
CUYAPAIPE BAND OF MISSION INDIANS
JAMUL INDIAN VILLAGE
LAS VEGAS INDIAN CENTER
MANZANITA BAND OF MISSION INDIANS
MESA GRANDE BAND OF MISSION INDIANS
PAUMA BAND OF MISSION INDIANS
PECHANGE BAND OF MISSION INDIANS
SAN LUISENO BAND OF MISSION INDIANS
SAN MANUEL BAND OF MISSION INDIANS
SAN PASQUAL BAND OF DIEGUENO INDIANS
SANTA YSABEL BAND OF MISSION INDIANS
SOBABA BAND OF MISSION INDIAN
SYCUAN BAND OF MISSION INDIANS
TIMBISHA BAND SHOSHONE INDIANS
TORRESMARTINEZ BAND OF MISSION INDIANS
TORRES-MARTINEZ DESERT CAHUILLA INDIANS
TRIBAL COUNCIL CHAIR, KERN VALLEY INDIAN COUNCIL
TRIBAL COUNIL CHAIR, TUBATULABALS OF KERN VALLEY

Haiwee Geothermal Leasing Area
Organizations Contact List

A&L LITHO, INC
A.G. EDWARDS & SONS, INC.
A1 AGGREGATES INC
AGRI EMPIRE COMPANY
AMA DISTRICT 37
AMERICAN HIKING SOCIETY
APPLE VALLEY GUN CLUB
APPLE VALLEY GUN CLUB INC
AUDUBON SOCIETY
AUDUBON SOCIETY KERN
AUDUBON SOCIETY NATIONAL
AUDUBON SOCIETY RIVERSIDE CHAPTER
AUDUBON SOCIETY SOUTH COAST CHAPTER
BAKERSFIELD SANDSTONE BRICK COMPANY
BIGHORN GOLF CLUB
BORN DIRTY INDUSTRIES
BRUBAKER MANN INC
CA TORTOISE TURTLE CLUB
CA TURTLE AND TORTOISE CLUB
CA TURTLE TORTOISE CLUB MEMBER
CAL ENERGY COMPANY INC
CALIF TURTLE AND TORTOISE CLUB
CALIF TURTLE TORTOISE CLUB
CALIFORNIA 4 WHEEL DRIVE CLUB
CALIFORNIA NATIVE PLANT SOCIETY
CALIFORNIA NATIVE PLANT SOCIETY EL CAJON CHAPTE
CALIFORNIA NATIVE PLANT SOCIETY PACIFIC PALISADE
CALIFORNIA NATIVE PLANT SOCIETY SAN DIEGO CHAPTER
CALIFORNIA TURTLE AND TORTOISE CLUB
COLE GROUP, INC.
COMM ENT INC
CPISTRANO VALLEY ROCK AND MINERAL CLUB
CRESTLINE 4WD CLUB
DEATH VALLEY 49ERS INC
DEL AIR ROCKHOUND CLUB
DELVERS GEM AND MINERAL SOCIETY
DESERT IRONWOODS RESORT, INC
DESERT MOTORCYCLE CLUB
DESERT WILDLIFE UNLIMITED INC
DESOMOUNT CAMPING CLUB
DOWELL SCHLUMBERGER INC
DOWNSTREAM SERVICES, INC
DRIFTERS JEEP CLUB
DWE ENGINEERING INC
EARTHWATCH CLUB
EXECUTIVESUITE SERVICS INC
FEATHERROCK INCUS PUMICE
FILM PERMITS UNLIMITED INC
FIRST ALLIED SECURITIES INC
FLY BY NIGHT 4X4 CLUB
GEAR GRINDERS 4 WD CLUB
GEM AND MINERAL SOCIETY TULE
GLENN RECORD INC
HAPPINESS IS BUGGY CLUB
HEMET HS CONSERVATION CLUB
HEMET JEEP CLUB
HOOVED ANIMAL HUMANE SOCIETY
HUMBOLDT BUGGY ATV ASSN INC
I AND M SHEEP COMPANY
IMPERIAL VALLEY GEM AND MINERAL SOCIETY
INDUSTRIAL METALS SALVAGE
INFORMATION BOULEVARD INTERNET SERVICES, INC
ISLANDERS GEM AND MINERAL SOCIETY
IZAAK WALTON LEAGUE OF AMERICA INC
JEEPING JEEPERS JEEP CLUB
KERN CO HISTORICAL SOCIETY
KERN CO MINERAL SOCIETY
KERN CO MINERALOGICAL SOCIETY
KERNCREST AUDUBON SOCIETY
LAKESIDE SPORTSMEN CLUB
LAND DEPT SHELL CALIFORNIA PROD INC
LAND PARCEL LIQUIDATORS INC
LAS VEGAS VALLEY BICYCLE CLUB
LOCKHEAD RECREATION CLUB
LONE TREE CATTLE COMPANY
LONG BEACH GEM MIN SOCIETY
LUNAR LAND YACHT CLUB
MATLOW KENNEDY COMPANY
MERKEL & ASSOCIATES, INC
MICROTEK LAB INC
MOBIL EXPLORATION AND PRODUCING US INC
MONO-INYO SHEEP COMPANY

MOTORCYCLE INDUSTRY COUNCIL
NADEAU TRAIL, INC
NATIVE PLANT SOCIETY
NATURAL HISTORY CLUB
NEEDLES GEM MINERAL CLUB
OF WOMENS CLUBS
OMYA CALIFORNIA INC
ORANGE COUNTY 49ERS INC
ORCUTT MINERAL SOCIETY
PACIFIC SHORES CONSTRUCTION AND PAINTING, INC
PACIFIC TELEPHONE COMPANY
PALOMAR GEM AND MINERAL CLUB
PALOMAR SPORTSMENS CLUB
PARKER INDUSTRIAL PROPERTIES
PFUESSSTAUFER CA INC
PLUESSSTAUFER INC
PRO CIRCUIT AV, INC
PUBLIC LANDS FOR THE PEOPLE INC
RABBIT CHASERS BUGGY CLUB
RED ROCK AUDUBON SOCIETY
REDEV INC
RHEOX INC
RIVER RUNNERS INC
ROCKCRAFTERS CLUB
ROYAL GOLD INC
SAFARI CLUB INTERNATIONAL
SAN DIEGO COUNTY GEM AND MINERAL SOCIETY
SAN DIEGO LAPIDARY SOCIETY
SAREEA AL JAMEL 4WD CLUB
SEARCHERS GEM AND MINERAL SOCIETY INC
SEARCHERS GEM MIN SOCIETY
SEQUOIA SIDEWINDERS 4WD CLUB
SIERRA CLUB
SIERRA CLUB CHAPTER CONSERVATION CHAIRMAN
SIERRA CLUB FRIENDS OF MOJAVE ROAD
SIERRA CLUB KERN KAWEAH CHPT
SIERRA CLUB MOJAVE GROUP
SO COUNCIL CONSERVATION CLUBS
SOCIETY FOR THE CONSERVATION OF BIGHORN SHEEP
SOCIETY OF CA ARCHAEOLOGY DEPT OF ANTHRO
SOLE TECHNOLOGY INC
SOUTHERN CLAYEDWARD LOWE INC
SPECIALTIES MINERALS INC
SPINNIN FOURS 4WD CLUB
STIMULUS INC
SUPERIOR MORTGAGE INC
TAFT SPORTSMAN CLUB
TAFT SPORTSMEN CLUB
TAFT SPORTSMENS CLUB
TETRA TECH INC
THE DESERT PROTECTIVE COUNCIL, INC
THE WATLING COMPANY
THE WILDERNESS SOCIETY
THOMAS OLSEN ASSOCIATES INC
TIERRA DEL SOL FOUR WHEEL DRIVE CLUB
TRAILMASTERS 4WD CLUB
TRI-CITIES LAPIDARY SOCIETY
TULE GEM & MINNERAL SOCIETY
US GYPSUM COMPANY
VERBAL SKILL INC
VICTOR VALLEY GEM MIN CLUB
WAX RESEARCH, INC
WESTERN MINNING COUNCIL INC
WJM FARMING INC
WOMENS CLUB OF BELLFLOWER
AGRI-EMPIRE CORP
AMA DIST 37
BACK COUNTRY HORSEMEN OF CA
BARSTOW BOARD OF REALTORS
CA OFF ROAD VEHICLE ASSN
CALIF OFFROAD VEHICLE ASSN
CALIFORNIA FILM COMMISSION
CALIFORNIA MINING ASSOCIATION
CALIFORNIA OFF HWY VEHICLE ASSOCIATION
CALIFORNIA OFF ROAD VEHICLE ASSOC
CANYON RESOURCES CORP
CANYON RESOURCES CORPORATION
CASCADIA EXPLORATION CORP
CV ORGANIC FERTILIZERS
DESERT CONSERVATION INSTITUTE
DOORA LAND CORP
ECOLOGY MANAGEMENT CORP
EL MIRAGE MAC STEERING COMM OFF ROAD

PARK
ENV MANAGEMENT ASSOCIATES
FOUR J CATTLE CORP
FREMONT GIRL SCOUT COUNCIL
FRIENDS OF THE MOJAVE ROAD
GIRL SCOUTS JOSHUA TREE COUNCIL
GOLD DOME MINING CORP
IMPERIAL VALLEY ASSOCIATION OF GOVERNMENTS
INLAND FISH GAME ASSOCIATIO
INTERNATIONAL MOUNTAIN BICYCLING ASSOC
CENTRAL ORANGE COUNTY CHAP LEAGUE OF WOMEN VOTERS
LANDERS ASSOCIATION
LILBURN CORP
LOWE RESERVE CORP
MANAGEMENT AND TRAINING CORP
MINE RECLAMATION CORP
MONACHE ASSOCIATES
MOTION PICTURE ASSOCIATION OF AMERICA
NATIONAL OHV CONSERVATION COUNCIL
NATURAL RESOURCES CONSERVATION SERVICE
NEEDLES DESERT WILDLIFE ASSOC
NEWMONT MINING CORP
NONPROFIT COUNSEL
OFF ROAD BUSINESS ASSOCIATION
OHV COMMISSION
LEAGUE OF WOMEN VOTERS SAN DIEGO COUNTY
NORTH ORANGE COUNTY CHAP LEAGUE OF WOMEN VOTERS
ORGANIZATION AGAINST TOXIC EXPOSURE
PACIFIC MINING ASSOCIATION
ORANGE COUNTY 3 WHEELERS
ORANGE COUNTY 49ERS
ORANGE COUNTY BUGS
ROAD RUNNER SPORTS
ORANGE COUNTY FILM OFFICE
SAN DIEGO ASSOCIATION OF GOVERNMENTS
SAN DIEGO FILM COMMISSION
SAN DIEGO OFF ROAD COALITION
SAN DIEGO OFF ROAD MAGAZINE
SAN DIEGO OFFROAD COALITION
SAN DIEGO OFF-ROAD COALITION
SAN GORGONIO CHAPTER
SAN GORGONIO GEM AND MINERALS
SANDPAPER
SERRANO BOARD OF REALTORS
SO CA ROCK PRODUCTS ASSOC
SO CALIF BIRD DOG ASSOC
SOUTHEAST COUNSELING CONSULTING SVCS
SOUTHERN CALIFORNIA EDISON LICENSING AND PLANNING
SOUTHERN CALIFORNIA SOARING ASSOCIATION
STAFFER & FLINT ACCOUNTANCY CORP
SYLMAR HANG GLIDING ASSOC
SYLMAR HANG GLIDING ASSOCIATION
THE DESERT TORTOISE COUNCIL
THE EARTH TECHNOLOGY CORP
UNITED CONTINENTAL DEVELOPMENT CORP
UNITED FOUR WHEEL DRIVE ASSOCIATIONS
US HANG GLIDING ASSOC
VICEROY GOLD CORP
VICEROY GOLD CORPORATION
WESTERN MINING COUNCIL
YUCCA VLY BOARD OF REALTORS
4H OIL CO
A & F SHEEP CO
ALL FOURS OF SOCAL
AMERICAN MUSTANG BURRO ASSN
ASSN COLORADO RIVER WATERWAY
AUTOMOTIVE PUBLIC RELATIONS
BERNAL SHEEP CO
CAL FED MINERALOGICAL SOC
CAL FED MINERALOGICAL SOCIETIES
CALIFORNIA ASSN 4X4
CALIFORNIA FEDERATION OF MINERALOGICAL SOCIETIES
CHEVRON USA PRODUCTION CO
COACHELLA VALLEY CYCLING ASSN
DEL NORTE GEM MINERAL SOC
DESERT TRAIL ASSN OF CALIF
EL CAJON VALLEY GEM MIN SOC
EL TEJON SHEEP CO
ENTOMOLOGICAL SOC
EXCELMINERAL CO
FRUIT GROWERS SUPPLY CO

GALAINENA SHEEP CO
GRANITE CONSTRUCTION CO
HALL MINING CO
HARRIS FEEDING CO
HUG CONSTRUCTION CO
INTERNATIONAL SCOUT ASSN
LA RONNA JOSOBA CO
MINERALOGICAL SOC OF SOCAL
MISSION ENERGY CO
MONO SHEEP CO
MORONGO BASIN CONSERV ASSN
NATIONAL SPELEOLOGICAL SOC
NEIGHBORHOOD HOUSE ASSN
O BAR O CATTLE CO
ORANGE BELT MINERALOGICAL SOC
PACIFIC COAST ARCH SOC
PACIFIC MUTUAL LIFE INSURANCE CO
PUBLIC LANDS FOR THE PEOPLE
RAYMOND CO
RICK ENGINEERING CO
RIVERSIDE CEMENT CO
RIVERSIDE CO
S CALIF EDISON CO
SAN BERNARDINO CO
SAN DIEGO ARCHEOLOGICAL SOC
SO CALIFORNIA EDISON CO
SOUTHERN CA EDISON CO
SOUTHERN CALIFORNIA EDISON CO
SOUTHERN CALIFORNIA GAS CO
SOUTHWEST PORTLAND CEMENT CO
SOUTHWESTERN CEMENT CO
TURN KEY ENGINE SUPPLY
UNIGRAFIX
US BORAX
US GYPSUM COMPAY
US POOR WHEELERS
USBR YUMA AREA OFFICE
VALLEY GEM MINERAL
VANCE ELECTRIC
VICTOR VALLEY 4 WHEELERS
VICTOR VALLEY GEM MIN
VICTOR VALLEY MUSEUM ASSN
VICTORY OIL CO
VIEJAS GROUP OF CAPITAN GRANDE BAND OF MISSION IND
VOLUNTEERS 4 DESERT RACING
W LOS ANGELES JACL
WANDA GREEN TRUST
WATROUS S CYCLING ENTERPRISES
WEBBER AND WEBBER
WESTERN FOUNDATION OF VERTEBRATE ZOOLOGY
WESTERN OUTDOORS
WESTERN ROCKHOUNDS ASSN
WESTERN STATES PETROLEUM ASSN
WESTERN STATES PETROLEUM ASSO
WEYMOUTH SCIENCE CENTER
WHITEWATER ROCK CO
WHITEWATER ROCK SUPPLY CO
WHOA
WIGGINTON RANCH
WILD SPACES
WILDERNESS ASSN OF SAN DIEGO
WILLIAMTERRY BEENE
WINDSKATE
WOOD
YAMAHA OF SAN LUIS OBISPO
YUCAIPA VALLEY GEM MIN SOC
1STANDARD
4WD GHOST RIDERS
4X4 FREELANDERS
ACE REALTY
AERA ENERGY LLC
AFTERSHOCKS
ALEXANDER HEFLIN RANCH
ALL AMER AGGREGAT
AMA D37
AMERICAN HANDGUNNER
AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
AMERICAN TOURS INTERNATIONAL
ANGELES NATIONAL FOREST
ANTHONY C SYCIP
AQUAFARMS
ASA AXECUTIVE COMMITTEE
ASARO BUILDERS

ASUNCION CONTRERAS
ATC FEVER
ATV CONNECTION
B D TRUST
BANNER QUEEN RANCH
BEACH N TOYS
BEACON
BEVERLY HALL
BEVERLY WILSHIRE HOTEL
BIDART BROTHERS
BIGHORN INSTITUTE
BIRDWELL RANCH
BLAST OFF HYDRO BLAST OFF ENTERPRISES
BLUERIBBON COALITION
BOB LONGPRE PONTIAC
BOBS CREEK RANCH
BOY SCOUTS
BOY SCOUTS OF AMERICA
BOYD DEEP CANYON RESEARCH CEN
BUENA VISTA CHAPTER
C/O KEITH RELPH
CA PORTLAND CEMENT
CALIF GROUND POUNDERS
CALIFORNIA GROUND POUNDERS
CALIFORNIA WILDERNESS COALITION
CALNEV PIPELINE
CALVARY BAPTIST CHURCH
CAMP ED
CAMPING BARES
CAPITAN GRANDE BND MISSION IN
CATTANI AND SON
CATTLEMEN ATLARGE COMMITTEE
CATVA
CENTERPOINTE LENDING
CENTRAL VALLEY SPORTSMEN
CENTURY 21 FAIRWAY
CENTURY HOMES COMMUNITIES
CFMS
CHARTER OAK REAL ESTATE
CHAVARIN WELDING
CHEVRON
CIBOLA WILDLIFE REFUGE
CIRCLE MTN CONSULTANTS
CLAUDIA LAKOSSIN
CO-CHAIR, NUUI CUNNI INTERPRETATIVE CENTER
COCHELLA VALLEY MOUNTAINS CONSEVANCY
COINSHOOTERS CLIQUE
COLORADO RIVER REC PROJECT
CONVAIR ROCKHOUNDS
CORTE MADERA RANCH
CORVA
CUSHENBURY MINE TRUST
DANICE SIMON JT
DEATH VALLEY 49ERS
DEL AIR ROCKHOUNDS
DERT
DESERT DISPATCH
DESERT DIVERS
DESERT ENTERPRISES
DESERT FOXES
DESERT RACE SUPPORT
DESERT TORTOISE PRESERVE COM
DESERT TORTOISE PRESERVE COMM
DESERT WILDLIFE UNLIMITED
DOMESTIC TECHNOLOGY INTNL
DON EMDE PRODUCTIONS
DUNE BUGGIES & HOT VWS
DVM
EAGLERIDER GLENDALE
EARLY BRONCOS LIMITED
EARTH JUSTICE ENVIRONMENTAL LAW CLINIC
EARTH SYSTEMS
EASTSIDE FEDERAL COMPLEX
EASY RIDERS
ECOLOGICAL 4 WHEELING ADVENTURES
EDITH WILLOUGHBY
EDITORROCKHOUNDS BULLETIN
EL CHICANO
EL SOL DE SAN DIEGO
ELITE AUTO SERVICES
ELLEN VAN CEERENT
EPWATRANSPORTATION
EQUESTRIAN TRAILS
ERWIN ENTERPRISES
ESMERELDA TRUCKHAVEN GEOTHERMAL LLC
EW MERRITT FARMS

F K CHAN
FORT MOJAVE RESERVATION
FOUR WHEELIN DEALIN 4WDC
FRATERNITY OF THE DESERT BIGHORN
FRIENDS CALICO EARLY MAN SITE
FRIENDS OF DESERT WETLAND PARK
FRIENDS OF EL GARCIS
FRIENDS OF EL MIRAGE
FRIENDS OF THE DUNES
GANONG O AND G OPERATIONS
GEOLOGICAL SCIENCES DPET
GEOTHERMAL RESOURCES
GERMAN STREET
GFOUR CONSTRUCTION
GIFFORD ENGINEERING
GOLD ROCK RANCH
GOLD STANDARD LODE MINE
GRANTS AIRPORT
GRUBB & ELLIS
H B RANCH
H. ELIZABETH WILMARTH
HARVEY HOUSE SHELL
HAY BROTHERS SHEEP
HEADFRAME
HELT ENGINEERING
HIGH DESERT ENV DEFENSE FUND
HISPANOS UNIDOS
HOLROYD TILE AND STONE
HONDA RESEARCH AND DEVELOPMENT ATTN LRI DI
HORSE ILLUSTRATED
HOUSE OF METAMORPHOSIS
HUMAN RELATIONS ASSIST
IMAM MINISTER
IMMIGRATION AND NATURALIZATION
IMMIGRATION NATURALIZATION
IMPERIAL PRINTERS
IMPERIAL VALLEY SIDEWINDERS
INLAND EMPIRE CHAPTER
IRONWOOD CHRISTIAN ACADEMY
IZQUIERDO WOOL GROWERS
JEFFREY STONE
JET PROPULSION LABORATORIES
JOEHAULER MOTORCYCLES CARRIERS
JOHNSON BROTHERS RANCH
JOSHUA TREE C C
JOUGHIN RANCH
KAISER STEEL RESOURCES
KEMP RANCH
KERN COG
KERN RIVER MUSKRATS
KERNVILLE CHAMBER OF COMERCE
KILPATRICK ENERGY GROUP
KINGSBURG 4WDC
LAFCO-SAN BERNARDINO
LAKE MINERALS
LAND PARCEL LIQUIDATORS
LAND ROVERS OF FONTANA
LARRALDE SHEEP
LAS TORTUGAS
LAURA RODRIGUEZ
LAW OFFICES
LAW OFFICES OF PAUL ZOGG
LEAGUE OF WOMAN VOTERS
LEAGUE OF WOMEN VOTERS
LEAGUE OF WOMEN VOTERS OF BH
LEEFAA INVESTMENTS
LIONEL SAWYER & COLLINS
LORI DODGE
LOS ADVENTUREROS
LOS ARRIEROS 4WDC
LOS COYOTES RESERVATION
LOS PAISANOS 4WDC
LOS TROQUEROS 4X4
MANZANITA RANCH
MEFFORD
MEROE ARTIST GROUP LLC.
MINERAL KING PACK STATION
MINERALS
MINNEOLA MINI MART
MOJAVE RIVER VALLEY MUSEUM
MOJAVE RIVER VALLEY MUSUEM
MONROVIA CANYON PARK
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MOTORCYCLE SAFETY FD

MOUNTAIN DEFENSE LEAGUE
MT SAN JACINTO HS
NAACP DELANO
NATIONAL OUTDOOR COALITION
NATL SORTY OF PHI DELTA KAPPA
NATURAL HISTORY MUSEUM
NATURE BOY AND BEARCAT
NAVY LEAGUE
NEON DIVERS
NICKEL FAMILY LLC
NRA
OAK CANYON NATURE PARK ANAHEIM PRKS
OC 49S
OCOTILLO WELLS SVRA
OREG LTD REAL ESTATE LOAN FUND
ORMAT NEVADA
OWENS VALLEY CAREER DEVELOPMENT CENTER
P V ENTERPRISES
PACBELL
PACIFIC BELL
PACIFIC SOUTHWEST BIOSERVICES
PACIFIC SW BIOLOGICAL SERVICES
PACIFIC SW RESEARCH STATION
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PALOMAR COMMUNICATIONS
PALOS VERDES PEN CHAPTER
PATRIOT RESOURCES LLC
PAUL T SELZER ESQ ATTORNEY AT LAW
PEGMATITE
PENDLETON COAST STATE PARK
PERRIS VALLEY FOUR WHEELERS
PETROLIC SERVICES
PG AND E
PGE
PIPARIAN REPAIRS
PLUM PRODUCTIONS
PO BOX 584
POINTS WEST REALTY
POMONA VALLEY TRAILMASTERS
PORTA POTTY PILOTS
PRESERVATION OF BIGHORN
PRO ARMOR
PROFESSOR
PRUDENTIAL CALIFORNIA REALTY
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SAN BERNARDINO AMERICAN
SAN BERNARDINO CO MUSEUM
SAN BERNARDINO NATIONAL HISTORY MUSEUM
SAN DIEGO 4 WHEELERS
SAN DIEGO CHAPTER
SAN DIEGO NATURAL HISTORY MUSEUM
SAN DIEGO OUTBACK 4WDC
SAN DIEGO OUTBACKS 4X4
SAN DIEGO SPORTS CYCLES
SAN DIEGO TRAIL RIDERS
SAN DIEGO VOICE VIEWPOINT
SAN DIEGUITO RIDERS
SAN FERNANDO VALLEY CHAPTER
SAND JEEPS
SANTA CLARITA VALLEY CHAMBER
SANTA FE PACIFIC GOLD MESQUITE MINE
SANTA MONICA COLLEGE LRC
SANTIAGO RANCH
SCHINDLER BROTHERS
SEISMOLOGICAL LAB 25221
SENATOR BARBARA BOXER STAFF
SERVICE
SFV PARTTIME 4 WHEELERS
SILICZ ESTATE

SJM BIOLOGICAL CONSULTANTS
SLASH X COMMUNITY
SLASH X COMMUNITY REP
SMALL MINERS OF AMERICA
SMITH RANCH
SO NV WATERFOWLERS
SOLID WASTE DIV CO OF SAN DIEGO
SONY BONO NATL WILDLIFE REUGE
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SOUTHWESTERN MINERS
STANDARD MINERALS
STAR RANCH
STATE FARM INSURANCE
STONE BUFFALO
STUDIES PROG
SUN AQUA
SUN REPORTER
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SYSTEMS SURVEYS
TECHNOLOGY CENTER
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THE CENTER FOR BIOLOGICAL DIVERSITY
THE DESERT TRAIL
THE GOOD IDEA GROUP
THE LIVING DESERT
THE NATURE CONSERVANCY
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THOROUGHBRED OF CALIFORNIA
TORTOISE GROUP
TRAIL REPAIR IMPROVEMENT
TRANSCOAST FINANCIAL
TRANSPORTATION PROGRAM MANAGEMENT
TREE OF LIFE NURSERY
TU MUNDO

Haiwee Geothermal Leasing Area
Chamber of Commerce Contact List

ALHAMBRA CHAMBER OF COMMERCE
ALPINE CHAMBER OF COMMERCE
ANAHEIM CHAMBER OF COMMERCE
ANZA VALLEY CHAMBER OF COMMERCE
AVALON CATALINA ISLAND C OF C
BAKER CHAMBER OF COMMERCE
BAKERSFIELD CHAMBER OF COMMERCE
BANNING CHAMBER OF COMMERCE
BARSTOW AREA CHAMBER OF COMMERCE
BELL CHAMBER OF COMMERCE
BELLFLOWER CHAMBER OF COMMERCE
BEVERLY HILLS CHAMBER OF COMMERCE
BIG BEAR CHAMBER OF COMMERCE
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BRAWLEY CHAMBER OF COMMERCE
BREA CHAMBER OF COMMERCE
BUENA PARK CHAMBER OF COMMERCE
BURBANK CHAMBER OF COMMERCE
BUTTONWILLOW CHAMBER OF COMMERCE
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CARDIFF BY THE SEA C OF C
CARLSBAD CHAMBER OF COMMERCE
CARSON CHAMBER OF COMMERCE
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CERRITOS CHAMBER OF COMMERCE
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CHULA VISTA CHAMBER OF COMMERCE
COLTON CHAMBER OF COMMERCE
CONEJO VALLEY CHAMBER OF COMMERCE
COSTA MESA CHAMBER OF COMMERCE
CRESCENTA VALLEY C OF C
CRESTLINE RESORTS C OF C
CUDAHY CHAMBER OF COMMERCE
CULVER CITY C OF C
DAGGETT CHAMBER OF COMMERCE
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EL SEGUNDO C OF C
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GRAND TERRACE CHAMBER OF COMMERCE
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HIGHLAND AREA CHAMBER OF COMMERCE
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IRWINDALE CHAMBER OF COMMERCE
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LAKE ARROWHEAD CHAMBER OF COMMERCE
LAKE ELSINORE VALLEY CHAMBER OF COMMERCE
LAKE ISABELLA CHAMBER OF COMMERCE
LAKESIDE CHAMBER OF COMMERCE
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MANHATTAN BEACH C OF C
MONROVIA CHAMBER OF COMMERCE
MORONGO VALLEY CHAMBER OF COMMERCE
NEEDLES CHAMBER OF COMMERCE
NEWPORT HARBOR C OF C
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NORWALK CHAMBER OF COMMERCE
OCEANSIDE CHAMBER OF COMMERCE
ORANGE CHAMBER OF COMMERCE
PACIFIC PALISADES C OF C
PALOS VERDES PENINSULA C OF C

PARAMOUNT CHAMBER OF COMMERCE
PASADENA CHAMBER OF COMMERCE
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POWAY CHAMBER OF COMMERCE
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SUN VALLEY AREA CHAMBER OF COMMERCE
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TAFT CHAMBER OF COMMERCE
TEMPLE CITY C OF C
THERMAL CHAMBER OF COMMERCE
THOUSAND OAKS/ WESTLAKE VILLAGE REG C OF C
THOUSAND PALMS CHAMBER OF COMMERCE
TOLUCA LAKE CHAMBER OF COMMERCE
TORRANCE AREA CHAMBER OF COMMERCE
TUSTIN CHAMBER OF COMMERCE
VALLEY CENTER CHAMBER OF COMMERCE
VENICE CHAMBER OF COMMERCE
VICTORVILLE CHAMBER OF COMMERCE
VISTA CHAMBER OF COMMERCE
WEST SHORES CHAMBER OF COMMERCE
WESTMINSTER C OF C
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ANTELOPE VALLEY PRESS
KROP RADIO
ASIAN JOURNAL
CALIFORNIA HORSEMANS NEWS
LAPIDARY JOURNAL
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CA STATE UNIVERSITY CARSON
CA STATE UNIVERSITY FULLERTON
CA UNIVERSITY COOPERATIVE EXTENSION
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CAL POLY LIBRARY DOCUMENTS DEPT
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DANA HILLS HIGH SCHOOL
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HEMET HIGH SCHOOL
JAMES MONROE HIGH SCHOOL
LA QUINTA HIGH SCHOOL
NORCO JUNIOR HIGH SCHOOL
RUBIDOUX HIGH SCHOOL
SANTANA HIGH SCHOOL
SCHOOL OF BUSINESS AND PUBLIC ADMINISTRATION
CSU SAN BERNARDINO DEPT OF GEOGRAPHY
DEPT OF MATHEMATICS WASHINGTON UNIV
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UNIV OF CA IRVINE GOV INFO DEPT
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UNIV OF CALIF IRVINE
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UNIVERSITY OF CALIF RIVERSIDE
UNIVERSITY OF CALIFORNIA
UNIVERSITY OF CALIFORNIA DEPT OF ARCHEOLOGY
UNIVERSITY OF CALIFORNIA DEPT OF BIOLOGY
UNIVERSITY OF CALIFORNIA IRVINE
UNIVERSITY OF CALIFORNIA RIVERSIDE
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UNIVERSITY OF REDLANDS
CALIFORNIA INSTITUTE OF TECHNOLOGY
CSU LIBRARIES
SAN DIEGO STATE UNIV
SAN DIEGO STATE UNIVERSITY

Haiwee Geothermal Leasing Area
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PALO VERDE VALLEY DISTRICT LIBRARY
PLACENTIA LIBRARY DISTRICT
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CLARK COUNTY LIBRARY
ANAHEIM PUBLIC LIBRARY
ARCADIA PUBLIC LIBRARY
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BURBANK PUBLIC LIBRARY
CALICO RESEARCH LIBRARY
KERN COUNTY LIBRARY
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APPENDIX C: SCOPING PRESENTATION AND INFORMATION BOARDS

Scoping Meeting Presentation

WELCOME

Haiwee Geothermal Leasing Area
Scoping Meetings

October 2009

Project Team

- **BLM, NEPA Lead Agency**
  - John Dalton, Project Coordinator
  - Sean Hagerty, Geothermal Lead
  - Linn Gum, Ridgecrest Field Office Assistant Manager

- **POWER Engineers, EIS Preparation**
  - Mike Strand, Project Manager
  - Karen Cadavona, Public Involvement Coordinator

AGENDA

- Introduction
- Project Background and Overview
- Purpose and Need
- Proposed Action
- Alternatives
- NEPA Process/Project Timeline
- Public Comments/Closing Remarks

Geothermal Energy

Geothermal Resources

- Underground reservoirs of hot water or steam created by heat from the earth.
- Geothermal steam and hot water can reach the surface of the earth in the form of hot springs, geysers, mud pots, or steam vents.
- Resources also can be accessed by wells, and the heat energy can be used for generating electricity.

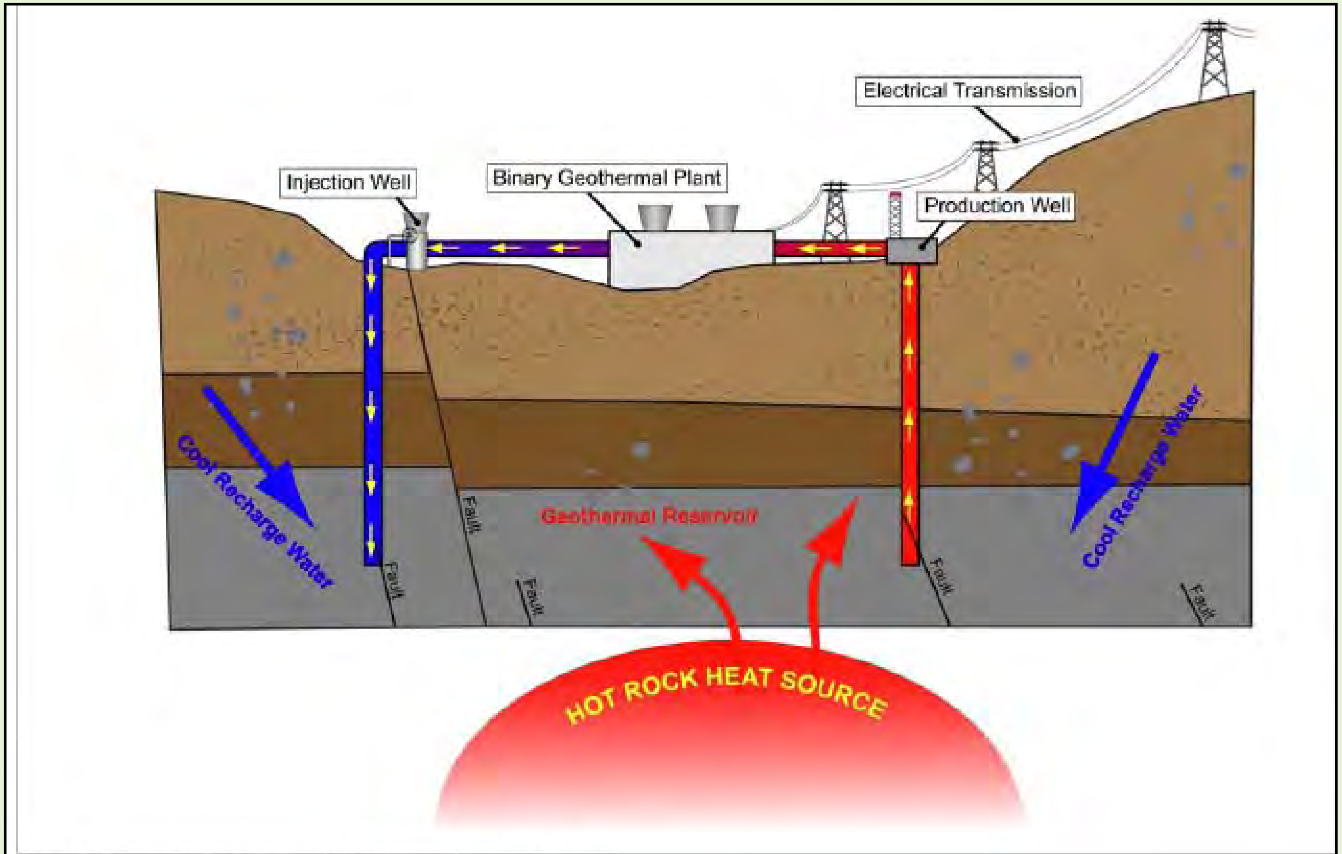
Benefits of Geothermal Energy

- Clean Energy
  - produce only about one-sixth of the carbon dioxide that a relatively clean natural-gas-fuel power plant produces
  - very little if any, of the nitrous oxide or sulfur-bearing gases.
- Reliable Source of Energy
  - available 24 hours a day, 365 days a year
  - geothermal power plants have average availabilities of 90% or higher, compared to about 75% for coal plants
- Geothermal power is accessible locally
  - reducing dependence on foreign oil
- Sustainable renewable resource
  - Earth's core provides an almost unlimited amount of heat
  - Even geothermal areas dependent on reservoir of hot water, the volume taken out can be re-injected.

Geothermal Energy Development

- Exploration
  - Production and Injection Wells
- Development
  - occurs when the operator has located a potentially profitable geothermal reservoir
  - undergo NEPA review by the BLM to evaluate the possible environmental impacts of the action
  - construct access roads, pipelines, power plants, transmission lines & substations
- Utilization
  - Power Plant Operation

Geothermal Energy Process



SOURCE: Geothermal Resources Council and MHA Environmental Consulting 2008

Three Types of Above-Ground Geothermal Power Plants:

- **Binary Plants**
  - conventionally applied to comparatively low-temperature (190^{o} - 330^{o} F) hydrothermal resources
  - apply the heat from the resource fluid to heat a separate working fluid which drives a turbine-generator through a closed-loop cycle

- **Flash Plants**
  - applied to higher-temperature (330^{o} F and above) hydrothermal resources
  - "flash" the resource fluid into steam which directly drives a turbine-generator
  - steam is condensed for injection or use in the plant's cooling water circuit

- **Dry Steam Plants**
  - applied in comparatively rare circumstances where the resource emerges from the wells as plant-quality steam
  - the steam is condensed after use and re-injected or used in the cooling water circuit

Leasing of Geothermal Resources on Federal Lands

- considered a major Federal action and a commitment to resource development; therefore, it requires NEPA analysis
- 43 Code of Federal Regulations Part 3200 <u>Geothermal Leasing and Exploration/Utilization</u>
- lease allows the right to future exploration and development of geothermal resources; however, subsequent activities involving surface disturbance will require additional NEPA analysis.

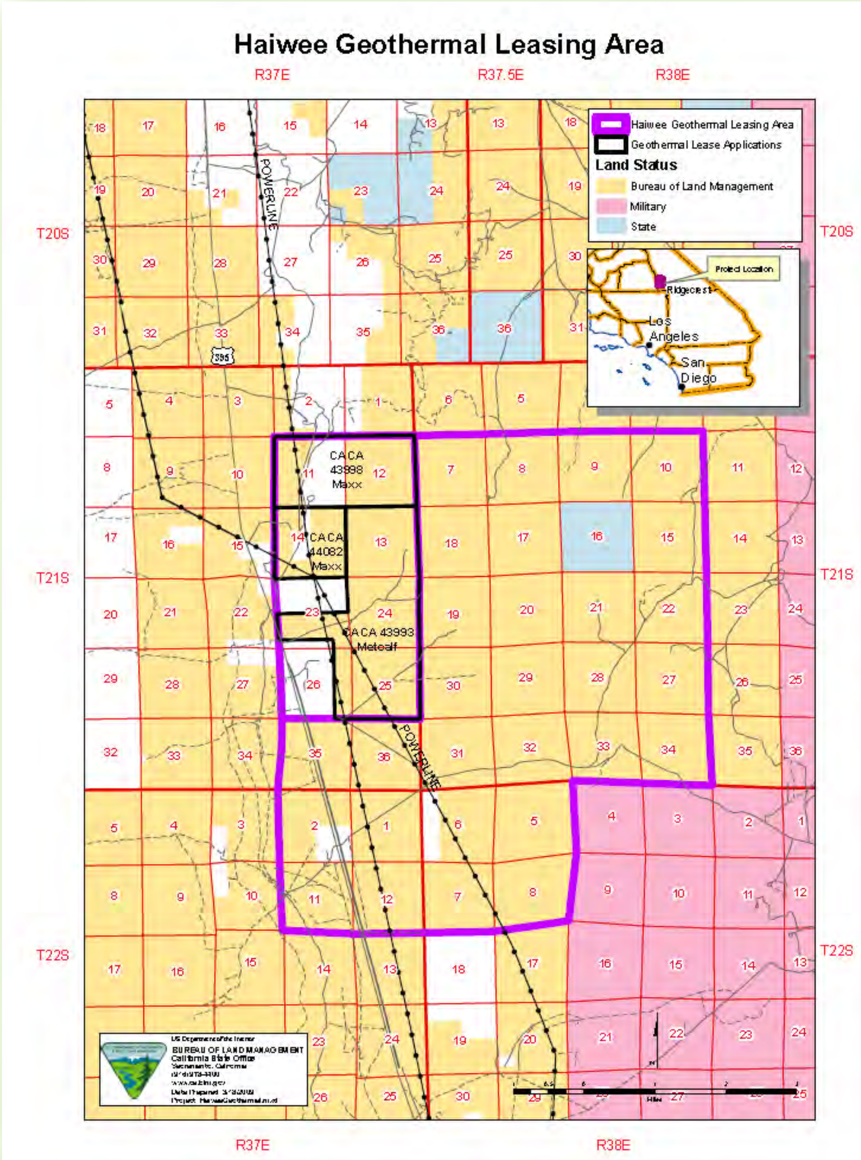
Environmental and Energy Laws

- **National Environmental Policy Act (NEPA) of 1969:** requires Federal agencies to review the effects of its actions on the natural and human-made environment prior to taking action.
- **National Historic Preservation Act of 1966**: provides for the establishment of the National Register of Historic Places to include historic properties such as districts, sites, buildings structures, and objects that are significant in American history, architecture, archaeology, and culture.
- **Endangered Species Act of 1973**: provides for the Federal protection of threatened and endangered plants, insects, fish, and wildlife.
- **The National Energy Policy Act of 2001:** determine ways to reduce the delays in geothermal lease processing as part of the permitting review process.
- **Executive Order 13212 (2001):** expedite Energy-Related Projects, review of permits, or take other actions as necessary to accelerate the completion of such projects.
- **Energy Policy Act of 2005:** encourage the leasing and development of geothermal resources from public lands.
- **Geothermal Steam Act of 1970:** governs the leasing of geothermal steam and related resource on public lands.

California Desert Conservation Area (CDCA) Plan: encompasses 25 million acres of land in Southern California designated by Congress in 1976. The plan provides overall regional guidance for management of public lands in the designated area and establishes long-term goals for protection and use in the California Desert.

Haiwee Geothermal Lease Area

- 24,320 acre Leasing Area includes:
  - 22,460 acres of public lands
  - 640 acres state land
  - 1,220 acres private
- Pending Lease Applications
  - 3 pending applications
  - Total of 4,460 acres



Project Area Map

- Located in Inyo County
- Approximately 13 miles south of Olancha, California
- East of the Inyo National Forest
- West of the China Lake Naval Weapons Center
- South of the South Haiwee Reservoir

PURPOSE AND NEED

- Determine whether to approve pending non-competitive geothermal lease applications
- Determine whether to offer competitive leases for geothermal resources in the Leasing Area
- California Desert Conservation Area (CDCA) Plan Amendment
- Implement President's National Energy Policy 2001 and Energy Policy Act of 2005
- Assist the State in meeting the Renewable Portfolio Standard (RPS) goals

PROPOSED ACTION

- Open or close leasing of approximately 22,000 acres of BLM-managed lands in the Haiwee Geothermal Leasing Area
  - Three pending lease applications covering approximately 4,500 acres are also included
  - Does not include State or private lands
- Amend the California Desert Conservation Area (CDCA) Plan of 1980 for leasing of geothermal resources on BLM-managed lands

ALTERNATIVES

- No Action
  - leasing of geothermal lands would stay the same as outlined in the California Desert Conservation Area Plan
- Leasing of less than the proposed 22,000 acres

NEPA Scoping

- Early and open process to determine scope of issues
- Identify significant issues
- Identify range of actions, alternatives, and mitigation measures
- Identify potential significant effects

NEPA Process/Project Timeline

INFORM	Notice of Intent	September 2009
LISTEN	**Scoping**	**October 2009**
EVALUATE	Draft Environmental Impact Statement/ Draft Plan Amendment •Notice of Availability •90-day comment period	Winter 2009
RESPOND	Formal Public Meetings	Spring 2010
	Final Environmental Impact Statement/ Proposed Plan Amendment •Notice of Availability •30-day protest period •60-day Governor's Consistency Review	Fall 2010
DECIDE	Record of Decision	Winter 2010

Be a Part of the Process

Submit Comments

BLM welcomes your comments and input throughout the environmental review process. Please write your comments on the comment forms available tonight throughout the room and submit comments one of the following ways:

–Place them in the comment box located at the welcome table.

–Write to:

BLM, California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
Attn: John Dalton, Haiwee Geothermal Leasing Area Coordinator

–Email comments to cahaiwee@blm.gov

While we encourage the public to submit comments at any time, all comments (letters and emails) for consideration in preparation of the Draft Environmental Impact Statement must be received by close of business **Monday, November 9, 2009.**

Project Updates

Available at www.blm.gov/ca/st/en/fo/ridgecrest.html

Review Project Information and Meet the Team

Please visit the project displays to review the project information. Team members are available to discuss the project and answer questions.

THANK YOU!

Scoping Meeting Boards

Proposed Action

Amend California Desert Conservation Area Plan to either open or close the 22,000 acre Haiwee Geothermal Lease Area to geothermal exploration, development, and utilization.

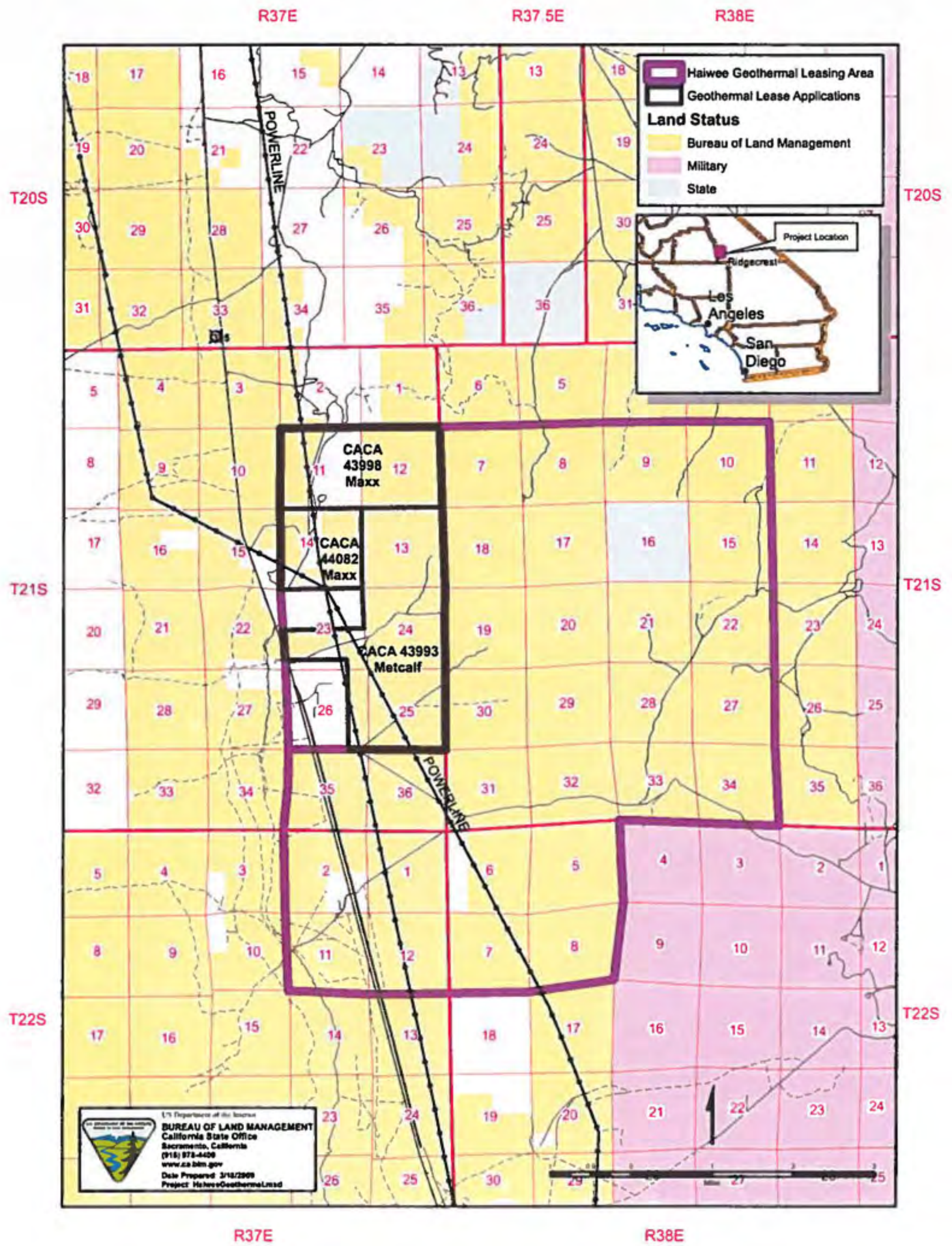
Alternatives

1. No Action Alternative (leasing of geothermal lands would stay the same as outlined in the California Desert Conservation Area Plan)
2. Leasing fewer than 22,000 acres of BLM-managed lands.

Purpose and Need

- California Desert Conservation Area Plan Amendment
- Implement Energy Policy Act of 2005
- Assist the State in meeting the Renewable Portfolio Standard

BLM Project Area Map



HAIWEE GEOTHERMAL LEASING AREA

Environmental and Energy Laws

National Environmental Policy Act (NEPA) of 1969: requires Federal agencies to review the effects of its actions on the natural and human-made environment prior to taking action.

National Historic Preservation Act of 1966: provides for the establishment of the National Register of Historic Places to include historic properties such as districts, sites, buildings structures, and objects that are significant in American history, architecture, archaeology, and culture.

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The National Energy Policy Act of 2001: determine ways to reduce the delays in geothermal lease processing as part of the permitting review process.

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Energy Policy Act of 2005: encourage the leasing and development of geothermal resources from public lands.

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California Desert Conservation Area (CDCA) Plan: encompasses 25 million acres of land in Southern California designated by Congress in 1976. The plan provides overall regional guidance for management of public lands in the designated area and establishes long-term goals for protection and use in the California Desert.

Geothermal Resources

Geothermal resources are underground reservoirs of hot water or steam created by heat from the earth. Geothermal steam and hot water can reach the surface of the earth in the form of hot springs, geysers, mud pots, or steam vents. These resources can be accessed by wells, and the heat energy can be used for generating electricity.

Benefits of Geothermal Energy

- produce about one-sixth of the carbon dioxide that a relatively clean natural-gas-fuel power plant produces, and very little if any, of the nitrous oxide or sulfur-bearing gases
- geothermal energy is available 24 hours a day, 365 days a year
- sustainable renewable energy resource

NEPA Process

INFORM	Notice of Intent	SEPTEMBER 2009
LISTEN	WE ARE HERE ▶ Scoping	OCTOBER 2009
EVALUATE	Draft Environmental Impact Statement/ Draft Plan Amendment • Notice of Availability • 90-day comment period	WINTER 2009
RESPOND	Formal Public Meetings	SPRING 2010
	Final Environmental Impact Statement/ Proposed Plan Amendment • Notice of Availability • 30-day protest period • 60-day Governor's Consistency Review	FALL 2010
DECIDE	Record of Decision	WINTER 2010

HAIWEE GEOTHERMAL LEASING AREA

We Welcome Your Comments

BLM welcomes your comments and input throughout the environmental review process and they may be submitted any of the following ways listed below.

email *cahaiwee@blm.gov*

send written comments to:
BLM, California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
Attn: John Dalton, Haiwee Geothermal Leasing Area Coordinator

While we encourage the public to submit comments at any time, all comments (letters and emails) for consideration in preparation of the Draft Environmental Impact Statement must be received by close of business **Monday, November 9, 2009.**

Project updates will be available at
www.blm.gov/ca/st/en/fo/ridgecrest.html

Scoping

Scoping is an early and open process for determining the scope of issues to be addressed, and identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in the Environmental Impact Statement.

APPENDIX D: SCOPING MEETING TRANSCRIPTS

GILLESPIE REPORTING SERVICES

Condensed Transcript
Haiwee Geothermal Project

October 14, 2009

Bureau of Land Management Scoping Meeting - Bishop, CA

Printed on: November 22, 2009

Job #: 68508DM

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BUREAU OF LAND MANAGEMENT

SCOPING MEETING

HAIWEE GEOTHERMAL PROJECT

REPORTER'S TRANSCRIPT OF PROCEEDINGS

LOCATION: EASTERN SIERRA FAIRGROUNDS
HOME ECONOMICS BUILDING
Bishop, CA 93515

DATE AND TIME: Wednesday, October 14, 2009
5:42 p.m. to 6:57 p.m.

REPORTED BY: DIANE CARVER MANN, CSR
CSR NO. 6008

JOB NO.: 68508DM

APPEARANCES

LINN GUM - Lands and Minerals Branch Chief

JOHN DALTON - Planning and Environmental Coordinator

SEAN HAGERTY - Geothermal Expert

MIKE STRAND - Project Manager

KAREN CADAVONA - Public Involvement Coordinator

BISHOP, CA WEDNESDAY, OCTOBER 14, 2009

PROCEEDINGS

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MR. GUM: We would like to go ahead and get started this evening. Thank you all for coming to our Haiwee Geothermal Leasing Project scoping meeting. My name is Linn Gum. I am with the Bureau of Land Management in Ridgecrest. I am the Branch Chief of Lands and Minerals there. My branch is the branch these applications will come to for these kinds of activities. I'm also the Assistant Field Manager there. And tonight we have brought together a group of experts to be able to introduce to you this project. They're sitting in the back row back here, and as we go through this, we'll call them up.

The fellow in the white jacket on the end back here is John Dalton. He's the project coordinator out of our California Desert District office in Moreno Valley. The fellow next to him in the black t-shirt is Sean Hagerty. He is our geothermal program leader out of our State office in Sacramento. The fellow standing up behind is Mike Strand. He is the program manager

with our contracted services that we're using, Power Engineers, and Karen Cadavona is the public relations specialist for Power Engineers, as well, and then we have two court reporters with us. They're going to capture everything that you have to say.

I'm going to have Mike come up in a minute and go over some ground rules. I just wanted to say thanks for coming, and as we go through this evening, hopefully we'll answer your questions and get some good interchange to help us on this project. Mike?

MR. STRAND: Yeah. Thanks. So, Sean, can you go to the next slide. I'll just run through the agenda tonight real quick, what we're going to be doing and looking at and have some timeframes here. Sean is going to get up here in just a minute and go through just some basic geothermal project information, general geothermal-resource-type stuff, development of geothermal resources and a little bit of history background for this particular area we're looking at.

And then I'll get up and talk a little bit about the actual action that the BLM is looking at taking on the project, and then we'll look at this EIS, the aspects of the document we'll be writing, the EIS.

I think that will take about 20 minutes, and

after that we will open it up for comments, and if we can address your comments tonight, we're going to do the best we can to answer questions. There may be questions you ask that will be great questions and we may not have an answers for you tonight, but we're taking them down, and we will make sure they are addressed adequately in the EIS.

So you guys should all have a speaker card. If you wish to give a comment tonight or ask a question, you can just fill that out with your name. After we're done with the presentation here, I'll collect them and ask you to stand up. And you'll want to state your name so the court reporter can hear you clearly. If you can, speak slowly and loudly so they can understand you. If she has trouble hearing you, she may ask you to repeat yourself or slow down or talk a little louder.

And we don't have a lot of people here tonight, so I'm not too worried about timeframe. But you know, we'd like to give everyone a chance to ask a question. If we could limit your questions to maybe one or two and then come back and ask some more questions once we've gone through all the speaker cards. I want to give everyone a chance to ask their question here. Okay. Thanks. Sean?

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MR. HAGERTY: Good evening. My name is Sean Hagerty. I'm the geothermal program lead with the Bureau of Land Management in the Sacramento office. There was a title someone gave me as geothermal expert. I'm far from an expert, but I've been around the issue for quite some time.

I started my career with BLM in Imperial Valley. I saw the development of East Mesa Fields. Now I oversee five different projects that are in California: the Geysers, most notably, north of San Francisco, big, big field; the Coso field, the East Mesa field, Mammoth Lakes and also at Honey Lake up near Susanville.

So I have a little bit of background, but as I said, I don't know everything, and tonight is a learning process for me. There may be questions you'll have that I don't know, but I'll work together to get an answer for you.

As Mike said, I'm going to go over some basics. I won't go into a lot of detail. I'll be here after the presentations. If somebody has questions about the geology or reservoir or thermodynamics or kinetics or things like that, I can try to answer some of those questions. But I'm just going to give you a brief overview of what is geothermal, where is it, how

do they find it, how to do they get it out of the ground, what is it good for, things like that. So it will be pretty generic.

When we talk about geothermal energy, we're talking about the heat of the earth, crustal heat down 20-, 30,000 feet beneath our feet. The heat itself is usually as a result of molten lava at depth. It can be a variety of other things, too, but for most of the areas around here, we're looking at a heat source that's down fairly deep.

When that hot rock source is fractured and water percolates down from the surface -- could be rainwater, could be some other water -- that water is heated, and it's that hot water that contains the energy that we're looking at here. The heat itself, the heat of the rock, is valuable, but current technology is limited as far as getting that heat out. So the water becomes a medium to get the heat to the surface so it can produce something, it can do something.

When we talk about geothermal steam and hot water and things like that, most of us know things like hot springs, fumaroles, geysers. Yellowstone is a good example of that. But there's some areas where we don't see that. There's still hot water at depth, but there

is no surface manifestation of the resource. There are no hot springs. And I'll talk a little bit about how people can find those resources even when you don't see any resource on the surface.

To access that resource, usually it's by drilling wells like a water well but much, much bigger, because you may have to drill down maybe 2,000, 4,000, 5,000, maybe even 10,000 feet to access that water. And of course, it's very hot. Water normally boils at about 212 degrees Fahrenheit at sea level, but the water we're talking about here is down very deep. It can be down over 4,000 feet. So water can actually be above 212 degrees Fahrenheit because the pressure on that water.

Going way back, thinking of my mom when she had a pressure cooker to cook vegetables, it's the pressure inside that pressure cooker that increases the boiling point of water. Same concept here is that water is very deep. There's a lot of pressure on the water, so the water might be 300 degrees Fahrenheit. Could be even higher but not boiling. Bring it to the surface, and it will make it boil.

Benefits of geothermal energy. A lot of discussion about renewable energy in California now. You hear about solar. We hear about wind. We hear

about biomass, and we hear about geothermal. One of the biggest benefits of geothermal, say, as opposed to fossil fuels, as opposed to oil or even natural gas is that there's very few things that are released from geothermal. There is some carbon dioxide, some types of carbon dioxide in the reservoirs released, but far, far less than what we have with natural gas.

It's a reliable source of energy from the standpoint that with solar, solar works great when the sun is shining. Wind is perfect when the wind is blowing. But as you think about it, in the morning, for solar, it ramps up a certain amount of voltage, and then as the sun sets, it drops down. Winds is the same thing. For geothermal, they turn the power plant on, and it continues to produce power.

And that's something that the utility is looking for so that they don't have to say, can you produce so many megawatts this afternoon? Well, it will depend on this cloud cover and whether the wind is blowing. So there's a real benefit there. Mostly the benefit is to the utility, but the benefit is to us, to you, because it makes for a reliable source of power.

Geothermal power is accessed locally. We have a resource here, and we have some transmission capacity to take the power out. In the case of the project here that we're looking at, there is a transmission corridor in that area. So it's local. It's domestic, and we don't have to import it.

And it's sustainable, for the most part. The heat of the earth will be there for a long, long time. The water issue is something else, but even at the Geysers, they have been in production for over 40 years. The temperature of the rock itself, which is about 475 degrees Fahrenheit, has only dropped a couple of degrees.

We've all done this -- most of us have done this. When we're camping, if we have a rock ring for a campfire, even the next morning, if you were to pick up one of those rocks, it's probably going to be pretty warm. It may not be scalding hot, but it's going to be hot. Once rock is hot, it stays hot. It stays hot for a long time, and that's what nature has for us at depth. So if there is hot rock there, a hot rock will be there for quite some time.

In terms of how do companies get down and find this water? What do they do? Well, there's a process of exploration where they actually, again, drill wells through the rock to get down to the water itself. These are much bigger than a normal truck-mounted water rig because now, if you're drilling

maybe a thousand feet, they may be going down much further. In some cases they may be down close to 10,000 feet to reach this water.

And you might ask, how did the water get down there? Well, because there's fractures in the earth that the water has gone down, has percolated down, much like a soaking of the ground, so it will get down to these warmer rocks and heat up.

When a well is drilled and the company has identified a resource, they'll flow test the resource out to make sure there's enough heat and volume of that water to make it commercially produceable, so now they can build a power plant that will take that fluid. Then that will become a commercial resource.

Wells. It may take a couple different wells to make sure there's an adequate supply of energy there, that there's an adequate supply of water in that reservoir. But assuming that they determine that it is a commercial resource, then there will be an environmental review by us, of course, to assess the project proposal, which might be a power plant, because from the NEPA standpoint, we want to know about the power plant, we want to know about the access roads, we want to know about the transmission lines, every aspect about that project. And utilization is that, once that

project has been completed, then the operator normally is able to go ahead and do commercial operations.

Just a little cartoon. Yeah, nothing fancy, just basically showing the heat of the earth down deep in the crust. It could be molten rock. It could be a variety of things. But the heat is conveyed up into a reservoir rock here called a reservoir rock, where water is percolated down from the sides through fractures, cracks in the ground. It's heated up, and then, although this fracture is here, usually over time the fractures will seal off. There's usually mineralization in the water much like you'll find in the water pipes and things like that.

So quite often these fractures will be sealed off to some degree so you've got water that has been trapped in here. This becomes, then, cap rock to hold the pressure in. Companies will then drill down through the ground, through the cap rock, into the reservoir to access the hot water.

In this cartoon we actually show a little power plant. The hot water is brought up through the pipe into the power plant, and if it's what we call a flash plant, they allow it to flash in the steam. In this case we are actually showing a binary power plant, which the water comes up. It's sent through heat

exchanger much like the radiator in your car. The heat is conveyed to a secondary fluid, usually a hydrocarbon of some sort, isopentane, propane. It's that fluid that heats up, turns into vapor that turns the turbine that turns the generator that turns into electricity.

Once the water goes through the heat exchanger, then it's injected back into the reservoir, probably not the same place they extracted the water, because they don't want the cool water coming in contact with the wells here. They want the water to migrate across the reservoir, picking up the heat of the rock and then come back and pick up production.

Yes, sir.

GREG WEIRICK: What's the actual surface footprint of an average geothermal plant, like the total surface area of the facilities? I mean, a couple of acres, a couple dozen acres?

MR. HAGERTY: For what we've proposed for the Haiwee project, we've done a proposal -- or an estimate of what we think that could be done. We would look at two 30-megawatt power plants. And we're saying that each 30-megawatt power plant would cover roughly about 25 acres. Now, that does not include the well field and access but the power plant itself, the switchyard, the laydown yard, a maintenance shed and

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all. We cover about 25 acres.

GREG WEIRICK: So about a tenth of one percent of the actual land that you're talking about opening up?

MR. HAGERTY: Right. I'll get into this a little bit later, but when we talk about leasing -- and part of the issue here is basically to lease or not to lease. If a decision is made to lease, then we have a couple of pending applications out there right now. The applications range from, I think, about 640 acres all the way up to a little over 2,000 acres, but the actual percentage of land utilized is very, very small.

It's not -- unlike solar -- I'm not throwing stones at solar, but if the solar application were to come in, if they were asking for a hundred acres and they're going to cover it with thin-film photovoltaics, they'll probably use a hundred acres, and that's what's out there. For the wind form, of course, it would be a lot less than a hundred acres, but they'd still have the foundations.

So the power plant is like this, too. A small portion of land would be used, but there wouldn't be a fence going around the entire 2,000 acres. There might be a fence around the power plant, but that's only for safety and security reasons.

Yes, sir.

GREG WEIRICK: The average temperature variance between the hot water you extract and the water you return, what is the general temperature difference there?

MR. HAGERTY: It can be several hundred degrees. In the case of a binary power plant, you might have water coming up -- and I'll talk a little bit about the various types of plants, for binary power plants versus a flash plant. A flash plant is, you bring the water up. It flashes into steam, and then it turns the turbine. In binary, you have a secondary that heats up. For that binary process, it could come up -- I'll use just an example of maybe 325 degrees Fahrenheit coming up in this direction. The injection water could be as low as 180 degrees Fahrenheit.

There's certain limitations to how low you can go with that because the lower heat you extract, the lower the temperature is on your injection, the more chemical issues you start having with the water. So you have to be careful.

In terms of the flash plant, flash plant is limited because you're trying to get as much steam to come out of the fluid. Well, it will only come out of the fluid if it's at or above boiling, and if you're at

sea level, boiling is 212 Fahrenheit. So if you have a resource of 330 degrees Fahrenheit, you're only going to take it down to, at the most, 212.

But there is benefits to both projects. It depends on -- it really depends on the temperature of the water in the reservoir. That will be the call.

GREG WEIRICK: Thanks. Just one final thing, and maybe you'll touch on this. But you spoke about the size of the plants and the footprint they have. Are you going to speak to the need for 22,000 acres and what that includes, whether it's going to include numerous geothermal operations? Or perhaps you could speak to us about why the need for such a large area for a relatively small footprint.

MR. HAGERTY: Yeah, I will talk about that. That's a very good point. Such a large area, when we talk about a footprint, it may be 50 acres. That's a good question. I kind of covered it a little bit, but let me go into more detail here.

We talked about a binary power plant. That's a power plant that, in terms of temperature, if the resource is, say, 325 degrees or less, that hot water at depth, then that would be most of what we would see for a binary power plant. Again, the water would be brought up to the surface. It's all contained

in pipe. It goes through the heat exchanger and is injected back down. When it goes through the heat exchanger -- and there's a secondary fluid that picks up that heat, turns into a vapor that turns the turbine, turns the generator, produces electricity.

A flash plant, on the other hand -- again, we're showing here about 330 degrees Fahrenheit. There are resources that will take it well over 450 degrees Fahrenheit, so there's a wide variation of resources, but roughly above 330 degrees. The economics will show that a flash plant is much better. For a flash plant, the same water that water is being brought up through the pipe, they basically bring it up through a vessel that drops it down to atmospheric pressure. It's like taking the pressure cooker and suddenly taking the lid off. It could be very dangerous in the kitchen.

That's exactly what they want to do in the power plant. They want to take the lid off, drop the pressure, and then the water will go into a portion of it that turns it into steam. It's that steam that goes into the turbine that turns the generator and produces the electricity.

There's a third type of a plant, though, that we don't see around here. It is up at the Geysers north of San Francisco and in one other place, a place called Larderello, Italy, where you actually have dry steam. This is an unusual, unique resource in that, when they drill into the rock, they don't hit any water. It's just hot, hot steam that's coming out steam that could be anywhere from 450 to 650 degrees Fahrenheit. It's gas at that level.

We think of steam as something coming out of the steam kettle. Well, that's only because of its condensation. We see a little bit of white steam. When you have steam at that temperature above 350 degrees Farenheit, you don't see it, not until it begins to condense out quite a ways. It can be quite dangerous. The good thing is, you don't have to let it flash. It already is steam, so it turns the turbine, which turns the generator, which produces electricity.

The Geyser produces about 900 megawatts of power. That's enough to cover all the city of San Francisco and most of Oakland Heights. Great resource. Unfortunately nature doesn't give us that very often.

For leasing, again, I'm kind of boiling it down as we get down to the bare essence here. The leasing of Federal Lands under the Geothermal Steam Act is considered a major Federal, action, and because of that, we must include it within an environmental

process.

Our specific regulations that deal with the National Environmental Policy Act -- and I'll talk about that Act in just a little bit -- is under 43 Code of Federal Regulations 3200, and I do have copies of those regulations on the table. In fact, I have two little piles there.

I have this sheet that is basically a reference to the Federal Register, not like people read Federal Registers, but late-night reading in case you want to go to sleep. But on this two-page sheet I do have the website. If you have access to the computer, you can access the regulations on it. If not, I also have another stack that looks like this, but it's 22 pages long. It has regulations that address everything from leasing to exploration to development.

It's important to remember, though, that our issue here is to lease or not to lease. So if a decision is made to lease -- and this document will be addressing leasing or the fact of leasing or not -- after lease is issued, if we decide to lease, then that doesn't give the company the right just to go out there to start drilling or build a power plant. When a proposal is submitted back to BLM for drilling, there will be an environmental review done at that time.

If the resource is identified as a commercial resource for binary or, perhaps, for a flash plant, then the company will come back to us with a project for a 30-megawatt power plant, a ten-megawatt power plant, so many wells, and that will also go through another environmental review. So there's a whole series of steps that will take place even if we make a decision to go ahead and lease.

I talked a little bit about some of the laws. I don't want to give you too much information here. This is just to give you some of the ideas of some of the laws that this document will be involved with. I already mentioned the Geothermal Steam Act of 1970. That's what gives the Federal government, the Department of Interior, the Bureau of Land Management the authority to lease.

But there's many, many other laws that are coming into play here. The National Environmental Policy Act, or NEPA, of 1969, that's the driving force that we have to address leasing under, and that's what this document is all about.

We get into the National Historic Preservation Act of 1966, talking about cultural resources, the importance of cultural resources and how that will also go into the document. So this is kind

of a kettle, and we put this in, the Endangered Species Act of 1973. That also has to be factored into the issue. We've got two Energy Policy acts under two different administrations. We've got the Energy Policy Act of 2001. More importantly, though, we've got an Energy Policy Act of 2005, and that's what these regulations are under right here.

The Energy Policy Act of 2005 did a couple of different things. Number one, as I talk on this map here, we do have three applications that have been pending since 2005. Excuse me. 2002. Excuse me. I stand corrected. When the Act was passed in 2005, we had two different types of geothermal leasing. There was non-competitive, where anybody could come out and say, "I'd like to lease this land right here." And then in areas where there was established production, we could have competitive sale.

In 2005 the regulations were changed so that it's all competitive. And so where this map here where -- this boundary here shows the applications. This area was considered to have some resource, potential resources. So these people could not just apply over here. So now under the current regulations if a decision is made to lease, we would consider the competitive lease applications but of this land here.

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So a couple of things are going on, so I can go into more detail, but I won't for right now. If any of you have more questions, I'd be more than happy to get into this. Again, as I mentioned, the whole driving issue here is the Geothermal Act of 1970. That gives us the authority to lease this.

Now, talking specifically, let's get down to the nuts and bolts. We talk about the Haiwee Geothermal Lease Area. The area covers a total of 24,200 acres. That's what we're looking at here. To make some marks here, this is Highway 395 coming up to what's called Rose Valley. South Haiwee Reservoir, south through here. Little Lake area is down just off the map here. For those of you who know where the Coso Junction rest area is, that's right here. So we're trying to put it in perspective most of what you've seen from the road is in a swath.

That means there's tall mountains here, so this part of the area would be out to the side of that, just to put it in perspective. Besides the Federal acreage there, we also have a State section, lands that are controlled by the State of California. And, in fact, this State section is about 640 acres and has already been leased to a company, and BLM has issued a right-of-way that cuts across public land here to

provide that company access to that lease. The company has chosen not to do anything with the lease up to this time. It had the lease up to about two years, I believe.

And we also have private land out here, private lands within the Rose Valley, about 2200 acres of which we have no jurisdiction whatsoever. It's my understanding one of the proponents owns the private land, and what she wishes to do with the private land, it will probably be up to the County to make that call.

So as I mentioned, we have the three pending lease applications pending since 2002, covers about 4400 acres all together. I kind of discussed where the project area is located, 13 miles south of Olancha, east of the Inyo National Forest west of the China Lake Naval Weapons Center. That is the area here. It's kind of hard to see. The green area here is Inyo National Forest and, as I said, south of the South Haiwee Reservoir.

Purpose and need. The driving force of this project is to determine whether to approve the non-competitive geothermal lease applications. That's one purpose. Under the Energy Policy Act of 2005, one of the provisions was that it said for BLM's backlog of applications by 2010, we had to process and lease 90

percent of those applications. This activity here, this effort, is to do exactly that, to take a look at these three applications to determine, should these be leased or not? So it will address those from our backlog.

The other aspect of the purpose here is then to consider the area outside of where the applications are, the other land, to determine, should these be leased as well? Maybe they shouldn't. Maybe that's an alternative that we would consider. A question came up from the gentleman earlier as far as, why would you even want to consider these acres out here? The reason being, when these individuals applied, they couldn't apply out here because it was what we call known geothermal resource area, and according to the regulations, they couldn't apply as a competitive area.

They were very much interested in this area, as shown by the fact that they do have a lease for the State of California. So the reason we wouldn't want to consider these is because they believe that the resource they believe is here extends under the lands here.

So the concept would be that, if a decision is made to lease, we might lease some of it, might lease all of it, depending on the environmental issues

in that area.

Again I already talked about the Energy Policy Act, the Desert Conservation Plan Amendment. This document would amend the California Desert Plan, and that's an important aspect of the documents. We're looking at leasing and a Plan amendment. The original Plan did talk about geothermal leasing, but there's been amendments to that Plan since it was established in 1980, so we're going to make an amendment to address geothermal leasing and competitive leasing in this area.

Of course, like I already mentioned, the other two Energy Policy Acts. Another big issue, of course, in the State of California is that Governor Schwarzenegger and the Assembly and the Senate have driven the point home that we need to really look at renewable energy in 2010. He's asked the utilities, Southern California Edison, Pacific Gas and Electricity and San Diego Gas and Electricity to come to basically purchase upwards of 20 percent of their energy from renewable sources. That's now being bumped up to 30 percent in the year 2030. Well, this could be one of those areas where they could buy their energy from.

Do these individuals here have a contract with Edison? I don't know. I don't know. But clearly the utilities are being put in a position where they need to get additional energy. And from things that are happening with the Public Utilities Commission, it's not going to be easy for the utilities to go outside of the state to find that energy. So it's going to have to be developed here, one way or another. So lots of stuff going on. I can get into a lot of details here, but I don't because it gets into a lot of politics. But I'll gladly talk about that afterwards.

I think I'm going to turn this over to Mike. Again I will be here throughout the meeting. If you have any other questions, I'd be more than happy to answer them. If I don't know the answer, I'll write them down and make sure I get back in touch with you. So with, that I'll turn it over to Mike.

MR. STRAND: Thank you, Sean. There's really not much more to cover. He's already touched on pretty much the remaining slides. I'll just click on these and reemphasize some of the decisions that are being made, the EIS document that we're going to be assisting the BLM in writing, what that's going to cover and what the project really is.

The project, or the proposed action, is to look at the entire 22,000 acres, including these lease applications, and again is to make a decision whether

or not to open or close that area to geothermal leasing. So one of those decisions will be made as to the proposed action, open or close it. And as part of that, that decision that will be made, we would amend that California Desert Plan. So an amendment will be made to that Plan.

And like Sean said, this Plan in 1980 has been amended many, many times since the last 29 years. There have been many Plan amendments. This will be another Plan amendment specifically for this area to, again, open or close it to geothermal leasing.

So what that means is, if it's open to geothermal leasing, then the BLM will accept those applications. Once those applications come in, they're accepted, that would start a specific NEPA process for those specific projects. So if they lease, you know, four sections over here, then they want to put a geothermal plant there, they're going to have to go through their own NEPA, a National Environmental Policy Act, process, have scoping, have meetings, write an EIA or an EIS for that project, look at the details of that project, proposing to lease it. So we're just looking at the decision whether or not to open or close that.

Alternatives to that decision would be not to take any action, and if we don't take an action to

the project, or the area, then it's going to stay the same, and it's still covered underneath the California Plan. The area, it would just be as that one in the California Plan. Those areas for geothermal will remain the same. There will be no action taken. No decisions will be made on that.

Other alternatives that we'll look at would be to lease less than the 22,000 acres. Maybe only half the area will be considered open to the geothermal leasing. That would be an alternative we'll look at that will be addressed in the EIS.

And then part of what we're doing here is -- this is called scoping. This is a scoping meeting. We're here to listen to you guys, to listen and hear your comments, your suggestions. Through this process we will produce a scoping report, and that's a report made that will address whether it's environmental issues that you're concerned about that we hear from the public or the agencies or elected officials. We'll address those in the EIS document.

There may be other alternatives we want to look at as a result of scoping, as well, so this scoping process -- we're right in the middle of it -- is going to go until November 9th. And so between now and November 9th, you have the opportunity to leave

comments here at these meetings. You can go to the website or e-mail any comment. You can write a letter to the BLM as well.

Looking at the project schedule, we're right here again in October, again, the NEPA scoping addressing comments and issues for the Draft Environmental Impact Statement. That's going to be -- well, it's currently under development and will be developed in the next several months. As soon as that is completed, that Draft EIS will be made available to the public for review and comment.

During that comment period there will be another hearing or a public meeting, maybe something similar to this, where, again, after you've had a chance to review the document, you come and give your verbal comments. You can also submit comments to draft just like you can submit comments now during the scoping period.

And then next spring we'll get into writing the final, what's considered a Final Environmental Impact Statement. And the Final Environmental Impact Statement is looking at the comments we received and our responses to those comments. That's really the heart of the Final EIS. There may be additions or clarifications made in the Draft EIS. Those would be

addressed in this Final Impact Statement as well.
And the Final Impact Statement would also include a Proposed Plan Amendment, so it's an EIS and a Plan Amendment all in one. Again the Plan Amendment is to the California Desert Conservation Area Plan. That would be included with the EIS. The language of the Plan Amendment will be in there. And then a Record of Decision late next year.
So again you're part of the process. We appreciate you guys being here tonight. If you have comments, please leave them with us here tonight, or again you can go to the e-mail. You can send an e-mail to the e-mail address right there or send a letter to the Moreno Valley Desert District Office as well.
With that, if you guys have comments or -- I'm sorry -- speaker cards, I can collect those, and we'll start our comment-and-question period.
MS. CADAVONA: Greg Weirick.
GREG WEIRICK: Hi. My name is Greg Weirick. I'm an Inyo County resident and wanted to, first of all, say I support the idea of renewable energy in its concept and would like to see the opportunity for more tax revenue for the County and whatnot.
My concern this evening is the loss of

motorized recreational opportunities due to this designation of these 22,000 acres, potentially up to the 22,000 acres. The 1985 through 1987 inventory of the roads that the BLM undertook and incorporated into NEMO, the Northeast Mojave Plan, is grossly inadequate, and a lot of that inventory is really flawed. Even roads that appear on BLM maps failed to reach the inventory.
And I need to insist that, based on the potential loss of all this motorized recreation, the BLM undertake a more thorough inventory and mitigate this loss of recreational opportunity by revisiting NEMO and potentially designating roads lost in NEMO.
I realize none of these roads are closed now, but they are administratively -- they were administratively closed in NEMO, and it merely hasn't been implemented yet. So I'd like to have BLM consider mitigating through revisiting NEMO and looking at roads that were not inventoried and consider them for designation and continued use.
MR. STRAND: Okay. And part of that comment, I think you heard you say, was, if something is developed, to mitigate the loss of that area, those roads, that access?
GREG WEIRICK: Yes.

MR. STRAND: Development in the area, 22,000 acres or whatever that would be.
GREG WEIRICK: Well, 22 acres isn't a whole lot.
MR. STRAND: Whatever development may occur in that area.
GREG WEIRICK: Right. The eventual -- pardon me. If eventually the lease does grow to be a significant amount of acreage, then I just want to make sure that BLM considers the recreation loss of that.
MR. STRAND: Okay. Thanks. That was Greg?
GREG WEIRICK: That's correct.
MR. STRAND: All right. Tanksley?
DAVE TANKSLEY: That's me.
MR. STRAND: What's the first name?
DAVE TANKSLEY: Sorry. My writing is real bad. I'm an illiterate. I'm Dave Tanksley, resident of Inyo County, and I have a couple of questions. And one of them is, how long has this process been going on to get to this point where we're at right here with the BLM, because were you guys -- I mean, has it been a year, two years, six months?
MR. STRAND: Well, the lease applications are dated -- what?

MR. HAGERTY: 2002.
MR. STRAND: The lease applications came in 2002. What's the next timeframe?
MR. HAGERTY: The critical timeframe is basically money. We didn't have adequate money to address the environmental review of those applications or even, of course, larger applications until the passage of the 2005 Energy Act. What that Act did was that it -- it takes 25 percent of the geothermal royalties nationwide and directs that into the Department of Interior, which is then given to BLM funding, producing what you're talking about right now. So there was quite a bit of lag time where we couldn't afford to look in this direction. Now we have the money.
MR. STRAND: One more thing. As far as, you know, this specific process, that's really started with what's called a Notice of Intent, and that Notice of Intent is to prepare an EIS. So that starts this NEPA process. The NOI was published -- what date?
MS. CADAVONA: September 11.
MR. STRAND: Of this year.
DAVID TANKSLEY: This will lead to my what next question is. Sean, I believe, brought up the codes and everything, which one of the documents that

you comply to was FLPMA, Federal Land Policy and Management Act, and in that it requires coordination with County government. And in that coordination process I would have thought that the BLM would have notified County government prior to the Notice of Intent, and I'm wondering where that ball got dropped in that.

In any land-use planning the local government is one of the entities that needs to be notified. I mean, this is going to affect what is on in this county. And I'd like to know why that hasn't happened. And I don't know if you have that answer.

MR. STRAND: Okay. Do you guys want to address that?

MR. DALTON: Sure. At this level this is a Federal undertaking at this point. You're absolutely right. The next step we will do is see who our partners, our cooperating agencies, are and move forward in that direction. It's not appropriate at this level to go out and say, Hey, we are thinking about doing a geothermal operation or a project area at this level.

Right now we want to hear from everybody to try to determine whether this is feasible or not. Does that make sense? So as we decide to move forward, we

will.

MR. STRAND: So there's been nothing happening, I guess. In the last couple of years there's been no action, no decisions, no progress until this point now. Now is really the point where it's like, okay. County is involved. Here's where we're looking at. This is the beginning stages of all that.

MR. DALTON: Exactly. This is the very beginning.

DAVE TANKSLEY: Okay. I still have a few more questions. We're not a big crowd.

MR. STRAND: Sure.

DAVE TANKSLEY: At what level are you considering dealing with the County, the local government as compared to what you have with the NEPA process? How does that fit into your scope of how FLPMA controls and the different CMR's, whether 30, 43, tribes, which would also be included in that.

MR. DALTON: Well, some letters have already gone out to the tribes as we speak. We have obligations through our 106 process, government to government. For instance they have until November 20th to respond and let us know what kind of concerns they have as nation. They also have the November 9th date as members of the public to respond and let us know

what their concerns are as residents and so forth.

I hope you're picking up we just started this process. Everyone will be invited, including our partners and counties and so forth.

DAVE TANKSLEY: Okay. That was one of my concerns.

MR. DALTON: Okay.

MR. TANKSLEY: Another one is, what's the estimated generated revenues? And you can make it simple. Say, a 50-megawatt plant, what percentage of that revenue will actually be directed into the County coffers?

MR. HAGERTY: Let me address that. That's a good question, as well, because it goes back to the Energy Policy Act of 2005. The Coso operations for the development there that -- at least for the portion that BLM manages, which is basically 90 megawatts, there's a lot more production than that, but the rest of the production is managed by the Navy. That's Navy contract. But for our land, there's roughly about $2 million coming off those leases every year for royalties. That's in general. I mean, it goes up and down. It has dropped over time because of a variety of issues. They take deductions on depreciation of the property.

But of that $2 million that is collected in royalties, half of that then comes back to the State of California. And of that portion 40 percent is directed back to Inyo County. Thirty percent goes into the Energy Commission for grants, some of the grants that have been utilized by Mono County, for example, or for direct use application in Mammoth Lakes. And another 30 percent goes into a riparian fund that's managed by basically the Assembly and Senate. I won't call it a slush fund, but it's hard to track where that money goes.

But more importantly, the other half collected by the Federal government under the Energy Policy Act, the statute states that half of that is returned to the county of origin. So not only is the 40 percent of the half going to the Inyo County, but roughly that comes out --

THE REPORTER: Wait a second. There's a frog near me.

(Pause in proceedings.)

MR. TANKSLEY: So roughly 45 percent of the revenue generated, and that's gross?

MR. HAGERTY: That's the royalty. You're right. Then so 45 percent of the $2 million, or roughly about $900,000, would be coming back to Inyo

County. For the projects here, we have developed what we call a reasonable foreseeable development scenario where we are giving kind of a crystal ball where we feel that perhaps two 30-megawatt power plants would be developed.

The royalty stream from those could be considered similar to Coso. So instead of two million, let's call it $1.5 million, so maybe $750,000 a year. These are just pulling things out of the air here, really, folks. So that's $750,000 a year could be coming back to Inyo County.

DAVE TANKSLEY: Okay.

MR. HAGERTY: It could be more; it could be less, depending on the resources. We don't know. We do not have any direct knowledge of the resource in this area. All we can do is basically base our estimates on what's in Coso. The proponents have said there's a resource now that's at 18,000 feet. My professional judgment, that's an awful long way to go to get to the resource. But if it's there, it's there. So that's regarding whether to make the lease or not. Does that answer your question?

DAVE TANKSLEY: Yes, it does. Thank you very much.

Sir, I have one more. It goes back to what

you were saying earlier, if you want to answer it. It was -- you had stated that, of course, with the 2005 and what Schwarzenegger signed for the renewable energy, that a lot of the majority of the renewable energy needs to come from the State of California.

But it was my understanding that Schwarzenegger shot that down as allowing that to be purchased from out of state. I mean that's, why that BrightSource has pulled their solar. So that's contrary to -- is there something that's going on that's going to make it more where these things have to be generated within the state of California?

MR. HAGERTY: I think what's going to happen is, you've got an expanding population in Nevada, and that's where there's a lot of geothermal development going on right now. The Nevada Power, Northern California and Nevada Power and Sierra Pacific Power, they do not have the percentage of renewable energy that they need to get into their mix as required by State law.

So I think what will happen is, instead of sending the power our way, they're going to say, "We need our power first. If we have excess, we'll send it to California."

So I think, when push comes to shove,

California will need to start generating more of its own renewable energy to meet these thresholds. You're absolutely right. The governor did shoot down the issue of not being able to go to another state, but I think we are finding other states are still coming up with their renewable energy portfolio saying, "We want to keep energy in our own state."

In California conservation is important, of course. I don't discount that. But the fact of the matter is that we do continue to consume electricity two, three, four, five percent more a year. We need to make it up someplace. I do think we'll see a renewable energy program.

DAVE TANKSLEY: Thank you very much.

MR. STRAND: I just want to point out, too, that in the project area there's several transmission lines. He mentioned a transmission corridor. One of them is a lower voltage line, SCE. The other two are Los Angeles lines, Los Angeles Department of Water and Power. There's no major station in the area, but those are the likely lines that the power would be put on to.

DAVE TANKSLEY: In the corridor?

MR. STRAND: Yeah. He mentioned a reasonable foreseeable development plan, which is what

we're basing our impact analysis on. Not a huge amount of power. You don't need a real large transmission line to utilize that. It's not likely they would look at building a large transmission line somewhere else to ship that power out. It's just too expensive.

DAVE TANKSLEY: Thank you very much.

MR. STRAND: You bet. Before we go on to the next person, Bob, I want to mention that over behind the blue curtain are some surprises. No. Left side, men's restroom; right side, women's restroom, so in case you needed that.

So Bob is next, Bob Harrington.

BOB HARRINGTON: I'm the water director for Inyo County. It may be fairly early in the process for this, but I wanted to alert BLM staff to the need for applicants or project proponents to get in touch with the County Planning Department early in the process to see what conditional use permits they may need under the County's Geothermal Development Ordinance or Groundwater Transfer Ordinance.

MR. STRAND: Okay. Yeah. Great. Thank you. I appreciate that. Pam Mitchell.

PAM MITCHELL: Yeah. I was wondering what type of jobs might be created from geothermal exploration and then, if it's developed and utilized,

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what type of jobs it would bring to the area.

MR. STRAND: Okay. Sean, do you want to hit that one?

MR. HAGERTY: Yeah, I can touch on that, and then that will be addressed in the EIS. But the early part of exploration would be pretty much just technical focus, you know, drilling the well and things like that. And this makes the assumption that we'd actually issue the lease.

Let's take it out. Let's be optimistic and say that the lease is issued, they do find a resource. If a power plant is being developed, there would be quite a large number of people involved in terms of the construction of that power plant. They would come and go. I mean, in other words they would come in, build a power plant, and then a big construction force, most likely, would leave. But there would probably be in excess of -- depending on type of plant and how many plants, there could be 25, maybe 50 jobs in terms of technical aspects of people managing the power plant, managing the wells.

There still is quite a wide scope of other types of employment. But in terms of a major, like, industrial site, it's not going to generate hundreds of jobs over a long period of time. The majority of the

jobs will be up front during the development, but there will be people to manage the power plants, monitor the wells, basically manage the environmental aspects of that plant, skilled and unskilled.

MR. STRAND: Okay. Doug Hicks.

DOUG HICKS: Hi. I'm Doug Hicks. I'm a resident of Inyo County. My questions go to, was this a known geothermal resource at the time that the California Desert Conservation Area Plan was implemented?

MR. HAGERTY: Yes, it was.

DOUG HICKS: So this was restricted knowing that there was geothermal potential. And just a rough calculation. There's already been a -- what? -- a seven-year delay in -- these applications have been sitting there since 2002?

MR. STRAND: Right, right, yeah.

DOUG HICKS: So seven years and running. Exploration jobs, construction jobs, operation jobs, which would be continuous throughout the life of this project, which as a renewable resource could be forever. In addition, two 30-megawatt plants would generate about $600 million a year for our economy. I'm sorry. Sixty million a year, not 600. So given it's already been seven years, by the time this thing

gets outs of the California Desert Conservation Area, you're probably looking at ten years, and we're at a $600 million impact plus the jobs.

You know, what my point is, the California Desert Conservation Area Plan, did they do a realistic economic analysis? Was this identified as a potentially one-billion-dollar impact just for this one little section of it? I mean, I doubt it very much. But that's something that I know this county is concerned about, the residents here are very concerned about, the continued restriction of land in this county that delays projects far more than are identified during the scoping of these wilderness actions or these, you know, travel management,plans or any other kind of land use restriction, that they're grossly underestimating the economic impacts on this county. And that's my point.

MR. STRAND: I appreciate that. Thank you for commenting. Anything in that that you guys want to address at all? It's a great comment.

Okay. We'll move on. Linda Arcularius. I hope I'm saying that right.

LINDA ARCULARIUS: You did good. I'm an Inyo County Supervisor, and I want to go back to the process of coordination and recognize that, as local

government, it's really not adequate to have this just published in the Federal Register then have it noticed in the paper that we should show up for comment.

Under coordination in the mandated coordination, that process needs to start early on for local government, and it's a government-to-government relationship. It's not a partner; it's not a stakeholder; it's not a commenter. So I would just encourage you to get in contact with Inyo County, both with our Planning Department and our Water Department and our County Administrator. They all have roles in this process.

And as this goes forward, coordination mandates consistency with our General Plan. So we need to be involved early as local government and be a part of the process and a part of the final documentation on this project, not a comment or after the conclusions have been made. So I just encourage you to do that.

I've got my address here. We certainly are a local government. You can find us anywhere. But we're very, very interested and are completely committed to the fact that coordination needs to begin on this, and it needs to begin sooner than later. So thank you.

MR. STRAND: Thank you. I appreciate

that. Last one I've got is Sally Manning. Oh, right there.

SALLY MANNING: Yes, I'm Sally Manning. I'm here representing the Big Pine Paiute Tribe. I'm the environmental director. I had a question first about a project we used to call Deep Rose. Was that located on that 640 acres of State lands?

MR. STRAND: I believe so, yes.

MR. GUM: Section 16.

MR. STRAND: This right here (pointing).

MR. HAGERTY: And it also includes the three applications that are pending just on the left side there too. That's also part of the Deep Rose.

MR. STRAND: It's the same applicant.

MR. GUM: Let's not confuse her. On Section 16 there is an application by Deep Rose to drill a well on that State section. The State did an EIR, Environmental Impact Report, on it. The Bureau of Land Management did an Environmental Assessment. They had to come to BLM to get rights-of-way for a road and a pipeline to serve that particular location.

The other things that he's talking about, these pending applications, the only tie they have to Deep Rose is that Deep Rose is the one with the applications pending, same company. But those two

things are not tied together, not the State section and the BLM applications. They are not tied together, the ones on the State.

SALLY MANNING: Okay. My other comment is similar to those made by others this evening, although it's from the perspective of an Indian tribe. The BLM does have, as you know, certain obligations, Section 106 under Consultation Process, and I am not an expert. The expert from our tribe on this, he couldn't be here tonight because he's not feeling well.

But I did want to point out that we found out about BLM's Notice of Intent from someone from the public, from a friend. And we should have known about it as soon as it hit the streets through this formal consultation government-to-government process that you are supposed to have with the tribes, all of the tribes in Owens Valley area and, of course, the Shoshone. And when we first got the Notice, comments were going to be due this Friday, so that really didn't give much time.

On October 1st many of us within the tribes attended a meeting locally with the BLM, which included a fellow from the Moreno Valley office of BLM, and it turned out that that person who is their archeologist and tribal liaison also didn't know about this project. We knew because of our friend notifying us.

So I'm just pointing out that the process does seem to be a little bit flawed in terms of getting to the people that you're supposed to get to early on in the consultation process. I'm raising this concern because, as you go further in this process and NEPA needs to be done on further parcels, the tribes would like to be notified in a timely and appropriate manner. Thank you.

MR. STRAND: Thank you. Okay. That's all for this. You've got one. Say your name.

JIM SCOTT: Jim Scott from Bishop. The question I want to ask again of Sean is, is that Energy Policy Act of '05 -- do I understand it that you guys are required or mandated to take action on these lease applications from '02; is that correct?

MR. STRAND: Yes.

MR. HAGERTY: That's correct, sir, yes.

JIM SCOTT: Can I assume or we assume that without that mandate, we wouldn't be here right now? There's a good chance we wouldn't be here right now?

MR. HAGERTY: That is correct.

JIM SCOTT: Now, if you do not comply with this mandate given to you, what happens?

MR. HAGERTY: There is a chance the

funding --

JIM SCOTT: You guys will lose your job?

MR. HAGERTY: I'll retire.

JIM SCOTT: I'm just kidding.

MR. HAGERTY: Sir, I don't know. I don't know. The chances are the funding we are currently receiving to do this project and to look at other projects in the Imperial Valley could be minimized, and that would bring our process to -- it would slow our process down.

JIM SCOTT: I'm trying to understand that. Now, if you get slowed down, then our economy could potentially get affected right here. That process would not be a penalty to you, but it would be a penalty to our county and to the --

MR. HAGERTY: Conceivably, yes.

JIM SCOTT: Okay. Now, if someone else -- going along with that policy and the mandate, if someone else puts in -- applies for a lease, what is the time limit on them, like if someone wants to do it after '010? Do you have a year, or do you go through this procedure where we get another Energy Policy around 2011 or 2012 or so and then you get a ten-year job on that? You see what I'm saying?

MR. HAGERTY: Absolutely.

JIM SCOTT: I don't know how that policy is worded, but if that's a mandate to you, things ought to be – what I'm saying is, this shouldn't happen if you're in the business of producing energy, if you are in the commercial business of doing this. And you're not the only entity that our county gets involved with on this. But I'm just asking questions that I think need to be addressed.

MR. STRAND: Well, I'm sure you guys can give some history maybe on this, but let me just make one point to your second comment. Once this decision is made to open or close, that will help greatly with those applications in the future that come in; right?

So let's just say the decision is made to open the entire 22,000 acres to geothermal leasing. Those applications will come in, be processed, start their own NEPA process for that project. This should happen just as soon as they can process that application in.

If it makes sense, they will start that NEPA process. There shouldn't be any foreseeable delays in that. This decision will help that, you know -- what I'm saying is, in the future they have to slow down, stop, look at the entire area and say, do we want to open that up for geothermal leasing? They may say they

want to close it.

JIM SCOTT: Okay. Another question, that blue State lease there, can you explain what the State lease is, or what is that?

MR. HAGERTY: Sure. Independent of BLM, of course, there's lands in the State of California that are managed by the State, specifically the State Lands Commission. When California became a state, there were two sections in every township, 36 sections that were awarded to the State of California. Section 16, in that case, and Section 36, unless the sections were already previously encumbered with something.

So in this case the company Deep Rose, since it is a State section, applied to the State Lands Commission for an actual lease to explore, and the State of California went through their own environmental process independent of us to process whether they should issue a lease or not. The final decision was that they issued a lease for -- how long? How many years is it? Thirteen years?

MR. GUM: From the time that their approval was made, I thought they had -- I think it's two years. It might be three years. I'm not sure. And I think it's actually three years, because I think

they're running up to their end time right now. And that's part of the issue that's pushing them to try to get this mandate, if I may jump in for just a second.

Well, it's funny, this 2005 Energy Policy. You know, oftentimes we in BLM get given directions by the Congress and the people of the United States to go do something, and most of the time it comes with no dollars attached to it. And so things languish because, how are you going to do an environmental impact statement that may run you half-a-million to a million-and-a-half dollars when you don't have two dollars, yet alone a million or a million-and-a-half?

So that's kind of where this runs down here. Why do things languish like that? We could wind up being in the same mode, just like you say. Even though Mike up here says yes, if we decide to open these up to leasing and we get an application in, remember those acres that are outside the area that is designated as the non-competitive lease -- those are the ones Deep Rose applied for -- those will all be under competition. So you might have the Lone Pine Tribe decide to compete for a lease, and somebody else out here -- you, as a person -- might want to compete for a lease. You get into bidding process.

Now, after you've got that lease awarded to

you, now you've got to come in with an application to do all this stuff we're talking about doing: developing that field, drilling those wells, making that power plant. And we've got to go through that environmental process again for each one of those sites specific to that location. So you could be seeing quite some time pass if we don't have the resources assigned to us to be able to conduct those types of analyses.

To be sure, we are now in cost-recovery mode, which means, when an applicant comes in, we sit down first with them one time, give them a free shot at us, and we'll tell them what all is going to be required of them. And then the very next thing we do is, we create a memorandum of agreement between us and that company, and we let them know, you're going to have to pay for every hour of our time we spend on this. You're going to have to hire third-party contractors to go out and do the biological study, to do the cultural study, to create the environmental document, just like we're doing for this leasing. So we pass the cost mostly on to those applicants at that point in time, but they've still got to have BLM to do that and issue their right-of-way grant. So it's quite a package overall.

It would not be unusual to see an application coming in, if these are leasable, to take anywhere from a year and a half to maybe three years to work through a process to get a permit and go out and start. So just be aware.

MR. STRAND: These guys, like you said, they can drill out here tomorrow, and they're not.

MR. GUM: They sure can, and they could have since -- 2006 is when they got their permit, and I think it's three years they had to turn it to the right.

JIM SCOTT: After that three years they've got to --

MR. GUM: They've got to go back and do it again.

JIM SCOTT: Okay. Thank you very much.

MR. STRAND: Any other questions? Anybody want to hit us up with anything else? We'll be here for a little while longer. Take a look these a little closer if you want, the boards. If you want to ask us specific questions one on one, we're happy to do that.

PAM MITCHELL: What's next after the Monday, November 9th, you know, the scoping thing that -- when is the next?

MR. STRAND: This is the second scoping meeting. We had one last night in Lone Pine. There will be a third one tomorrow night in Ridgecrest. Next Tuesday, the 20th, there will be one in Death Valley and then scoping comments.

We're asking you to submit your scoping comments to us. If you gave them to us tonight, they're already in, or if you haven't given them to us tonight, if you want to submit anything else, give them to us by November 9th, please.

PAM MITCHELL: Thank you.

MR. GUM: We also want to let you know that, although we'd like to have them by November 9th, as we go through this process, we'll open and willing to take those comments all along. We're looking at them by November 9th so we can focus our effort to create this document.

PAM MITCHELL: Sure.

MR. STRAND: Absolutely. Thank you guys.

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(The proceedings were concluded at 6:57 p.m.)

REPORTER'S CERTIFICATE

I, DIANE CARVER MANN, a certified shorthand reporter, do hereby certify that the foregoing pages comprise a full, true and correct transcription of the proceedings had and the testimony taken at the hearing in the hereinbefore-entitled matter of BLM Scoping Meeting for the Haiwee Geothermal Project

Dated this 20th day of November, 2009, at Chino, California.

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DIANE CARVER MANN, CSR NO. 6008

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Condensed Transcript
Haiwee Geothermal Project

October 13, 2009

Bureau of Land Management Scoping Meeting - Lone Pine, CA

Printed on: November 22, 2009

Job #: 68507DM

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BUREAU OF LAND MANAGEMENT

SCOPING MEETING

HAIWEE GEOTHERMAL PROJECT

REPORTER'S TRANSCRIPT OF PROCEEDINGS

LOCATION: Boulder Creek RV Resort
2550 South Highway 395
Lone Pine, CA 93545

DATE AND TIME: Tuesday, October 13, 2009
5:40 p.m. to 6:58 p.m.

REPORTED BY: DIANE CARVER MANN, CSR
CSR NO. 6008

JOB NO.: 68570DM

APPEARANCES

LINN GUM - Lands and Minerals Branch Chief
JOHN DALTON - Planning and Environmental Coordinator
SEAN HAGERTY - Geothermal Expert
MIKE STRAND - Project Manager
KAREN CADAVONA - Public Involvement Coordinator

LONE PINE, CA TUESDAY, OCTOBER 13, 2009

PROCEEDINGS

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MR. GUM: Good evening, and welcome to our public scoping meeting. My name is Linn Gum. I'm the Assistant Field Manager and Lands and Minerals branch chief in the Ridgecrest BLM field office, and I'd like to introduce this team. We're here to talk to you about a proposal for leasing some 22,000 acres of public lands for geothermal exploration, production, development.

Next to me is John Dalton. He's the project coordinator/program manager for this particular EIS effort. He's out of our Moreno Valley office from the California Desert District. Next to him is Sean Hagerty --

MR. HAGERTY: Hi.

MR. GUM: -- who is our geothermal resource program leader from our State office in Sacramento. And next to him at the end of the table is Mike Strand, who is with our third-party contractor, Power Engineers, Inc., that's helping us

develop this Environmental Impact Statement/ Environmental Impact Report. And back here in the back of the room standing is Karen Cadavona, who is the public relation specialists with Power Engineers. Is that close?

MS. CADAVONA: Yes.

MR. GUM: Okay. With that I'd like to introduce Mike, who will go over our agenda and our ground rules for the meeting, and we'll proceed.

MR. STRAND: Well, the first part of the meeting we'll just have PowerPoint slides prepared for you guys, and it's going to take us through the background of the project, why we even have an EIS project to look at. It will take us through that. The purpose of the meeting and need will be discussed for the project, the EIS, the proposed action, the alternatives. And Sean will be presenting most of that information, as well as just some geothermal information, geothermal as a resource, geothermal plants, just some basic information on that.

Then we'll go through some of the environmental laws, the EIS follows -- that we'll have to follow as we're developing the EIS and then the schedule, the NEPA process we'll be following, as well. Myself and John Dalton will be going through

some of that information.

Yes, sir.

RICHARD CERVANTES: For the record I'm County Supervisor of the Fifth District of the southern part of Inyo County, and this is Janice Roberts, who's representing the Tribe too.

MR. GUM: Mr. Cervantes, could you give the court reporter -- we're getting all this taken care of here -- your name fully.

RICHARD CERVANTES: My full name is Richard Cervantes.

JANICE MC ROBERTS: Janice McRoberts. It's J-a-n-i-c-e M-c R-o-b-e-r-t-s.

MR. GUM: And you are representing which tribe?

JANICE MC ROBERTS: The Lone Pine Tribe.

MR. GUM: Thank you so much.

MR. STRAND: I appreciate you guys being here. A couple of housekeeping items to go through. After the presentation is done -- it's going to only take about 15, 20 minutes to get through. You guys, when you walked in, if you don't have one, they are over by the door, speaker cards. If you could just write down your name on there, and then I'll collect those from you guys. Afterwards you'll be able to

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give a comment, ask a question. The court reporter is here to take that down verbatim.

And if we can answer the questions, we're going to do that here tonight. If we can't answer the questions, we'll let you know and address it in the EIS. There's also a back sheet with some basic information on the project, a map, as well. And then some notices that have been posted for the EIS are available over there, as well, and this notice on the front here is just to point out that the scoping time has been pushed out from -- I believe it was October 16th. That's been pushed out to -- November 9th is the time period where we're collecting scoping comments.

So we'll collect comments here tonight, or if you'd rather, you could go and send an e-mail, or you could write a letter. And all that information is here for you, as well as how you can read those comments.

So when I collect your speaker cards, if you want to leave a comment or ask a question, if you want to do what you just did, which is state your name and then speak loudly and clearly so the court reporter could hear you, we would appreciate that.

Okay. Shall we get started, Sean?

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MR. HAGERTY: Good evening. My name is Sean Hagerty. I'm the geothermal program lead with BLM in the Sacramento office. So my title is "geothermal expert" on the card. I'm clearly not an official expert. I have been in the program for about 29 years. I've worked in the Imperial Valley on projects at East Mesa. I've been involved on projects at Geysers, Mammoth Lakes, at Coso and also Northern California at Glass Mountain.

I'm just going to go over some brief stuff. I won't go into any real particular detail. I will be around later on after the presentation, so if you ask specific questions, I'll be more than happy to answer them the best I can.

Geothermal energy. Again we're talking about heat of the earth. We are talking about heat that's within the crust of the earth. It's natural heat coming from radioactivity down deep. The resource that we're hoping is out here is both a combination of heat in the rock, as well as water. So water is very important because it is the water that actually conveys the heat from the rock to the surface.

We know that it's geysers, fumaroles, mud pots, other manifestations. In this project here,

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though, we don't see any manifestations. There may be something at depth. We don't know for sure, but clearly in this case there is no surface manifestation like you see at Yellowstone.

To access that resource, wells would have to be drilled in order to get down to that level, whatever that level might be. It could be over several thousand feet; it could be over 10,000 feet. We don't know for sure. But before anybody would do that, we'd have to approach the leasing aspect.

Benefits of geothermal energy. Of all of the renewable resources --

THE REPORTER: Can you speak up, please. The birds are loud.

MR. STRAND: The birds are a little loud.

RICHARD CERVANTES: Could you speak up, please.

MR. HAGERTY: One of the greatest benefits of geothermal energy compared to solar or wind is that it's what they call a base load. You turn the power plant on, and it stays on. Solar is really good when the sun is shining. Wind energy is great when the wind is blowing. But those two energy sources do have basically an oil type of energy curve,

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whereas geothermal, it stays flat. And that's what the utilities are looking for, because that's what's really important in the power mix. It's reliable. As I said, once you turn the plant on, the plant normally will stay on unless there's mechanical problems. So it's accessible locally.

Again it's a resource that we believe is here. It goes immediately into the grid. There's no other conversion necessary. Solar, you basically have to step up the power. Geothermal the turbine actually turns at 60 cycles and can produce power directly into the grid.

And it's sustainable. The heat of the earth is there. Issues with water, of course, those are things that may be utilized, but the heat of the earth will remain. A case in point is that at the Geysers, which have been operating for over 40 years, the overall temp of the rock has only dropped about five degrees. There's a tremendous amount of heat. And we all know that, if you've been camping and you have a campfire and the stones circling the fire to protect the fire from getting out, even in the morning most likely, you touch the rocks and the rocks are still warm; they retain the heat for a long, long time.

In terms of what do we think could happen, if a decision is made to lease -- and that is a decision to lease or not to lease -- we'll get into that a little more -- is, how do they access that resource? Well, the first action that we probably would see is that the company would want to drill a well, drill a well down through the earth much like a water well but much, much bigger, to drill down thousands of feet. It could be three, could be four or 10,000 feet. We don't know because we don't know exactly where this resource is in relationship to the surface because, again, there's no surface manifestation of this there.

But if a resource is identified, then the project proponent and the lessee may come forward with a project for building a power plant. That power plant could be of various sizes. In our assessment we have identified up to two 30-megawatt power plants. Each megawatt is capable of providing energy for about a thousand people, so about 60,000 people is what we feel is something we might be able to go by.

At that stage, when the project proponent comes forward, we would undergo another level of environmental review. So first we're talking about this environmental review just to decide to lease or

not to lease. If the decision is made to lease and the project proponent is granted the lease and they come forward with a project to drill, then that will undergo another environmental review and so on and so on.

It's important to remember that, because some people feel this is the only environmental review to be done. No. This is just a make a decision to lease or not to lease. And once a power plant is constructed, of course, then we're actually utilizing the resource.

Normally the hot water or mixed hot water and steam is brought up. It's flashed into steam, more additional steam. It turns the turbine, which turns the generator, which produces electricity, and out it goes. As far as any power plant, coal fire or gas fire or other fires, basically we're using the heat of the earth as the energy source. Once we've heated the water up, basically it's the same as any other power plant. It's basically using some sort of motor force that turns the turbine that turns a generator that produces electricity.

Just a real quick little sketch as far as what we believe to be at depth there. There it goes. Okay. We're talking about the heat of the earth. It

could be down maybe 10,000, 15,000 feet. It will heat up rock above it. Here is a magma source, and clearly in the coastal area history has shown that there has been magmatic activity in the past, thousands of years ago. That's why you see some of the hills in the area, some domes. Magma has come up to the surface. It's actually seen south of Little Lake here. That's the salt. And actual lava has come out so that the heat of the earth has been injected up through these rocks here.

Water is percolated down, gets through the rocks. And in order to access that heat and that water, people will drill down through a cap rock that keeps the water at depth and then it brings it up. It's flashed into steam. It's cooled back down and reinjected back into the reservoir.

This is simple, kind of common to look at. We do show some faults in here. Unlike oil and gas, which oil and gas has reservoirs that are pretty much permeable, like a sponge, so lots of little holes that are connected. So geothermal, that access to water is all controlled by fractures. The more fractured, the more permeability, how the water flows through the rock. Very rarely will we actually have a geothermal resource that is like a sponge. Normally it will be

like a fractured rock.

The three main types of power plants for current technology as we know it: We've got binary plants, flash plants and dry steam plants. We'll go into a little detail here. Binary plant basically takes hot water out of the ground, sends it through a heat exchanger, like a radiator in a car, and it heats up a secondary fuel, isopentane or isobutane or some other fuel. That vaporizes, turns the turbine, which turns the generator, which turns into electricity. The cooler water, then, after it's gone through the heat exchanger, is injected back into the ground.

For a flash plant, depending on the temperature, if it's above, say, 350 degrees Farenheit for the hot water coming up, it's brought up to the surface, and it's put into a bigger container to allow the steam to flash. An example is my mom. We had a pressure cooker, and she was cooking vegetables and things like that. Water under pressure will have a higher temperature before it boils, but if you were to take that lid off the pressure cooker quickly, you'd have that water boiling.

And that's what's happening here for the flash plants. The water that is under pressure, we call it hydrostatic head under pressure. When you

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bring the water up to the surface, that pressure is relieved and the boiling point increases, flashes into steam, and that's what happens in the flash plant.

For dry steam there's only a couple of places in the world we actually find dry steam. For these other plants they drill a hole into the ground, bring up hot water, but places like Larderello in Italy, there's actually just dry steam. There's hot steam. It's above 212 degrees Fahrenheit. It's a perfect resource that you just drill into a rock, allow steam to come out, turn the turbine, turn the generator, and it's electricity.

But most likely what we expect here at this resource would be something amenable to a flash plant, maybe to a binary plant. It always depends on the economics of the project.

Leasing of geothermal resources. It's a major action, and that's what's triggering off the requirement for the National Environmental Policy Act, the document that we're going to prepare, the EIS. The Code of Federal Regulations, Part 3200. I do have copies of the regulations back on the table there. I have a full copy of the regulations. If you would like to take a copy, please do.

If you have access to a computer, I also

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have a website that you can actually go and at your leisure pull up the regulations. One has two pages; the other one has about 30 or 40 pages.

If the decision is made to lease -- and that's the pivot point here for this document -- if a decision is made is lease, then once a lease is issued and then the company comes forward, to do anything, there will be a subsequent environmental review conducted. So the actual lease document itself conveys the right but not the right to access the land. It gives them the right to access the geothermal resource but only after environmental reviews have been done.

Here's just a laundry list, and I'll step out of the way here. These are some of what will be addressed in the EIS. As I already mentioned, the National Environmental Policy Act of 1969. That's basically the umbrella document that we are operating under. We've got the National Historic Preservation Act of 1966, Endangered Species Act of 1973, the National Energy Policy Act of 2001 under previous administration.

I'd like to make a note of the Energy Policy Act of 2005. That Act created a new set of regulations that addressed geothermal, and those are

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the regulations I have on the table at the back there. So that Energy Policy Act also allowed for the nomination of lands, a variety of things.

The other important thing that's driving this is that we do have three applications that are pending. On the map here there's three modifications that were filed back in 2002. And that is the driving force for this document, because in the Policy Act of 2005 it says, BLM, for your backlogged applications of geothermal, you must basically process 90 percent of those by 2010. And we're approaching it, so the driving force for this project basically are the three applications that are pending.

We also included a larger area outside just because, in case there is a resource in that area, we'd want to sweep out the rest of the resource, just so we could address it under one document as opposed to piecemealing it under several documents, which is not appropriate under NEPA.

So again applications in 2002, Energy Policy Act of 2005. Money is coming in as a result of variety of issues of Congress, and we're moving ahead with this document. And of course, the Geothermal Steam Act of 1970, that's what covers the regulations. That's what gives the authority for the Department of

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the Interior and the Bureau of Land Management, whom we work for, the authority to lease.

Just talking again, the size of the entire project area covers a little bit more than 24,000 acres. Of that a little over 22,000 are public lands. We do have some State lands involved. That one State section, 640 acres, currently is leased. The California State Lands Commission has commissioned a lease to a company. They have taken no action on that at this time. And there's also about 1220 acres of private land that we don't have any authority over. Again I mentioned the three pending applications covering about 4400 acres of the 22,000 acres that we have.

Project map. We won't go any detail here. That map is also on the back table, if you'd like a copy of that. It's nicely colored, and on the back of that map is the legal descriptions of all the parcels.

Purpose and need. I'm going to let John. John, would you like to address that.

MR. DALTON: Or would you?

MR. STRAND: Sure. Yeah. Like Sean said, the purpose is really to determine whether or not the area will be open to geothermal lease. The entire 20,000 acres, as well as the three applications that the BLM has received, those were non-competitive leases that they've received those applications. The decision within this document, the proposed action will be to approve those applications and open up the entire area to geothermal leasing. Once that happens, then those individual projects would go through their own separate NEPA analysis, which is what we're doing here today. Yeah.

RICHARD CERVANTES: Would you give us an idea, orientate the map to some landmark or something so that we could kind of have an idea of where it is.

MR. STRAND: Yeah. You know what? I've got another.

MS. CADAVONA: This is a little better.

MR. STRAND: I'm trying to think of a spot on here. There's Little Lake. It's just, I believe, off the map, just south of this southern border of the map. That doesn't really help too much. This line here going through is the highway. You see this vertical line. There's also some power lines that are parallel here.

MR. HAGERTY: Coso Junction, if that's familiar, there's a rest stop there and a Chevron gas station.

MR. CERVANTES: Okay. So it's north of

Coso Junction?

MR. STRAND: Correct, yeah.

MR. HAGERTY: There's a rest stop up over here.

MR. STRAND: Yeah. The Haiwee Reservoir is up in this land here. Little Lake is off the map. Coso Junction, right there. And so he's talking about the Coso geothermal areas. Those are right over in this area here by China Lake there. Most of those roads lead to that area.

So geothermal, in general, is going to do a couple of other things. Of course, the State of California has renewable portfolio goals. That was just in the news again last week with the governor signing into laws these renewable portfolio goals. So much percentage that the utilities of the state needs to meet in their overall mix by 2010. So for opening up additional areas to more renewable resources, geothermal is a great one that allows utilities to tap into the developers' projects and bring that geothermal and that renewable energy load to the load centers, Los Angeles, San Diego, wherever it may be.

And it also implements, like Sean mentioned, too, the energy policies from the Bush administration that were set in place 2001 and then

the actual Energy Act that came out in 2005.

So that's the purpose and need for the project, and I kind of skipped ahead here. I was talking about the proposed action, as well, here. But the proposed action would be to, again, open those entire areas, open up to geothermal leasing the entire 22,000 acres, approve the applications on the three geothermal projects. It wouldn't approve the projects; it would just approve the applications. And there would be an amendment to the California Desert Conservation Plan, as well.

And then also according to NEPA, we would look at alternatives to the proposed action, and we have two. We've got a no action, and we've got a second alternative. And John, do you want to explain the no action one.

MR. DALTON: Yeah. The no action basically would be consistent with our Land Use Plan. So I won't go into great detail on that. So we have the no action. We're most likely going to have to lease only those pending lease applications, lease all of the lands to geothermal exploration or close the lands to geothermal exploration. So again an amendment to the California Desert Conservation Plan, so that is our proposed action. The no action, which

is a requirement through NEPA, will be to be -- nothing would change. It would be consistent with our current Land Use Plan.

And like I said, we hope to develop more alternatives, especially through the comments. We hope to get more and be able to analyze the comments through this process.

MR. STRAND: Okay. And so that's a good lead into what we're doing here tonight, which is scoping. And scoping is just a way for us to hear public comments. It's not just public but also agency comments, elected officials' comments on the project itself. And like John said, it does a couple of things. It will help shape the Environmental Impact Statement, the EIS that we're setting off to write. Right now we're getting ready to start those environmental studies. And that will package in the alternatives that we have listed up here tonight, the proposed action plus the alternatives here.

If we hear comments about other alternatives that we should, perhaps, address in the EIS, we will consider those, and those will be addressed in the document. So all of your scoping comments that you give to us tonight between now and November 9th would be addressed in some way in the

Environmental Impact Statement, again, tonight, e-mail, written letters, however, you may send those in.

And so looking at the timeline of the project, the calendar here, we're just really at the beginning stages of the project, of the EIS, scoping. That's us here tonight, and that will continue for another few weeks. We've got several more meetings planned this week and one next week, and then that leads us right into developing what we consider a Draft Environmental Impact Statement. And this is all NEPA, National Environmental Policy Act, language, which spells out an EIS, when an EIS needs to be prepared, what should be included in an EIS. So we're really at the beginning stages of that. There's several more opportunities for public comment.

STEVE MC LAUGHLIN: Can I ask a question?

MR. STRAND: Sure.

STEVE MC LAUGHLIN: My name is Steve McLaughlin. What exactly is the project?

MR. STRAND: The project. "Project" is not the best word, really, for it, because we're not necessarily proposing to build anything with this, you know, in the normal sense of what you consider a

project. But in this case the project is -- or the actions, really -- the Federal action, really, on this is to open up this entire area, this 22,000 acres that's within this boundary, open that up to accepting geothermal lease applications.

So if a developer wants to set up a geothermal power plant within those boundaries, what this process will do, if the proposed action is selected, it would accept that application. It would open it to geothermal leasing. And once that be application is accepted, then that project would undergo its own environmental review and a separate approval process.

But this is really just to amend the Area Plan to set aside this area to accept geothermal applications. It would also approve the three applications that we've already received in this area. That's what these three are.

STEVE MC LAUGHLIN: Thank you.

MR. STRAND: So that's what the action of this would approve.

Yeah. You had one question. Could you say your name.

KATHY GOSS: Kathy Goss. I live in Darwin. I'm sorry. I apologize for getting here

late. I just heard about the meeting. I thought it started at six.

Have you provided us with a description of the geothermal resources that you are talking about here, what's there, what's known to be there and also whether you plan to inject cold water into that area as is being done at the Coso plant and what the consequences of that might be?

MR. STRAND: Okay. Can I do one thing? Can I just hold your question for just another five minutes, and if you have -- do you have a speaker card? What we're asking people to do is to fill out a speaker card. Another two or three minutes, I'll call on you. That's a great question. We'll be happy to address it. In a couple minutes we'll get to those very specific questions. Thank you.

Let me just finish this off. I've got one more slide after this, and we'll be done. Then we'll get into the good stuff, the questions.

So Draft Impact Statement, that will be developed over the winter, 2009 into early winter, 2010. It is projected to be available spring, 2010, so the next, you know, April, May timeframe it will be ready. And there will be notices that will go out that will say it's available for public review.

During that public review period, that's another chance for you guys to participate, to review it, to give comments back to us on the document itself, some very specific questions that, you know, you're talking about, the environmental review that was done on the project, the alternatives that were addressed on the project, whatever you want to address.

There will also be another meeting, probably something very similar to this, that you can attend, and again notices will go out on those. You can attend those and give comments on the draft itself. Part of that draft document, you mentioned that we're going to amend the Area Plan, that California Desert Conservation Area Plan. That Plan amendment will be attached to that document, included within that document.

After the public comment period we'll issue out a Final Environmental Impact Statement, and the Final Environmental Impact Statement will include any changes that were made to the Draft Impact Statement that you'll have a chance to review, and then it will also have the public comments received during the public period on the draft and then responses to those comments.

So that's really -- the meat of the final

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is really the comments and the responses to the comments and then any particular changes that were made to the document itself.

And then after that there will be a decision made on the project, and we're expecting that all to occur in 2010. So late 2010 we should expect a Record of Decision, or a ROD, it is referred to, and that will also refer to that proposed Plan amendment.

So again there's lots of ways to be a part of this process. We hope you want to be part of the process. There's e-mail. There's a physical address you can send a letter to. There's website set up; we'll post project updates on that. We'll also post the project documents on that website as well.

So thanks, you guys. That's all we had planned for the presentation. We can jump into any specific comments you want to ask. If you guys want to hand me your speaker cards, I'll take those, and I'll just call you up as I grab them here just randomly. Any more? Okay. Did you have any more comments?

RICHARD CERVANTES: Yeah. I had some questions. I've been involved with geothermal for a long, long time, and being a County Supervisor going on six years, have toured the plant. And I understand

the basic workings of it. I'm totally familiar with the mechanical engineering part in that in my business career, my company -- we made central plants. We built central plants throughout California. So I understand that process.

My question that I have is that there have been other permits, I believe, issued. One that I was involved with was Deep Rose. I don't know if you guys remember that one.

MR. HAGERTY: Yes.

RICHARD CERVANTES: Went up and toured the site on Deep Rose, and I don't think it ever went anywhere. One of the questions that I have that I would like to ask is, are prospective developers required to prove financial responsibility? In other words are they adequately capitalized to do the project of which they want to do? Or can anybody, you know, take out a lease, anybody that can pay the fees to get a lease? So that was one question that I had to ask.

The other question involves the de-aquifering of Rose Valley. It's been -- we've had a lot of controversy on that, and you know, there is water -- whenever you run condensers, you have to have make up water to the condensers because they are

notorious for evaporating water. And so the condensing process, it cools liquid back for reinjection, takes quite a bit of water.

So the aquifer -- can the aquifer support more geothermal plants in that area? So that's a question that I have. That's a technical question that only the geologists and hydrogeologists would be able to answer. I don't know.

So but basically the other question I had is, would it be possible for the Tribe to put in a plant, to obtain a lease and then through a subcontractor put in a geothermal plant? All of the plants that we're talking about are under 50-megawatt plants?

MR. HAGERTY: Yes.

RICHARD CERVANTES: They're all under 50 megawatts? Well, you know, Coso plant is 250 megawatts. You know, that's a big -- one of the biggest plants in the state.

And so, I had another question, too. I wanted to ask, does a developer have to have a buyer of his product before he can go ahead and develop? In other words does he have to have a utility along the line that's going to say, yeah, we'll buy all your capacity? I tried to find that out, but utilities

wouldn't tell me because they said it was privileged information. So they wouldn't tell me what they would pay or if they would buy it or anything about it, you know. It was proprietary information, according to them. So that's another question that you might come up with an answer for at some point in time.

MR. STRAND: Okay.

RICHARD CERVANTES: That's basically what I had. The County of Inyo is very interested in the development of geothermal energy and alternative energy of, you know, photovoltaic and solar towers and all of the new technologies coming out when we have some locations that could possibly be good locations. One is Dry Lake. There is also a possibility of utilizing part of that for solar collecting.

Geothermal, it works night and day. With solar, its location is critical, you know. It can't be in the shadow of the mountains. You've got to have the most solar hours on it that you can. It's very interesting. That's all I have.

MR. STRAND: Do you want to address it specifically, or shall we just --

MR. HAGERTY: I can.

MR. GUM: Sean, why don't you start, so much as we're capable.

MS. CADAVONA: Just so that you guys know -- I'm sorry, I'm Karen Cadavona. I'm just taking quick little notes, along with the court reporter, of topics.
MR. GUM: We're going to try and give you an answer here as best we can.
RICHARD CERVANTES: Some of them.
MR. HAGERTY: And some of the answers I don't know for sure. The capitalization of the company, if a lease is issued, before we will allow the company to go out on the land, we will bond the company. There's a requirement for the performance bond, and that's not the same as insuring that the company is capitalized to cover the project.
What we have done in other areas, especially up north, is that the scientist looking at a performance bond, which may be as minimal as $10,000 for a single lease, we have looked at reclamation bonds where, as the company increases the amount of activity out at the land, a couple of wells or whatever, we'll increase the bond to cover those activities in case the company decides that they no longer are interested and it leaves the public with basically the responsibility to plug and abandon those wells.

So to answer your question specifically, no, we do not address the capitalization. It often is difficult to do that. There's nothing in regulations that require us to basically have a threshold of what a company can or cannot do. But through reclamation bonding, we can require that before they take on a project and move forward, they must have that bonding in place. So I'm not sure if that's what you're looking for.
The offer for the use of the water, I don't have an answer for that. Clearly another project in Rose Valley, there was a lot of discussion that involved utilization of that water. There was a model proposed that will be used to see that the pumping, when it does occur, how that model will react.
Clearly the use of water in geothermal is important. There are situations where air cooling can be utilized. Back in Mammoth in Mono County, the three power plants there actually use air cooling. But air cooling is dependent upon ambient temperature, or ground temperature. If it's too warm, a company can't cool the exhaust of the turbine down low enough, and so it doesn't work. Thermodynamically it just won't work. So while it would be easy to say that air cooling is a possibility, the economics I don't know.

RICHARD CERVANTES: I've looked into the air-cooling part. Air-cooling condenser would work fine for half of the year, and then you could go with a water cool condenser for the other half of the year. It would require the additional expense of another condenser, where you'd have two condensers, one air cooled and one water cooled. Right now, you know, an air cooled would be working fine right now. It would be wonderful.
MR. GUM: Today.
RICHARD CERVANTES: We have below freezing temperatures at Coso and Rose Valley for quite a few months. We have 80-some -- 85 nights below freezing typically in the area. So that's beautiful for air cooling.
MR. HAGERTY: So that's a possibility. That wouldn't be addressed at a project level to determine what is a company proposing and then in terms of alternatives or mitigation what would be required. It might become a fine line as far as what the company can do an how much mitigation can be applied.
It's like I don't have a specific answer for how much water could be withdrawn from Rose Valley, how much more geothermal can support. That's

something I don't know for sure.
Can the Tribe apply for the a lease? Absolutely. The Tribe can nominate lands for geothermal. Certainly the Tribe could actually acquire their own lease. There are special provisions under our regulations that would allow a tribe and another municipality-type entities to acquire a lease, so that is an opportunity.
If the decision is made to lease here for lands that are outside of the three applications that are pending, covering about 4,000, acres the remaining 17,000 acres would be put up for competitive bid. So clearly the tribes could bid on that. But specifically if the tribes were interested in a direct use, where they're utilizing the hot water for heating, actually a direct lease could be issued to the tribe.
I can talk more about that later. I didn't want to go into too much detail because I'm afraid I'm going to confuse myself. But I can talk more about that.
RICHARD CERVANTES: Maybe if you could give us a contact, I work with the Tribe very closely. I'm on the fire safety council, Paiute-Shoshone Tribe, and currently we're working on a project to build a

firebreak completely around the line with --
THE REPORTER: Pardon me.
KATHY GOSS: With stimulus funds.
MR. HAGERTY: I will be the contact. I will gladly give my card, and at your convenience I'll be more than happy to go into details as far as acquiring a lease. But that certainly is something the Tribe could do.
Does a lessee need to have a buyer for the prior development? No, they don't. They don't require that, but usually the company will have a power sales agreement with utility, because that's where the money is going to come from. Without that power purchase agreement, a company will probably have a very difficult time obtaining funding, obtaining a loan from the bank to build a project because, if they can't sell the power, they're not going to make any money.
RICHARD CERVANTES: That's a critical issue. It's my understanding -- and I may be wrong -- that the City of Los Angeles is not interested in purchasing power.
MR. HAGERTY: Perhaps not.
RICHARD CERVANTES: They have their own, and they'll give you credit for any energy that you

generate for your own use, but as far as purchasing bulk power, they're not interested in doing that. PG & E is, and Southern California Edison is. I attended the meetings down in -- where was it? -- Victorville, and they had representatives there, and they were making agreements with various people, Solar One, solar people there.
MR. HAGERTY: All the power being generated at Coso is being sold to the Southern California Edison. All the power being generated up in the Mammoth Lakes area is also being sold to Edison. In fact, a lot of power proposed to be generated in Nevada will also be sold to Southern California Edison. So SCE is quite a purchaser of renewable energy power.
That was it, I think. Was there another question?
RICHARD CERVANTES: The other is just an observation. We had a lieutenant colonel come before the board from Nellis Air Force Base, and they have their complete solar system for the base, and it's a possibility I'm going to meet with the base commander for the Naval Weapons Station at China Lake. It may be going that way, where they want to have the redundancy of alternate energy on our military bases

and especially those that are located in the southwest, where they have available a lot of solar days. So maybe you might want to have their own geothermal plant.
MR. HAGERTY: Part of the proposal at Coso, the Navy One Power Plant, which is made up of three turbines, three 30-megawatt turbines, the first turbine is actually dedicated to the Navy. The power is sold to Southern California Edison, but the agreement between the Navy, the contractor, Terra-Gen and Edison is that, should Edison's power go down, the first turbine there -- it may be one uniform one -- would be directed to go into the base. The base has a requirement of about 27 megawatts. That turbine would more than cover the base.
This is a side note, though. Apparently some time ago when Edison did go down and the relays were supposed to kick in to provide power to the base, something went wrong, and the base went down, too. So anyway, all the best things sometimes don't work out well.
MR. GUM: Part of the withdrawal orders on the Naval Air Warfare Station, as well as Edwards Air Force Base, say that, so much as they can, they are encouraged to become energy independent, supply

their own needs. And that's why you're seeing some of these major solar applications as you're seeing at Nellis. There's also one interior to Edwards Air Force Base at this point.
MR. STRAND: Okay.
RICHARD CERVANTES: It's an exciting time.
MR. STRAND: Kathy, do you want to ask us your question.
KATHY GOSS: Okay. I'm going to say a little bit more than I was going to say because my friend, Sam, here is more knowledgeable on some of these questions. But first of all, I'd like to ask how you notified the public about these meetings, because I just heard about it today and not through public noticing. So I wondered how you made the public aware that you were holding these meetings.
MR. DALTON: Yes. We did it through the news releases, BLM news releases, which went through our entire database that consists of 5,500 names and addresses of public, elected officials, the media, tribal members. It's quite a large database. It's a consistent database that we use for all of our projects. It also was posted in the Federal Register Notice, which was Friday, September the 11th.

KATHY GOSS: Okay. This date was listed in there?

MR. DALTON: Yes.

KATHY GOSS: Thank you. And then I just wondered if you had a formal description of the geothermal resources that are known in the project area that you're considering, what kinds of surveys have been done, what's known about fault lines in that area and questions like that.

MR. HAGERTY: Good question. We don't know much about the area. What's prompting this are the three applications that have been pending since 2002. I do have a copy of what we put together. It's called reasonable foreseeable development scenario. It's our best guess as far as what might happen, what best type of resource might be there and how it might be developed. This is my only copy, but I can send you a copy of it.

Clearly there haven't been any wells drilled in this 22,000-acre area. Our estimates are based upon the Coso field itself. Deep Rose, the applicant on the three applications, has inferred that there's a resource down maybe 12,000 feet, maybe deeper. In talking to the Coso people, the Terra-Gen people, they don't necessarily agree. Whenever you

get a couple of geologists in the room, everybody is going to have their own opinions.

In terms of faults, no, we don't. It's just speculative, because there is no surface resource that's there. There's no mud pots. There's no thermal features of whatever. So because of the Energy Policy Act of 2005, which is directing us to address these applications, we're moving forward. But the answer is specifically no, we don't have any concrete evidence as far as what's at depth.

KATHY GOSS: And how extensively would the environmental impact -- I forget what level of review you're talking about for this, but for the environmental study, whatever it would be, to what extent would there be some assessment of potential consequences along unknown earthquake faults?

MR. HAGERTY: The reasonable foreseeable development scenario in which we addressed up to two 30-megawatt power plants, identify that each plant conceivably would have about 20, 22 wells drilled, 15 production, seven injection. As a result of that study, we would have to consider pretty much at the project stage, though, in terms of faulting in the area, what would happen with injection associated with that vaulting? Would we create additional seismicity?

So that's a very good question, and those types of studies have been done at the Geysers in Northern California.

That is something that's catching a lot of attention right now is, what happens when you take cold water or cooler water and inject it into rock that might be 400 degrees Fahrenheit, much like if you had very hot piece of glass and dropped it in the water, the glass is going to crack. And most likely, when you inject water at a temperature that's lower than rock temperature, the rock is going to fault, or going to crack. How far will it crack depends on the differential in temperature. But it's a very good question.

KATHY GOSS: Am I hearing now that this would not necessarily be part of the Draft EIS? It is something that will come down further down the line if specific projects were going to be implemented?

MR. HAGERTY: If the decision is made to lease the entire area or these applications or some mixture, if the project were to be proposed, that would be a specific issue that would have to be addressed at this time. At this level it's more of a large umbrella. Because we know so little about the resource, it's hard to develop mitigation to protect

what's out there because we don't know what the company might come in for.

We were hoping that with the State section, with the company that still is Deep Rose, they would drill a well in an area and give us some data that we could then work with. So far they've chosen not do that, so we're a little bit blind in this case.

MR. GUM: They have had their approval from the State of California to drill that year for three years, something of that nature, and they still haven't done it. We have issued them a right-of-way for them to access Section 16, as well as a right-of-way for a pipeline to deliver five acre-feet, I think it is, a year of water for their use during the drilling process. And their application was with a total depth of 20,000 feet.

RICHARD CERVANTES: That brings up a good question. Is a 30-megawatt plant economically viable when you're talking for each borehole that they drill $4 million, $4 million a borehole. So you're going to have 20 boreholes. Then that doesn't even build a plant. So, you know, the geothermal plant, Coso's plant, that's a billion-and-a-half-dollar investment.

MR. HAGERTY: That's a very good

question, sir, and that is a question that we don't have an answer for. But you're absolutely right. In fact, I would be -- I think that's a very conservative amount. I would say that, if you're drilling down to, say, 15- to 18,000 feet, I'm saying you're probably looking at closer maybe to $10- or $15 million for the well.

This is a question that we've had on our minds, too. That's why we were hoping that for the State section that they would drill there just to determine -- they have a hypothesis that the resource is down around 18,000 feet. It's as good of a theory as anybody's. And, you know, until you actually drill into something like that, we don't know.

But clearly those wells would be very expensive. And we feel that it's going to take, say, 15 wells for just the production side. Well, let's see. Fifteen times ten is $150 million on your drilling, and that's an awfully expensive amount.

So that's why, in terms of the capitalization, our reclamation bonding would be commensurate with how much money they're going to put into those wells, because we want to make sure -- if a decision is made to lease and a proposal is made to drill, if they decide they don't want to keep the

wells, we want to make sure the wells are plugged properly.

RICHARD CERVANTES: Just off the top of my head, it doesn't sound like it would be economically feasible in that the return on capital investment would be so far out that no one would want to take that big a risk. Usually they want a return of three years. They want a return capital.

MR. HAGERTY: Good point.

MR. STRAND: Thank you, Kathy and Richard.

Steven McLaughlin. Do you have a comment?

MR. MC LAUGHLIN: Yeah.

MR. STRAND: What's your last name?

MR. MC LAUGHLIN: Stephen McLaughlin. I live in Big Pine, and I'm associated with the Bristlecone Chapter of the California Native Plant Society. We were also involved in discussions about Coso Thermal Plant and their recent application to withdraw all of the annual recharge from the Rose Valley to keep their plant going. And we're mostly concerned about the water issues that may be associated with additional geothermal development in this area.

I didn't live here at the time when the

original Coso plants were evaluated, so I don't know if part of their project description was needing 5,000 acre-feet per year at some unspecified date in the future or not. But if that's going to be the case with any of these projects, I think that needs to be spelled out explicitly in the project description. And if a company is going to tell you they're not going to need it, then I think they would be forfeiting the right to future water appropriations.

If you are going to be appropriating water, I think it also needs to be covered in detail in the EIS where is that water going to come from, and what are the impacts of that water withdrawal? And in our opinion that was never adequately done in the case of Coso. When you withdraw these water sources, whether they're surface water or groundwater, you're going to have an impact on wetland habitat.

The hydrological model that you referred to for the Coso thing actually explicitly states that there will be a drawdown that will result in the drying up of Little Lake and possibly that it would be indicated that that could -- that as soon as 14 months there may be a significant drawdown in those monitoring wells to indicate that, over the life of the project, all those wetlands would be very

seriously impacted.

In the case of that project, no surveys were ever done of the wetland areas. We have no idea what is potentially going to be impacted, and I think that needs to be covered very explicitly in any EIS that's on future water development.

And again it's important to remind you that the entire annual recharge for Rose Valley has already been appropriated. County gave it to a Coso operating company. So even for expiration, if you're going to start handing out five acre-feet here, ten acre-feet here, you're just going to accelerate whatever negative impacts could occur down at Little Lake and associated wetlands. We need to know what those impacts are going to be and when they're likely to occur.

MR. GUM: Okay. I'd like to address, so much as I'm capable, your comment. My name is Linn Gum, L-i-n-n. G-u-m is my last name. I'm with BLM. The understanding that you express as to the hydrologic monitoring and mitigation plan for the Coso project is somewhat skewed. When you say that they're taking the entire recharge for the Rose Valley in the 5,000 acre-feet a year, first of all, they weren't authorized to take 5,000 acre-feet; they were authorized to take 3,000 acre-feet. And the recharge that you're referring to, remember, comes from this water model that deals with this hydrologic maintenance and monitoring plan.

The hydrologic model only considered precipitation that falls on Rose Valley that's 4500 feet in elevation and greater. It does not take into account all of the precipitation that falls on Rose Valley at 4500 feet in elevation and less. In the Rose Valley on an annual basis you get about six inches worth of rain; okay? Each acre has a half an acre-foot. I don't know how many hundreds of thousands of acres are totally encompassing the Rose Valley. But none of that water that falls on that portion of the valley was used in the water model to predict how much water may come into the valley or go out of the valley on an annual basis.

That was done for a very specific reason. That was done to make sure that the estimate was a conservative estimate when we considered water that was going to be put into the pipeline to go over to Coso and help recharge that reservoir.

We have data that goes back nearly 30 years that talks about certain conditions within the Rose Valley aquifer. Overall estimates show that there's

as much as five million acre-feet of water within the Rose Valley aquifer. Five thousand acre-feet versus the five million acre-feet that's available, you could do the math. It's minuscule in regards to how much annually actually is being used by that one particular operation.

Now, we also devised within the HMMP certain trigger levels that we would monitor, and we've got a whole series of monitoring wells throughout the valley between where Coso Hay Ranch is all the way down to Little Lake. And true, we identified under worst-case scenario conditions, if we pumped theoretically this amount and we only had this recharge of 4500-feet elevation and above, we could potentially at a certain rate or time hit that trigger mechanism that would say at Little Lake itself there may be noticeable change at the surface level of the lake.

What was determined to be within normal annual range was 10-percent reduction in the surface acres of the lake itself versus what could possibly be taken and not impact the lake significantly. Each of those trigger levels along those monitoring wells all down the valley assure that, if that is ever reached, pumping terminates. And that will make sure that that

cone of depression, as it travels down the valley over the years, will never result in a significant impact to the surface waters that are expressed at Little Lake. So we're not going to dry it up.

Now, right now we also have a program. Over the next two years, as we are monitoring those conditions in the pumpage of that water when it does begin there at Coso Hay Ranch. And we have times all through these next couple years -- and we'll continue to monitor after that -- where we will gather that data and refine, recalibrate and break that model so we get a greater around more accurate picture of what's occurring in the pumpage of that water.

STEVE MC LAUGHLIN: The 3,000 could be increased with 4800 feet.

MR. GUM: It could.

STEVE MC LAUGHLIN: And that is the entire end of the recharge. Granted, the model did not include rainfall in Rose Valley, but it also did not include transportation by plants in Rose Valley.

MR. GUM: It also did not include water that comes up from the subsurface. We believe that there are deeper waters that are contributed. For example, the waters that are present at Little Lake have a total dissolved solid content of about 1100

parts per million. The water that's picked up out of the discharge from Rose Valley to the Indian Wells Valley at the nearest measurement point to Little Lake, once you're into Indian Wells Valley, is only 200 parts per million.

There's clearly some kind of barrier or something that's going on that's keeping some of that recharge or discharge into the Rose Valley, and it's not making its way to the Indian Wells Valley.

So there's a number of factors that were not included in saying how much makeup water actually is coming into that aquifer that supports the Rose Valley on an annual basis. And again, we did that specifically to make it a conservative model. We don't want to damage that resource. We have no desire to.

STEVE MC LAUGHLIN: I hope the model is conservative. I am not a hydrologist, but I've talked to them, and I think that the yield figure of 30 percent that goes into that, isn't that considered to be a rather optimistic parameter? If that's wrong, if it's 20 percent or 10 percent, then those trigger points are going to be reached a lot quicker than 14 months.

MR. GUM: That's why we have monthly

monitoring being done by Inyo County Department of Water.

STEVE MC LAUGHLIN: Well, I'm very hopeful that, if the hydrological mitigation and monitoring plan does show we're reaching the mitigation levels, that it will be implemented, but I disagree when you say it's assured because, as many times as I read through the EIR, I didn't see anything that actually required turning off of pumps.

MR. GUM: If ever we reach a trigger point, the very first option is shut down pumping, the very first thing. It's right in the HMMP.

So anyhow, we're kind of off base here as far as this present project that we're talking about, trying to just determine whether or not we should even lease these grounds. Certainly the water issues that you raise will be addressed within this document.

STEVEN MC LAUGHLIN: That's all we're asking.

MR. GUM: Absolutely.

MR. HAGERTY: In this document also, taking you one step further, again, I don't mean to repeat myself, but I will. If the decision is made to lease -- and that is a decision. We may not lease. But if a decision is made to lease and a project is

proposed, clearly, as you say, sir, if water is being proposed to be consumed, that's going to be a key issue.

MR. GUM: Absolutely.

MR. HAGERTY: And that's where mitigation in terms of maybe other alternative types of cooling may be required. You know, clearly our intent here is -- as Linn is saying, we don't want to damage that aquifer at all. And the model will bear out as far as hopefully what the Hay Ranch pumping will do. So if any company comes along with their lease and says they want to use so many acre-feet, that is going to be something that is going to be very carefully scrutinized --

MR. GUM: Absolutely.

MR. HAGERTY: -- to the point it could reach where we will deny the project because the water balance will not be there.

MR. STRAND: Again the specification will be at that very specific project level, not in this EIS.

STEVE MC LAUGHLIN: Right.

MR. STRAND: Okay. We've gone through the three speaker cards, so if we can now -- oh, you've got one. I'm sorry.

MR. GUM: Sam had one.

MR. STRAND: Okay. One more, and then after this -- we're scheduled to be here until 9:00. So as long as you guys want to hang out, we're happy to mix and mingle and answer questions one on one and grab some coffee or whatever. Sophia.

SOPHIA MERK: Thank you. I notice that the first Federal Register that came out 9-11-09, it has a deadline of this Friday as far as comments go. Considering the fact that you scheduled some meetings after deadline, I was wondering if you had extended the schedule, and is it located in the Federal Register?

MR. STRAND: It is. I'm sorry. It's not in the Federal Register, but we attached it to our information that you received at the door. I mentioned this earlier before you came, but we noticed that that was, you know, obviously not going to make it. We have a meeting after October 16. So we have extended to out November 9th.

SOPHIA MERK: November 9th?

MR. STRAND: That's right. That will be the end of the scoping.

SOPHIA MERK: Are you going to put that in the Federal Register?

MR. STRAND: We talked about that. What we're going to do is make a correction in the Federal Register. It's going to address, actually, the project area boundaries, which was a mistake in the Federal Register, as well. By the time this posting gets into Federal Register, that meeting will already occur, so we're not planning on addressing this specific November 9th date in the Federal Register, just the project area lands.

SOPHIA MERK: Okay. I have a couple more.

MR. STRAND: Okay.

SOPHIA MERK: The links on your Federal Register, they do not work, and I read through -- I tried to write to Mr. Bolton, I guess it was.

MR. GUM: Dalton?

SOPHIA MERK: Dalton.

MR. DALTON: It sounded close enough. I'm not going to volunteer.

SOPHIA MERK: I'm sorry. I sent an e-mail to you. You never responded, sir, so I was wondering, have you corrected that?

MR. DALTON: Well, let me back up. And I apologize. I've been on travel for the last two weeks, so if this is something you sent since then,

then I apologize. To answer your question in regards to the link itself, is that --

SOPHIA MERK: The links. There was three of them listed in the Federal Register. None of the three worked.

MR. DALTON: Well, we need to look into that, then, because that's something that between the district and the field office --

SOPHIA MERK: But I don't understand --

THE REPORTER: Wait. You need to let him finish talking. You're talking over him. Go ahead.

MR. DALTON: I'll try to work with the district office and the field office to correct those links, because we're both trying to take the lead on who's going to be managing this website.

SOPHIA MERK: Okay. I have a couple of more questions. The geology fracturing that is prominent up in the Geysers area -- and they're having earthquakes and whatever -- they haven't really measured everything. But what I was wondering is, instead of doing a mitigation after the fact to the companies, isn't there some way that you can build into this Plan amendment before the fact that it needs to be explored, it needs to be explored by USGS?

MR. HAGERTY: Part of the document here will be to take a look at the seismic activity, seismic history of the area to determine, what is the baseline? How much seismicity has occurred over time? Quite frankly we don't know what would occur by injecting water into this area.

Clearly at Coso there has been fracturing. There has been some seismicity. The thing with the Geysers, though, it is a different reservoir. There has been ongoing seismicity even before geo-development occurring up there. What would occur here, we don't know, but at least we will have a baseline from which to go.

If this resource is down as far as the proponent is claiming it is, at, say, 18,000 feet, just from a professional opinion, I would doubt that we would see much at the surface in terms of seismicity. If most of the seismicity within the Geysers is within, say, 3- to 7,000 feet, if these gentlemen want to drill down 18,000 feet, I don't think there would be much activity at the surface.

I'm just saying at the standpoint of what we know today. We don't know exactly if there's faulting in this area. We do know, of course, there's the Sierra thrust fault that basically allows for the

Eastern Sierras to move. How that might be involved, I don't know.

MR. GUM: We know in that area there's literally thousands of microtremors on an annual basis, things that you and I don't normally detect, you know, Level One and Level Two-type seismic events. And G.S. has been monitoring those for years and years and years, as has, I think, probably the Coso Geothermal Office there.

So we do have some knowledge of it. Major events -- you've lived in the area longer than I have, you know. There's been half a dozen major events since about 1991 or '92 up and down here that measured -- I guess the biggest one was 7.4 down at Landers, and we had a couple near here within that three-mile-deep zone, epicenters on the base that ranged in the five category. I don't think we have had anything over six and lots of them, thousands, in the two, one and less category.

SOPHIA MERK: Okay. Thank you. I have two more questions. I notice that in some of the documents I was able to download and get from the BLM office that the concerns for the Native Americans were going to be addressed, but I have something else that probably needs to be addressed, too, for the Native

Americans, and that's the access for the Native Americans.

I mean, you can say, "Okay. You can go in that area," but without access to that area, they really have a problem. So I would like to see that also addressed in the Plan amendment.

And then the final one is, if this does come in as a Plan amendment, would companies just have to do mitigation instead of a complete EIS?

MR. STRAND: No. In an individual project, once the application is approved, then that individual project would go through its own separate NEPA evaluation.

SOPHIA MERK: Thank you.

MR. STRAND: Scoping meetings, noticing, draft documents, final document, same thing.

MR. HAGERTY: I have a question, then. In terms of access for the Native Americans, are you referring to just this project area, because I know that there's an issue, of course, within the base but --

SOPHIA MERK: There is an issue on the base but for this area.

MR. HAGERTY: I'm not aware that there's any restrictions.

MR. GUM: The only restrictions we have in the area is maintaining your vehicular access to existing roads and designated trails through the system. And, as you would know from being in the area, there's not many of them out. There's Coso Gill Station Road and Pumice Mine Road, and then there's a road that goes to McCloud Flats, and that's it.

MR. HAGERTY: Are you asking for additional access?

SOPHIA MERK: No. I was just wondering if those were going to be left open even if this goes.

MR. GUM: Yes, absolutely.

SOPHIA MERK: Thank you.

MR. STRAND: Okay. Well, thank you all for coming. We really appreciate your time. We appreciate your questions and concerns and just patience with the process. Like I said, we'll be here a little while longer, and we'll just hang out. If you want to ask additional questions one on one, we'll be happy to do that.

If you can, there's also comment cards you can fill out and take with you. And you can leave them here with us tonight or mail them in. We'll accept it either way. Thank you guys.

MS. CADAVONA: I just have to clarify,

too, for the folks that have the Federal Notices as well as these comment forms. I know everyone said the links weren't working, but I know for sure that the links that I placed right here down below where it says "BLM.gov," it's not a project-specific website. It brings up all the documents and things that the Ridgecrest field office has, so that's where the information is going to be available at. And I know this is a functional link. And they also have for the Haiwee project a project-specific e-mail address. It's also on this little notice.

SOPHIA MERK: But it wasn't in the Federal Register?

MS. CADAVONA: No, it was not in the Federal Register.

SOPHIA MERK: Thank you.

MR. GUM: Thank you very much.

(The proceedings were concluded at 6:58 p.m.)

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REPORTER'S CERTIFICATE

I, DIANE CARVER MANN, a certified shorthand reporter, do hereby certify that the foregoing pages comprise a full, true and correct transcription of the proceedings had and the testimony taken at the hearing in the hereinbefore-entitled matter of the BLM Scoping Meeting for the Haiwee Geothermal Project.

Dated this 21st day of November 2009, at Chino, California.

DIANE CARVER MANN, CSR NO. 6008

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Certified Copy
Haiwee Geothermal Project

October 15, 2009

Bureau of Land Management Scoping Meeting - Ridgecrest, CA

Printed on: November 22, 2009

Job #: 68509DM

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BUREAU OF LAND MANAGEMENT

SCOPING MEETING

HAIWEE GEOTHERMAL PROJECT

REPORTER'S TRANSCRIPT OF PROCEEDINGS

LOCATION: Ridgecrest Parks and Recreation Dept.
Pinnacle Room
100 West California Avenue
Ridgecrest, CA 93555

DATE AND TIME: Thursday, October 15, 2009
5:44 p.m. to 7:02 p.m.

REPORTED BY: DIANE CARVER MANN, CSR
CSR NO. 6008

JOB NO.: 68509DM

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APPEARANCES

LINN GUM - Lands and Minerals Branch Chief
JOHN DALTON - Planning and Environmental Coordinator
SEAN HAGERTY - Geothermal Expert
MIKE STRAND - Project Manager, Power Engineers
KAREN CADAVONA - Public Involvement Coordinator

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RIDGECREST, CA THURSDAY, OCTOBER 15, 2009

PROCEEDINGS

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MR. GUM: Good evening. I feel like I'm one of those guys in the radio that's talking into the echo chamber. We anticipated having a few more folks here tonight, but since we don't, let's proceed.

My name is Linn Gum. I'm with the Bureau of Land Management here in Ridgecrest, California. I'm a supervisory geologist. Specifically I'm the branch chief of Lands and Minerals and an assistant field manager. The reason we're asking folks to come into the scoping meeting is that we have a Bureau of Land Management proposal to consider some acres up by the Coso area for leasing for geothermal exploration and development.

And with that, I'd like to introduce you to who's here with me to bring this presentation and answer your questions. First we have John Dalton. He is from the Moreno Valley office of the California Desert District. He's a planning environmental coordinator, and he's our project coordinator for this

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project. Next to him is Sean Hagerty. He's the geothermal program lead out of our Sacramento BLM State office. And the gentleman at the end is Mike Strand. Mike is with our third-party contractor, Power Engineers, and he is the program engineer that will assist us in developing this EIS. And last but certainly not least is Karen Cadavona. She's the lady in the rear who is the public information specialist with Power Engineers that helps us pull all this together.

With that, I'd like to turn this over to Mike.

MR. STRAND: So tonight, just to give you an idea of what we're going to be going through here, Sean is going to get up and go through a number of slides. He's going to be discussing geothermal resource, geothermal energy power plants just in general touching on what it is that we're looking at as far as an energy source. Then he's going to touch on a little bit about the project itself, a little bit of history, why we're here, why we're looking at this area for geothermal resourcing, and then I'll get up and talk a little bit more about the NEPA process and the scoping process that we're conducting right now.

So if you can, you guys, you could have

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grabbed one of these when you walked in, a speaker card. I'm going to ask you guys to just fill that out while we're giving this presentation.

This presentation is going to last about 15, 20 minutes. When we're done with this, I'll collect these cards, and I'll just call you up randomly. You can just stand up at your seat -- there's not a lot of us here tonight -- and just ask your question, give us your comment.

And, you know, like I said, I'm not going to keep you guys to a time limit by any means, but we'd like to get through it so everyone has a chance to speak. If we get to the end of the speaker cards, I'll ask if anyone has questions or comments. And we're free to stay as long as we need to to answer questions tonight.

One thing I would ask is that, if you can stand up, if you can address the court reporter we have tonight, state your name, speak clearly and slowly so she could get everything down verbatim for your comment and then our responses to your comment as appropriate.

Okay. Thanks, you guys. Does anybody need a speaker card right now before we get started, anyone? Can you give him one.

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MS. CADAVONA: Oh, yeah. Right here.
MR. STRAND: I've got him one.
MR. HAGERTY: Well, good evening. My name is Sean Hagerty. I'm the geothermal program lead in the BLM California State office in Sacramento. My position basically oversees the leasing and utilization of geothermal resources within the state on Federal Lands. So they have my card as saying I'm a geothermal expert. I'm far from that. I've been in the program for 29 years, but there's still -- a little higher?
AUDIENCE MEMBER: Can't hear you back here.
MR. HAGERTY: Let me speak up a little. I've been in the program for 29 years, and I started out in the El Centro office down in Imperial Valley. There was quite a bit of activity down there back in the early '80s and even more activity right now. So I have some background, but clearly I don't know it all, and if there are questions that come up tonight that I don't know, I'll quite frankly say I don't know, but I'll do my best to find out the answers for you.
What I'm going to do tonight is talk basically just very briefly over, what is geothermal? What is the resource? How do we find it? What do we

do with it when we do find it and then the laws that are involved with what applies to the leasing, what applies to the utilization of that resource. So it's all going to be real brief.
I'm not going to go into a lot of detail about the reservoir, so there's some experts in this room who will kind of smile because I'm just going to talk about cartoons and things like that. But I'll be here after the meeting, and if you have any questions that you'd like to ask me of detail, I'm more than happy to at least address those questions. Again I might not know the answer, but I can get that answer for you.
Let's start out with geothermal energy. What is geothermal energy? We talk about the heat of the earth, hot rock, hot rock at depth, how far down? Maybe 5,000 feet, maybe 10,000 feet, maybe even deeper. It's a combination of both having hot rock and then water in that rock, because it's the water in the rock that actually conveys the energy to the surface.
And when we see the hot water coming to the surface, we normally call it, like, a fumarole or a geyser or mud pot or something you'd see at Yellowstone or some other places, hot springs on the

Sierras. So anyway, that's a normal way of convecting that energy to the surface.
The other way to get it is to drill for it, taking a -- not a water well drilling operation because that's too small. You're drilling down to well below a thousand feet, maybe 5,000 feet. So drilling rigs will take you down maybe a mile down into the ground. That's a big piece of equipment. But by drilling down into the earth, you can access where the hot rock is and hopefully where the water is too.
And again, by pulling that water up, the purpose, at least for what we see here in this project, is to produce electricity. The hot water can be used for other resources too: drying vegetables, raising fish. It's real popular in the Imperial Valley, raising tilapia. But for the resources up here, most likely it will be quite hot and more amenable towards producing electricity.
Benefits of geothermal. There's quite a few. It's a clean energy source. Basically there's no gases that come out of it. There is usually some carbon dioxide that comes up with the water but a very small percentage compared to, say, natural gas or coal or some other fuel source. It's reliable source of

energy. It's a source of energy that, unlike, say, solar and wind that's cyclic -- the solar works great when the sun is shining, and the wind power is great when the wind is blowing, but when the sun sets and the wind stops, that energy source stops as well. Now, that's not to say there's anything wrong with that energy source. It's just that it's a source that is cyclic.
Geothermal energy is a type of energy that basically, once you turn the power plant on, it stays on, and it produces energy throughout the life of the project. It does shut down for maintenance, things like that, but overall you turn it on, and it runs at 30 megawatts or whatever, and it stays on.
Geothermal power that is accessible locally. I mean, here's an energy source that we don't have to go overseas to find, we don't have to go outside of our country to find, in fact, we're hoping in this case that we don't even have to go outside of the county to find. And there already is a project nearby, Coso project, that is already producing geothermal energy, so it's likely that there's energy nearby in this project area as well.
Sustainable. Well, what is sustainable? If a resource is found, can it be produced for a long

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time? In most cases, yes. The heat of the rock will stay with the rock for a long, long --

AUDIENCE MEMBER: Sorry. You're being overridden by the gym class next door.

MR. HAGERTY: I want to make sure you can hear.

MR. STRAND: Do you want to use the microphone?

MR. HAGERTY: Yeah. Let me use the microphone.

Is this better?

AUDIENCE MEMBER: That's better. We can hear you.

MR. HAGERTY: Okay. I don't want to blow anybody out here. Let me use this, then.

So what we're talking about is sustained resource, a resource that can go on for a period of time. I will use again an example of the Geysers of Northern California about 70 miles north of the city of San Francisco. Their production has gone on for almost 40 years, and the temperature of the rock, the actual reservoir rock that they're extracting the water from, has only changed a few degrees. It's about 475 degrees Farenheit, and the temperature has only dropped a few degrees. So with sustainable, the

rock will still be hot.

Now, if you're pulling water from the resource and not injecting enough back in, that's another issue and certainly something that would need to be discussed. But as far as the heat source, the heat source is something that will be there for a long, long time. How long depends on how quickly we're extracting energy, but normally we're looking well in excess of 30 years, so a long, long process.

Okay. So in terms of energy development, what actually occurs? If we actually decide to lease, if a decision is made that we will lease a portion of this land or all of the land, what's going to happen on there? Well, we've developed a reasonable foreseeable development scenario based upon the best information we have right now. There's no wells that are in the area right now, so we don't know exactly what is the temperature of the resource, if it doesn't even exist.

We have some applications that have been applied back in 2002 that the applicants feel that there is a resource, and so that's the driving force. And I'll get into more of that a little bit later as far as the purpose and need.

But the issue being is that, if the leases

are issued and the company wants to access that resource and drill for it, what will first happen is that they'll drill at least one well. They'll drill it out there to determine, what is the depth of the resource?

Okay. So if they do discover a resource at depth and they produce it up and it turns out to be commercial -- in other words, there's enough fluid that comes up through the well and enough heat to warrant building a power plant -- then we've got a couple of different things that can go on.

Clearly, if the decision is made to lease and then a proposal is made to drill the resource, the drilling of that resource will also require another environmental review. The environmental review that we're going through right now is just to make the decision basically to lease or not to lease. Once that decision is made and if a decision is made to lease, then subsequent operations on that lease will also undergo a separate environmental review.

And that's important to remember because there's a lot of issues out there. Clearly water is one of them. Cultural resources is another. Visual is a whole slew of issues that will come into play. But for this demonstration for this example, let me

just say that we're moving on. They've drilled a well. They've found a resource. Now what are they going to do? Well, most likely they'll come in with a proposal to build a power plant.

Okay. With that power plant they'll also say how many wells they'll need to sustain the power plant. There will be production wells and injection wells. Also there will need to be access roads to get into where the power plant is going to be built, as well as where the wells are going to go.

There will be transmission lines because you need to get the power out of the area to sell it to a utility, and that's basically where they're going to make money, is selling that electricity. And then finally, as I said, there's utilization. That's where they turn the power plant on and it's now producing.

So we have identification of the resource by drilling down to the hot water and rock. We have a proposal coming in to build a power plant. I'll get into more detail on that but kind of conceptual. Then we have exploration, drilling, development and then, finally, utilization.

This is just a little cartoon, very, very simple as far as what we might expect in a perfect world as far as geothermal resource. Let me get over here. There's supposed to be a pointer on this thing. Oh, it's still here. Okay.

At the bottom here we've got a hot rock heat source. Those could be magma, could be liquid rock. Probably it's not liquid, but it's a very, very high-temperature rock. That rock is conveying heat upwards as it cools off. It's coming into this area here, where it's full of fractures.

In most situations we've got fractures that are coming in from the surface as well. We've got rainwater that percolates down into the fracture, hot rock on both sides here. Again this is a cartoon. This isn't how it really works, but it's close enough for this presentation.

Once the water is in the rock here, of course, as it gets hotter, it gets lighter, and it will normally come to the surface as a hot springs, a fumarole, a geyser. But in most cases there's some sort of restriction, some sort of barrier rock or cap rock. In most reservoirs because of the chemicals in the water -- like calcium carbonate, iron, other things -- the fractures that have allowed the water to come into the reservoir in the first place often get plugged up, just like your plumbing in the house. If you have well water, if you have to replace a pipe, I

mean, you'll find that there's some deposits that are in the pipe -- not necessarily bad, but it will eventually clog the pipe.

Okay. So in this case these cracks will normally see a level -- and then this darker material rock will become what we call a cap rock, sealing in the hot water, so it's like a steam kettle with a cap on, and the heat continues to come up and heat that water up.

What was I talking about earlier about exploration? Then what a company will do is that they'll drill down into that hot rock, accessing the hot water. The hot water will be brought to the surface. This type of power plant is called a binary plant.

I'll get into the different types of power plants, but for this purpose the water is brought up to the surface. It goes through a heat exchange, much like the radiator in your car. The water goes through the radiator, and there's another working fluid that picks up the heat. It's an isobutane or some other fluid that absorbs the heat, turns into a vapor, which turns the turbine, which turns the generator and turns it into electricity.

In this case the water is never allowed to

reach the atmosphere and never goes out in the open. I doesn't flash. It's cooled down because energy is taken out of it, and then they inject the water back into the reservoir but not necessarily the same depth. But it's important to inject the water back in there because they want to maintain reservoir pressure.

This is a quick schematic, and after this meeting if you have a question as to how this action works or geology issues, I will be more than happy to talk about them.

Okay. In this last part, you may have heard talk about a binary power plant. Well, there's three different types of power plants that we find. Any one of them could be used, depending on the type of resource that we find. The first one is, as I mentioned, that we've got a binary power plant. Binary means two, two fluids, binary, two. You've got the fluid that comes up from the rock. It's hot. They send that fluid through a heat exchanger, which absorbs the heat, and that heat is conveyed to another working fluid -- again, isobutanes, et cetera, propane and that sort of thing. That's what boils, turns into a vapor, turns the turbine, turns the generator, produces electricity. Then the water is ejected.

The second type that is commonly used is a

flash plant. The difference between a flash plant and a binary plant is that the primary issue here is that for the flash plant the water normally that comes up out of the well is over 330 degrees Fahrenheit. Now, you'd say, well, gee, why isn't it boiling? Well, the reason it isn't boiling is -- and you don't really want it boiling -- is because it's under pressure.

I used this example the last couple of nights, but think of an old-time pressure cooker, the kind my mom used to use. You cook vegetables in there, and the reason why it cooks faster is because, as the pressure increases in the pressure cooker, the boiling temperature of that water increases, as well. That's why pressure cookers are very dangerous, because, should a child open the pressure cooker while it's still cooking, much like taking a soda can and shaking it and popping it open and taking the cap off, suddenly you release that pressure, and the boiling point drops immediately. Well, if the water is at 250 degrees Farenheit and somebody is taking that top off, now you have got water that's been boiling immediately scalding. So you don't see pressure cookers anymore.

Same here in the flash plant. They want it to have it. They bring the water up, send it into a large vessel that's at atmospheric pressure. Then it

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boils into flashes of steam. The steam then turns the turbine, which turns the generator, which creates electricity.

So I kind repeat myself in terms of this turbine-generated electricity, but you see, it's just an energy source that's turning something that's producing electricity. It's the same in a coal plant, same in a nuclear power plant, just a different energy source that's turning that generator.

Finally a dry steam plant. These are not common. Luckily in California we're blessed to have one resource north of San Francisco called the Geysers, where we actually find dry heat. In most of the reservoirs throughout California and throughout the West, when you drill into the rock, you go down a mile or so, what you find is actually hot water, very, very hot water, 400, 500 degrees, 650 degrees Farenheit.

In the Geysers what they find is, it's just dry steam. Geologists believe that there still is a pool of water boiling way down in depth 13-, 15-, maybe 18,000 feet down. But so far they haven't found it. It's just dry steam, which makes it perfect because you don't have to convert it through anything. You don't have to send it through a big pot to get a

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flash. It already has a flash. So the only thing you need to do is, basically it turns the turbine that turns the generator that produces electricity.

And those plants with the Geysers are fairly good sized, somewhere upwards of 130 megawatts in size, so they're pretty good. But unfortunately there's only a few places in the world where there's a real commercial resource like that. One is at the Geysers. One is in Italy about 50 miles to the north, northwest of Rome.

So when we talk about leasing of Federal Lands, we consider the leasing action, this issue to lease or not to lease, to be a major Federal action on our part. Therefore, since it is a major Federal action, then that National Environmental Policy, NEPA, comes into play, and that's what this whole process is about, basically taking that action, the action of deciding to lease or not to lease, and analyzing it, analyzing it for what could happen if we lease. And it's a Federal action, so under NEPA we have to address it.

The specific regulations that deal with geothermal are Title 43 Code of Federal Regulations, Part 3200. I do have copies of the regulations back on the table. I also have a website that should work.

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So if you have access to a computer, you're more than welcome to take the full booklet of regulations. But if you don't want to have all that paper and want to save some paper, then the website will give you access to where those regulations are.

If a decision is made to lease and a lease is issued, then the lease conveys the right to drill for, explore, utilize the resource. But it doesn't convey the right that they can go out there right away. As I mentioned earlier, if they're going to do some exploration, that exploration is also going to have to undergo a NEPA review. If through that exploration they determine there is a commercial resource, then they come back in with a proposal for a power plant and the power plant will also undergo another NEPA review. So we're conveying the right to access the resource but not until the necessary NEPA review has been completed.

Here's just kind of a laundry list of some of the laws that are coming into play and will be addressed in this document. I already mentioned the National Environmental Policy Act of 1969. That's the document that triggers off our responsibility in terms of this document.

Also other factors that will come into play

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that will add to and supplement NEPA. One is the National Historic Preservation Act of 1966, addressing issues associated with cultural resources, Native American issues, a wide variety of issues here.

We also have the Endangered Species Act of 1973. What species are out there? Are they sensitive? Are they threatened? Are they in danger? Under this act we can find that out, and if this decision is made to lease, what could be the impact on those animals?

We have a couple of Energy Policy Acts that are involved here too, two under different administrations. Under the Bush administration we have got the Policy Act of 2001, which basically is encouraging the utilization of renewable energy, so it talked about gas and a lot about that, but it also encouraged the Federal government to pursue and allow access to Federal Lands for renewable energy.

The second Energy Policy Act of 2005 -- this is under the current administration, and it gave us greater incentive, basically. It said that by 2010 that the backlog of geothermal lease applications must be reduced by 90 percent. That's across the board through all Western United States. So part of the issue here, part of the driving force, is that in the study area we have three pending lease applications, and they're part of the backlog, and so our issue here is to address that backlog. I'll get into that a little bit more, but that's an important issue.

And, of course, lastly, the Geothermal Steam Act of 1970. That is the act that gives the authority to the Department of the Interior and to the Bureau of Land Management to issue geothermal leases in the first place. Some of you will say, well, why can't the Forest Service issue leases, or why can't another agency issue leases? Because only the Department of Interior under this NEPA act is authorized to issue leases.

Let me go back. Okay. One of the more important issues here is -- of course, this is all under the umbrella of the California Desert Conservation Plan. I need to talk about that. And also one act that's not on here, but some astute person the other night brought it up, the Federal Land Policy Management Act of 1976, which talks about coordination. That talks about addressing public lands and ensuring that resources are being used. So that's not on that list, but it's important.

Let's get specific. Let's get down to the brass facts, or let's boil this down here a little

bit, if I can use a little bit of a pun here. We're talking about the Haiwee Geothermal Lease Area. It covers about 24,000 acres, of which about 22,000 acres are public lands.

Let me stand right here so you can see. These might be easier to take a look at a little later on. It's too hard to see right now. But in essence we've got a little over 22,000 acres of Federal Lands, of which about 4,000 are currently encumbered by three geothermal lease applications. We have also have 640 acres, or a section, of State land. And that land is actually already leased through the State Lands Commission. And we also have about 1200 acres of private land, mostly in Rose Valley itself.

So for the private land we have no jurisdiction over, and on the State lands we have no jurisdiction over. The only thing that this document is going to address are the 22,000 acres, roughly, of Federal Lands, and that's where this comes into play under the Geothermal Steam Act. As I mentioned, pre-pending applications, about 4,400 acres have been pending out there since 2000.

Project area map. We've got two maps up here. This is kind of an aerial-type map for locations. Let me bring your attention to where I'm

pointing here. For those who are familiar with Coso Junction off of Highway 395, Coso Junction is approximately in this area right here. So the Little Lake riparian area is to the south just off the map. The South Highway Reservoir shows up here. 395 is running pretty much north-south, and then you have several transmission lines that are cutting across the area too. So the darker area to my right here, that's the China Lake Naval Weapons Center. You can see there's pretty much a boundary on the southeast side. There's a buffering here.

Purpose and need for the project. Again one of the key issues here is to determine whether to approve geothermal leases or not, whether we're going to have the land open to geothermal leasing or not. That's the critical issue because, later on, if we do decide to lease and a project is being proposed, then there will be other decisions: Should we approve the project? Should we modify it? Should we deny it? So that's a whole other set of issues with a lot of detail further down the road.

The other issue is basically two issues when it comes to leasing. Should we offer the three pending leasing applications? Should those be leased? Should we consider the other 18,000 acres out here for

leasing or maybe a mix of someplace in between? Maybe instead of 18,000 acres, maybe we should consider 10,000, maybe more, maybe less. So I'm just trying to get you to think that there's alternatives that will be coming into play here, and those alternatives will be based on issues coming up from this meeting as well as from the draft document.

We've got the California Desert Conservation Plan that this is a Plan amendment. So this document will amend the California Desert Plan, and that's important. There's been a lot of amendments to the Plan since 1980, and so this is an amendment going way back to the initial Plan back in 1980.

Again, the consideration of leasing here, two presidents' energy plans of 2001 and 2005. Then finally, if a decision is made to lease, then the issue here is that we're leasing. We're helping the State of California hopefully reach its renewable energy portfolio goal for 2010. It's currently at 20 percent. The Governor has said something over the last couple of years where in 2020 it's supposed to be bumped to 30 percent. So with renewable energy coming from this area, if we decide to lease and if a resource is found, it will go toward that goal.

I'm going to at this point turn it over to Mike, and again I'll be here for the rest of the evening. If you have any questions about geology, about leasing, I'd be more than happy to talk to you. With that, I'll give it to Mike.

MR. STRAND: Thanks, Sean.

AUDIENCE MEMBER: Do you have a volume knob on your microphone? We're competing with the dance.

MR. STRAND: I don't see a volume on here. Is it okay? Can you hear me?

AUDIENCE MEMBER: A little better, yeah.

MR. STRAND: Okay. Well, Sean has already really gone through everything that we need to know at this point. Let me just touch on a couple of items here. Then we'll open it up to comment and questions. He talked about the proposed action, and that is to amend the California Desert Plan. And again that's a decision that's either to lease or not to lease this project area over to geothermal resources.

One of the alternatives to that is a no action. Under the no action, there would be no Plan amendment and the lands within the project area will remain the same, will be managed the same as they are

right now within the current Plan. There will be no Plan amendment.

Other alternatives that we have, like Sean mentioned, is a combination of approving those applications that we already have plus some combination of the 22,000 acres. And we're here for scoping. We're here to hear your guys' comments, and through the scoping process there may be additional alternatives that could be developed.

NEPA scoping. That's what we're doing right now. NEPA requires scoping. We're conducting these scoping meetings. We're collecting your comments here tonight, and you can also fill out the form. You can mail it in to us. There's an e-mail address. You can send comments in through e-mail, so there's lots of ways to participate in scoping.

As far as the project timeline is concerned for developing the EIS, we're right here in this October section here of scoping. The Draft Environmental Impact Statement and Draft Plan Amendment will be completed this winter, early winter, 2010. And then once that's out and completed, it will go out to the public for review. It will be on the websites. There will be notices out to where you can view that, where you can get copies of it if you need

a copy of it. You can review that. There will be a public review period. You can submit comments on the draft, and during that time period we'll also conduct some public meetings.

Once we're through that, the Final EIS -- the bulk of the Final EIS is really just your comments and the responses from the Agency regarding your comments. There may also be changes or clarifications in the draft itself. That will all be published as a Final EIS, and that Final EIS will then go to the BLM decision makers. They will make a decision on the project, and that's when we'll issue the Record of Decision, what we commonly refer to as a ROD. And if there's a Plan Amendment, then that will be the Final Plan Amendment with that ROD.

Again I just appreciate you being part of the process. I appreciate you guys being here tonight. Let me mention one thing. The Notice of Intent had a date for scoping to be completed by October 16th. That's tomorrow. That's not going to happen, so we're extending that out to November 9th. So we encourage you guys to have your comments in to us by November 9th so it can be clear in the EIS.

However scoping is an open process throughout the development of the EIS, so we will take

your comments past November 9th, as well, but at some point there will be a cutoff because we've got to get the thing printed and put out to you guys for review. So we just encourage you guys to get it in as soon as possible, your scoping comments.

So again thank you guys for being here, and if you guys could just hand me your speaker cards, then I'll collect those, and we'll continue. I think I'll hand you guys another microphone. That way the court reporter can hear us.

MS. CADAVONA: Hello. The first one, Chris Ellis.

CHRIS ELLIS: Good evening. I just had a question, and I know we're early in the process. And this is related to a decision whether or not you're going to lease. My question is probably a little bit further down the road. How does a decision to lease and ultimately make a decision to produce or attempt to produce or explore for geothermal power -- how is the BLM going to make decisions relative to groundwater usage? And do these leases include a provision for groundwater associated with potential drilling and then potential future recharge if a geothermal reservoir is found?

MR. HAGERTY: Yeah. Good question,

Chris. And this came up actually in the first meeting we had in Lone Pine.

The decision here, besides the Plan Amendment, is just to decide to lease or not to lease. In terms of the water budget for the Rose Valley and getting into the issues there, while this document will talk about the need for addressing water, it will talk about the model that was developed for the Hay Ranch pipeline. We're not going to get into an issue of how much water could be used or may be used or whatever until after that decision to lease is made.

At that point the project comes in to drill, and they plan to use -- let's say they need to use an acre foot of water for the drilling. It will be at that point that we'll address, where is the water going to come from? Are we planning to take from Rose Valley or someplace else? If it's coming from Rose Valley, then these are the consequences.

If we take it a step further, if we find it's a commercial resource, then the same thing will apply with even more scrutiny. Obviously a lot of issues, a lot of concerns. So we want to make sure they're addressed, but at this level it's too premature because there's a variety of issues that come into play.

Dry cooling can be a factor. Will it be a flash plant, a binary plant? Will they find water someplace else? There's a multiple of issues we could address, but we'll be shooting in the dark. So all we're going to address at this point is the decision to lease or not to lease.

But clearly the applicants that already have their hands in the fire, they know water is going to be a big issue.

MR. STRAND: Dan Burnett.

DAN BURNETT: Yeah. Actually I don't have any comment.

MR. STRAND: Okay. Tom Budlong.

TOM BUDLONG: Yeah. I don't have any comments. I have questions. Mike, can you explain who you are and where you're from. I'm confused.

MR. STRAND: Absolutely. Good question. I had it last night too. Why are we here? Someone asked me last night. I'm with Power Engineers. I'm an environmental project manager with Power Engineers, working in the Environmental Division, and we've been hired by the BLM to assist them in developing and writing this Environmental Impact Statement, so we're working as an extension of the BLM staff.

TOM BUDLONG: Okay. Thanks. If you

actually get together on making a plant, what's the typical life of a plant like this?

MR. HAGERTY: Normally, sir, they would be built with the expectation of producing at least for 30 years. That's in terms of financing. But normally the plant would probably go a long way, way beyond 30 years. Some of the projects I talked about -- the Geysers, for example -- some of the operations up there have gone beyond 30 years. So it's more of an issue of the resource. What is the life of the resource?

Management can go way beyond 30 years, but in terms of mechanical issues, the plant will keep running. But just like your house, where you get a loan for 30 years, these power plants normally have a loan for 30 years. So after it's all paid off, it's all written off, but there's no reason to shut them down. They will continue. With the resources there, they'll continue.

TOM BUDLONG: The resource is basically infinite; it could be on forever?

MR. HAGERTY: It could. There's factors that become involved. If you're actually expecting energy faster than it's being replaced within the rocks, you may cool the rocks down. Also the water

issue we touched on, if you pulled out too much water, it's the water that's sustaining the energy from the hot rock to the surface. So you want to make sure you're not extracting the water and basically taking it out so that you're not drying the reservoir. But that's another series of issues as well.

TOM BUDLONG: Somebody said there was an applicant in 2002?

MR. HAGERTY: Yes, sir.

TOM BUDLONG: Who was that, and is that applicant still around?

MR. HAGERTY: The applicant is still around. There was three applications for leasing that were filed, I think, back in February of 2002. Mr. Metcalf, or Terry Metcalf, is one of the individuals. He's associated with a group called Deep Rose, and I was kind of hoping that somebody from Deep Rose would be here tonight. However I don't think he is. I don't think there's anybody in the audience from Deep Rose, but they are still around, yes.

TOM BUDLONG: And all three are Metcalf, are they?

MR. HAGERTY: They are associated with Mr. Metcalf. They co-owned the group with the name of Deep Rose, but Mr. Metcalf actually has one of the leases under his name, and the other two lease applications are under Maxx, M-a-x-x, Incorporated, but I believe they're all associated under a Deep Rose group.

TOM BUDLONG: How deep do you think the initial well will go? We talked about Deep Rose before, and they were talking about going down a long ways.

MR. HAGERTY: Yes, sir. They have told us that they believe the resource is down somewhere approximately 15- to 18,000 feet down. In my own opinion, I mean, that's a tremendous amount of depth. That's a tremendous amount of cost. All I could say is that it will be a very costly endeavor to go that far down.

TOM BUDLONG: And that's what you're talking about with this initial process that, before you decide whether to amend the Plan or not, is going down that deep?

MR. HAGERTY: If the decision is made to lease, if we issue the leases, that will be up to the lessee to come forward with a project to explore. If they do plan to drill at that depth, we'll scrutinize it as far as casing and types of metals, surface area, things like that. But it will be very costly on their

part to drill at that depth if that is the target.

TOM BUDLONG: I've heard rumors that there are a lot of cultural resources in this area. Anything about that?

MR. HAGERTY: I'm going to defer to Linn Gum on this one.

MR. GUM: There are a lot of cultural resources in this area.

TOM BUDLONG: Answered that question. The answer was "yes." You could have just said "yes."

MR. GUM: Yes.

TOM BUDLONG: Yeah. Why 20,000 acres instead of just the initial part that the three lease applications? Why such a big area?

MR. DALTON: The reason for this is that we're going to process these three applications. If indeed we do process these three applications, we may get requests for additional with the competitive lease applications, so we decided to include the 22,000 acres potentially for geothermal development.

TOM BUDLONG: Do you think other applicants could show up and want to get the same area?

MR. HAGERTY: Just to kind of go a little bit further than what John said, when these

applications were filed back in 2002, the current regulations at that time said that for areas that are outside of a known geothermal resource area, or KGRA, there is a KGRA area called Coso KGRA. You could apply for lands outside of the KGRA without applications, and that's what these gentlemen did here with the three applications. They couldn't apply for lands inside the KGRA because that's competitive. So while they were much very much interested in applying and they did get a lease, Section 16 -- they did get a lease from the State Lands Commission. We felt that instead of piecemealing this, instead of addressing the three applications, since they were interested beyond the KGRA, we felt would be good to at least address the larger area of the 18,000 acres beyond the 4,000 acres here.

As it is right now under the 2005 recommendation, all this will now be leased competitive. We have done away with the issue of KGRA. We no longer have non-competitive applications. Much like our boiling gas program, all of the lands now have become competitive, so if somebody were to nominate the land even outside of our boundary area, then we now all become competitive.

TOM BUDLONG: Thanks. Let's see. You

talked about the 640 State is already leased to Deep Rose?

MR. HAGERTY: Yes, sir.

TOM BUDLONG: All right. That's all I have right now.

MR. HAGERTY: We're doing great.

MR. STRAND: Sophia -- Sophia Merk.

SOPHIA MERK: My name is Sophia Merk, NPL News. Thank you. In the 1872, a little while ago, we had a 7.4 earthquake in Lone Pine, California, which is not that far up the road from Deep Rose, this area. What I was wondering about, there's been recent reports on increased seismic activities in Europe and Northern California. Some say it is the result of fracturing geothermal development projects.

And I will follow up further with a letter, but I was wondering if -- would you seriously consider analyzing this issue in this part, not after the 90 days when we go into the other part, but during this part, if you will really look at the fracturing at this point.

And I was also wondering, you say that you're going to have other alternatives in this part, but I haven't seen anything in writing so far. And it's just verbatim. And since I know that things are

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flying pretty fast and things have changed since the first meeting, I know now that you've incorporated other public -- other scoping meetings with the Timbisha, and I just wonder if maybe you shouldn't start with another Federal Register Notice and put it out there for the full 90-day review.

Since this is a land use, it's going to be an amendment. It's not just an EIS. It's an amendment. So I was wondering if you could really seriously look at the fracturing part of this.

I also was wondering, there's some land that's being designated under WEMO for disposal. Is any of this in that area, Linn?

MR. GUM: Yeah. The lands that were under WEMO that were just entered for disposal were at the northern end of Haiwee not subject to this area.

SOPHIA MERK: Thank you. I wasn't sure exactly where it was. It wasn't real close.

MR. GUM: Up by the North Haiwee Dam in the section that is immediately adjacent to it, is where that land is.

SOPHIA MERK: Okay. And I just have one more thing that I would like to add to my comments, and that is, what other tribes have you contacted besides the Timbisha?

MR. GUM: I'd like to call Don Storm. He's our archeologist, and he can talk about exactly which tribes will be contacted.

MS. MERK: Thank you.

MR. STORM: Thank you. I'm Don Storm, archeologist for BLM in Ridgecrest. And last week I sent out five formal private consultation letters to Timbisha Shoshone Tribe in Death Valley, for one. Four tribes in Owens Valley were in this: Lone Pine, Fort Independence, Paiute Tribe -- Big Pine Paiute Tribe and the Bishop Paiute Tribe. And there are still advisory letters that I'm going to be sending out to several of the federally unrecognized tribes in Kern County, Lake Isabella and Tehachapi probably next week regarding this.

The formal consultation went to the five recognized tribes, and we'll be following with other communications and correspondence letters to other Federally unrecognized Indian communities in Kern County.

SOPHIA MERK: Have you scheduled formal meetings with those tribes?

MR. STORM: Next Tuesday, the Timbisha, next Tuesday. That was scheduled not by me, but that's one of the four scoping meetings, and if other

tribes would like to have a presentation about the project, we will most likely -- management will probably schedule it with them.

SOPHIA MERK: And since they are public meetings, they will be open to the public also?

MR. STORM: That I don't know. These will be government-to-government consultation from the Federal government to the Indian tribe on their reservation, their property, and anything public would be through them, only if they -- you know, I presume that they would allow it. But that kind of a meeting, if they request it, would be government to government and not the general public.

SOPHIA MERK: Thank you, and that's all I have.

MR. STRAND: Jeff Aardahl.

JEFF AARDAHL: Good evening. I'm Jeff Aardahl. I represent Defenders of Wildlife. I'm from the Defenders of Wildlife office in Sacramento, California. My title is California Representative, and I have a number of questions similar to the way Tom Budlong began, and then I also have a few general comments, or I suppose you might label them issues or concerns I'd like to just briefly state. And then I will follow up when I return to my office with a

detailed written document for you.

But just to begin with some questions, could you identify where the boundary of the Coso KGRA is and let me know, going back to -- let's see, '80, '90 -- almost 20 -- 29 years now, were any leases issued in the KGRA for Coso that expired because of non-development or non-plan of development? Is part of this area here within that former Coso KGRA?

MR. HAGERTY: That is correct. The KGRA itself, the boundary came up to just to the east side of where the applications are pending right now. It also moved down to the south, came out to the west a little bit. A little nub came out and went back, and basically everything to the far side of my hand here was in the Coso KGRA.

There were applications. There were leases that were issued back -- several geothermal competitive lease sales were held in the 1980s. One was held, I believe, in 1981. There was another one in 1985 where leases were issued, and there were some leases that were issued, part of the sales that no activity ever occurred on. The names of those -- I have a complete record of all of them, but you were correct. There were leases that were issued where no activity was taken. The leases dropped -- fell by the wayside.

The rest of the boundary of the KGRA goes off the boundary to the east, so way out there.

JEFF AARDAHL: Okay. So are any of these decisions from the Coso Geothermal Record of Decision back in 1980 or '81 going to be carried forward as still valid today if it overlaps the same land within this Haiwee zone? In other words could you just bring forward decisions from the previous geothermal effort there rather than go through the whole process again to address the same piece of property?

MR. HAGERTY: We'll have to go through the process all over again. Whatever was developed back in 1981 certainly will be utilized as a reference for the new document. But in terms of Endangered Species Act issues, in terms of National Historic Preservation Act issues, all that, many things have occurred since '81 that need to be readdressed.

If there are recommendations from the Record of Decision at that time that are still pertinent, I would imagine they would be incorporated. But since it's been such a lapse of time and since normally we have a document that we would be making a determination of NEPA adequacy, clearly the 1981

document for this area, we need to do it again, at least for this area.

JEFF AARDAHL: Okay. During the process will we be able to get a copy of the 1980 -- the decision so we can kind of track and kind of see how things are changing with regard to proposals for leasing?

MR. HAGERTY: The document will, absolutely. It's a public document. I'm sure there's a copy in the Ridgecrest office. If not, I know I've got a copy in my office, so I'm sure it's available. They will let you see that. I can make sure that it's available if anybody wants to see it.

JEFF AARDAHL: Okay. Thanks. And somebody, I think, in the introduction mentioned -- maybe it's you, Sean -- that you're working on a reasonable development scenario for this particular area. And will we be able to see what is a reasonable foreseeable development scenario for this area before our scoping comments are due?

MR. HAGERTY: Sure. And at the previous meetings Sophia asked for a copy, and I can make a copy available. What we did, myself as well as petroleum engineer, Rich Estabrook in our Ukiah office, is, given the data available -- and there

isn't any drilling data out there, so all we can do is look at the geology and look at the Coso operation as it is today and make some assumptions that there is a volcanic field here. It most likely is of a certain temperature and depth that we don't know how deep; we don't know the exact temperature.

Rich and I came up with a proposal that we would consider up to two 30-megawatt power plants. They would be dual flash type plants similar to what we see in Coso. We made the assumption that the entity would have to drill down anywhere between 8- to 10,000 feet to reach a resource but just a developable model, and then from that model that we look at how many surface acres are going to be impacted.

So we said for each power plant we would look at about 25 acres for the power plant itself. Each power plant then would need an addition- -- it would have up to 22 wells, 15 production wells, approximately seven injection wells that would add to the total of the impact, now taking it up to over 50 acres per power plant.

In addition to that, then you have access roads, transmission lines. Again that's all described in the RFD, and I can make sure that's available to you as well. But it's just a guess. I ask you that,

in reading this, to understand that we're taking a crystal ball, because from that and then through the NEPA document we'll see what sort of impacts will occur at about, say, 200 acres of that impact in this area or that area or whatever. So it's just our best guess. If we had more data, we could fine tune it, but we don't.

JEFF AARDAHL: Okay. Those are the questions I had. And should I hand it over to somebody else? And I would like to, before I close, come back and just make a few observations at a later time.

MR. STRAND: Okay. Lee Sutton.

LEE SUTTON: Hi. I'm Lee Sutton. I'm vice president of Kern Pres. Audubon Society. I'm primarily interested in the subsurface water resource in Rose Valley and participated and followed the Hay Ranch Pipeline controversy significantly. I understand -- and I may be wrong on this, but I think the cognizant agency for the subsurface water is Inyo County, and if that's so, I'm wondering when you will involve Inyo County in this process.

MR. DALTON: Yes. We've just now begun the scoping process, as you're aware. We have sent letters out to the County. I spoke last night with an individual in regards to the Planning Department, so we want to seek out our partners early on. That's presently where we're at.

So while scoping is going on, besides the letters going to local government and tribal members, our cooperating agencies, they certainly will be brought in as a group. And we're starting to put together core groups. That's the next step in this process. Does that answer your question, more or less?

LEE SUTTON: Yes. That's my only question.

MR. STRAND: Is that your only question? Okay. Dick Arruda. Arruda?

DICK ARRUDA: Dick Arruda. You touched on it a little bit. Just wanted a little bit further clarification on the non-competitive leases that are in for those three. I'm trying to understand. Right now you're proposing that to include the whole area, the 22,000-some-odd acres that includes those three competitive leases. If something in the scoping process, you know, comes up and there's issues and you don't go forward with that, how will you move forward with the three non-competitive leases that you have applications for?

MR. HAGERTY: As part of the process, again, some of the discussions on alternatives have come up already. The three non-competitive applications we have pending since 2002, in the process conceivably we could address to offer them -- or not to offer them or -- because of the environmental concerns, we can actually deny them. But that is a separate decision there.

The other decision that would be put together for the other 18,000 acres -- 18 plus four; that would be 22,000 -- is that, should we offer this as competitive? So there's a whole mixture of alternatives that could be involved, depending on reasonable foreseeable development scenario, how much acreage would be impacted here and what sort of service resources will be impacted as a result of that development. So it encompasses those things.

But through this process, again, we could issue this. We could deny it. Or in the case of the no-action alternative, we just won't do anything with it. It will just sit there. But as I mentioned earlier, under the 2005 Act we do have the deadline of August, 2010 to eliminate -- to process 90 percent of our backlog lease applications in the Western United States. And so we're being asked to address all of

our backlog.

MR. STRAND: Those are all the speaker cards we have. Did you want to make a few more comments, then?

Yeah. Let's go here first. Then we'll come back to you.

TOM BUDLONG: You're so quiet back there. It's not on. You're so quiet; I didn't know you were here. Could you describe the cultural resources in this area.

MR. STORM: Yes. There are quite a few cultural resources, as they're called. For the history, we've got the Southern Pacific Railroad and Work Camp associated with the Southern Pacific Railroads from Mojave to Lone Pine. There is the Los Angeles Aqueduct, both the first and the second aqueduct and the various labor camps, certain camps associated with those. And there is some homesteading out in Rose Valley.

Prehistorically Rose Valley is the primary obsidian reduction quarrying area, making a hole in the ground or a piece of rock from an outcropping. Basically it's not only for California but Nevada and, to a certain extent, the Western United States. And a major project for archeologists working in the region,

they are trying to delineate the historical sequence that went on for about 3- to 5,000 years of people living, working in Rose Valley, going through these obsidian crops, which mostly occur on China Lake Naval Weapons Station, and bringing them back to their villages and reducing them down to hand-size pieces of obsidian called biofacies, and then these biofacies were taken by craters across the Sierra east across the desert to the southwest into Nevada, Utah and all through most of Southern and Central California as the main obsidian source, tool source for the prehistoric peoples.

So there are a number of large village sites that have what's called midden, m-i-d-d-e-n, soil deposits and much lithic scatter. So as it pertains to this particular project, there will be, you know, a cultural resource survey, a field-intensive survey of probably what's called a Class One literature search, and then perhaps a Class Two sampling of the area within the proposed leasing boundary for the EIS preparation to judge what the extent of the universe of known information sites that are out there. And then from that, eligibility potentials and then leasing potentials.

And with large plants such as this, there's also, then, usually a standard where, you know, the broader, you know, umbrella, that this is a sensitive area, and if there is any specific project construction projects like a geothermal electrical production plant, then that specific proposal will then get its own, you know, very detailed, very intensive survey of the area of their footprint, as it's called.

But for the planning right now, any fieldwork will probably be in a sampling scientific sample to ascertain, you know, the general overall pattern. But it's understood there is a lot there.

MR. GUM: I said that in three words.

TOM BUDLONG: It gives me a good idea.

MR. STORM: Anything else?

MR. STRAND: Jeff, did you want to ask some questions?

JEFF AARDAHL: Just one more. Then I want to make observations. Since the decision coming out will be whether or not to issue leases here within this boundary, would it be perhaps appropriate to refer to this area as a geothermal leasing study area rather than to state that it is a leasing area at this time? Just to clarify the terminology, is this really a study area rather than a leasing area?

MR. DALTON: We're certainly open to that, so thank you.

JEFF AARDAHL: Okay. Okay. Good. And I just wanted to make a couple of statements here about recent BLM California Desert Conservation Area Plan commitments to the public.

The first one goes back 29 years ago to the 1980 Desert Plan. The most recent ones that I believe occurred in 2006 with the West Mojave amendments to that 1980 plan, and I just want to bring up the relationship of those decisions to the Mojave ground squirrel viability and long-term conservation.

In 1980 BLM dedicated an area of about 18,000 acres in Rose Valley as the Mojave Ground Squirrel Habitat Management Area. It was referred to as the Rose Valley Mojave Ground Squirrel Area. Unfortunately that management plan was never written. When the BLM does write that plan, it requires the full participation of the State Fish and Game office.

And I was up in the study area today in a number of places, and I mapped that Rose Valley Habitat Plan Area, that commitment from 1980, and it -- oh, I think it overlaps just under half of this particular study area, roughly. I think this study area is about 22,000 acres of Federal land, and I

think the Mojave Ground Squirrel Habitat Management Area from 1980 is at about 10,000 acres.

Now, complementing that, in 2006 the West Mojave Amendment also established a much larger ground squirrel conservation area. The primary decision there was that anywhere within this zone, Federal land, if a project were to occur, it would require the habitat replacement or compensation at a ratio of five acres to one acre disturbed. And for the life of the plan, which is 30 years, the limitation on habitat disturbance within this greater conservation area for the ground squirrel is limited to one percent.

I just want to bring that up just so that's factored into the analysis that we're going to be seeing. And that concludes everything I have tonight, and I thank you very much for the opportunity.

MR. DALTON: Thank you, Jeff.

MR. STRAND: Yes. Go ahead. Can you state your name again.

DICK ARRUDA: Dick Arruda. One thing that comes to mind when you're looking at plan development and looking at cooperation with utilities et cetera, what are we thinking in regards to transmission? You know, we can have all kinds of resources out there. Are we thinking down the road

about -- you know, we already have problems with transmission through this area, and if we put something in out there, other things are going to have to happen. You know, it would be a shame if something did come to be developed out there, and now we're going to bump into another wall, and that's transmission and the ability on your lands -- BLM lands all the way down to L.A. Are we thinking any about that or what's happening in that regard?

MR. STRAND: I'll say something real quick of what I know, and I'll let Sean speak to it. South of here there are current proposals: The Barren Ridge area south, transmission lines that are being -- they're in the planning stage right now and looking at being under construction in the next couple of years. So between here, this area, and that Barren Ridge area, I know of no current proposals. But certainly that would be something that we would have to look at to get the energy out.

MR. HAGERTY: And that's an excellent question because last night during our public scoping meeting in Bishop, of course, is the consideration of a 500-kV line coming in through the center of Nevada basically tying into Bishop someplace that would carry forth a lot of energy from Nevada going into Edison's

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territory.

So it's a domino effect. In other words, if that project is to proceed and it does reach completion over the next, you know, four or five years, then the existing 230-kV lines that Edison has in the Rose Valley area, I believe that just won't make it. So as part of this project, certainly that's consideration as far as what transmission could be utilized.

But again our decision here is primarily on the issue of leasing. If the decision is made to lease and somebody comes forward, it's part of our coordination effort to make sure that we are in contact with the various entities. But we are going to leave that up to the operator.

And again the question that also came up from previous nights, do the gentlemen that have the applications right now -- do they have power purchase agreement? I don't know. I don't know. So there's a lot of issues there too. So that's a very good question.

Certainly we don't want to approach the bottleneck on the transmission lines, because obviously, if we do have a viable resource here, we want to make sure it gets out and becomes part of the

renewable energy portfolio for California.

MR. STRAND: Any other questions?

TOM BUDLONG: I could ask one.

MS. CADAVONA: Name?

TOM BUDLONG: Tom Budlong. When Terry Metcalf, I guess, talked to the steering committee some number of years ago he, was talking about the State section only, and now he's talking about these. Do you know if he's given up on the State section, or is this easier for him to deal with because it's closer to the road? Do you have any idea why he moved?

MR. STRAND: I understand he has a current lease on the State section and he has an approved right-of-way for an access road for the BLM to access that State property. I don't have information on these current leases or these applications.

MR. GUM: He has actually two rights-of-way, one for the road to access the State section, another for a pipeline to carry water to that State section for the drilling purposes. Why Deep Rose has chosen not to drill at this point in time, you need to talk to Deep Rose and find out what they have to say. I know they're interested in trying to

get those non-competitive leases to tie up those acres, and I don't know that if they do, then that means they'll actually drill or not. So that's speculation on our behalf to try to say why it is they haven't stepped forward.

MR. STRAND: Okay. Thank you guys again for coming. What we're going to do is, we're going to be here for as long as you guys are here. If you have more questions, feel free to look at the boards, ask more questions one on one. And again thank you guys for coming. We appreciate your guys' participation.

(Applause from the audience.)

(The proceedings were concluded at 7:02 p.m.)

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REPORTER'S CERTIFICATE

I, DIANE CARVER MANN, a certified shorthand reporter, do hereby certify that the foregoing pages comprise a full, true and correct transcription of the proceedings had and the testimony taken at the hearing in the hereinbefore-entitled matter of the BLM Scoping Meeting for the Haiwee Geothermal Project.

Dated this 18th day of November, 2009, at Chino, California.

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DIANE CARVER MANN, CSR NO. 6008

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APPENDIX E: SCOPING HANDOUTS

Fact Sheet

HAIWEE GEOTHERMAL LEASING AREA

SCOPING MEETINGS • OCTOBER 2009

Haiwee Geothermal Leasing

The Department of the Interior, Bureau of Land Management (BLM) is proposing the leasing of the Haiwee Geothermal Leasing Area located in Inyo County, California for geothermal exploration, development, and utilization. The area encompasses approximately 22,500 acres of BLM-managed public lands that also include three pending lease applications covering approximately 4,500 acres.

The Haiwee Geothermal Leasing Area is approximately 13 miles south of Olancha, California. The project area is east of the Inyo National Forest, west of the Naval Weapons Center, and south of the South Haiwee Reservoir.

Geothermal Resources

Geothermal resources are underground reservoirs of hot water or steam created by heat from the earth. Geothermal steam and hot water can reach the surface of the earth in the form of hot springs, geysers, mud pots, or steam vents. These resources can be accessed by wells, and the heat energy can be used for generating electricity.

Geothermal fields produce only about one-sixth of the carbon dioxide that a relatively clean natural-gas-fuel power plant produces, and very little if any, of the nitrous oxide or sulfur-bearing gases. Geothermal energy is available 24 hours a day, 365 days a year. Geothermal power plants may be the most reliable of all energy production methods, because they do not require purchase or transport of fuel, or waste disposal, and have no intermittency or dispatchability problems.

Geothermal energy is a renewable resource, because its source, the Earth's core, provides an almost unlimited amount of heat. Tapping into clean, renewable geothermal energy will help reduce greenhouse gas emission associated with other types of power plants.

Purpose and Need

The development of domestic energy resources, particularly renewable resources, has become a national priority. President Bush issued Executive Order 13212 in May 2001 that directed Federal agencies to increase production and transmission of energy in an environmentally safe manner. In response to the executive order, the BLM issued a National Energy Policy Implementation Plan in June 2001, which directed the BLM to process geothermal leases in a timely manner in order to help support efforts to increase energy production from federal minerals, while preserving the health of the public lands.

In August 2005, President Bush signed into law the Energy Policy Act of 2005 that encourages energy efficiency and conservation, promotes alternative and renewable energy sources, reduces our dependence on foreign sources of energy, and increases domestic production. It made significant changes to the Geothermal Steam Act of 1970, to encourage leasing and development of geothermal resources from public lands.

The California Desert Conservation Area (CDCA) Plan provides overall regional guidance for management of the public lands in CDCA and establishes long-term goals for protection and use of the California Desert. The BLM directly administers about 10 million acres of the CDCA, which includes the Haiwee Geothermal Leasing Area. Congress directed the BLM to prepare and implement a comprehensive, long-range plan for the management, use, development, and protection of public lands within the CDCA. The plan is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The plan would be amended to allow the Haiwee Geothermal Leasing Area lands to be leased for geothermal exploration, development, and utilization.

The BLM received three noncompetitive geothermal lease applications for approximately 4,500 acres of BLM-managed lands within the Haiwee Geothermal Leasing Area and must determine whether to approve the applications. Adjacent public lands occupying approximately 18,000 acres have also been identified for competitive leasing of geothermal exploration, development, and utilization and BLM must decide whether to offer competitive leases for geothermal resources in the leasing area.

Although this is a Federal action taking place on Federal land, this proposal will also assist the State of California with its Renewable Portfolio Standard goals that call for 33 percent of California's energy to be derived from renewable sources by 2020.

Project Description

BLM is proposing leasing of geothermal resources in the Haiwee Geothermal Leasing Area, which consists of approximately 22,500 acres of BLM-managed lands; this area also includes the three lease applications for approximately 4,500 acres of BLM-managed lands. The BLM-managed lands considered for leasing are located in the Mount Diablo Meridian and occupy the following 37 sections:
Township 21 South, Range 37 East, Sections 11-14, 23-26, 35-36
Township 21 South, Range 38 East, Sections 7-10, 15, 17-22, 27-34
Township 22 South, Range 37 East, Sections 1-2, 11-12
Township 22 South, Range 38 East, Sections 5-8

The proposed action is to amend the CDCA Plan to allow project area lands to be leased under the authority of the Geothermal Steam Act of 1970, as amended (30 U.S.C. 1001 et seq.).

The approval to issue geothermal leases could have indirect environmental impacts because such leasing represents a commitment of resources, and it is reasonably expected that subsequent exploration, development, production, and decommissioning activities would occur. A lease for geothermal resources allows the right to future exploration and development of geothermal resources within the lease area; however, subsequent activities involving surface disturbance or other extensive operational activities specific to a project will require additional NEPA analysis.

Environmental Review

Issuing leases for the exploration, development, and utilization of geothermal resources is considered a Federal action and may have a significant adverse impact to the environment. The BLM will prepare an Environmental Impact Statement (EIS) in compliance with National Environmental Policy Act (NEPA) to identify, analyze, and disclose potential environmental effects of leasing geothermal resources.

BLM is conducting scoping for the proposed leasing of geothermal resources to identify issues to be addressed, and identify the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in-depth in the EIS. The anticipated release of the Draft EIS/Draft Plan Amendment to the CDCA is Winter of 2009. The publication of a Notice of Availability in the Federal Register will announce the release of the report and start of the 90-day comment period. Formal public meetings will also be conducted during this time. The Final EIS/Proposed Plan Amendment is expected in Fall of 2010 and another Notice of Availability will be published to announce the release, as well as start of 30-day protest period and 60-day Governor's Consistency Review. A Record of Decision to open or close leasing of geothermal resources in the Haiwee Geothermal Leasing Area and amendment to the CDCA is expected in Winter 2010.

Public Outreach and Communication

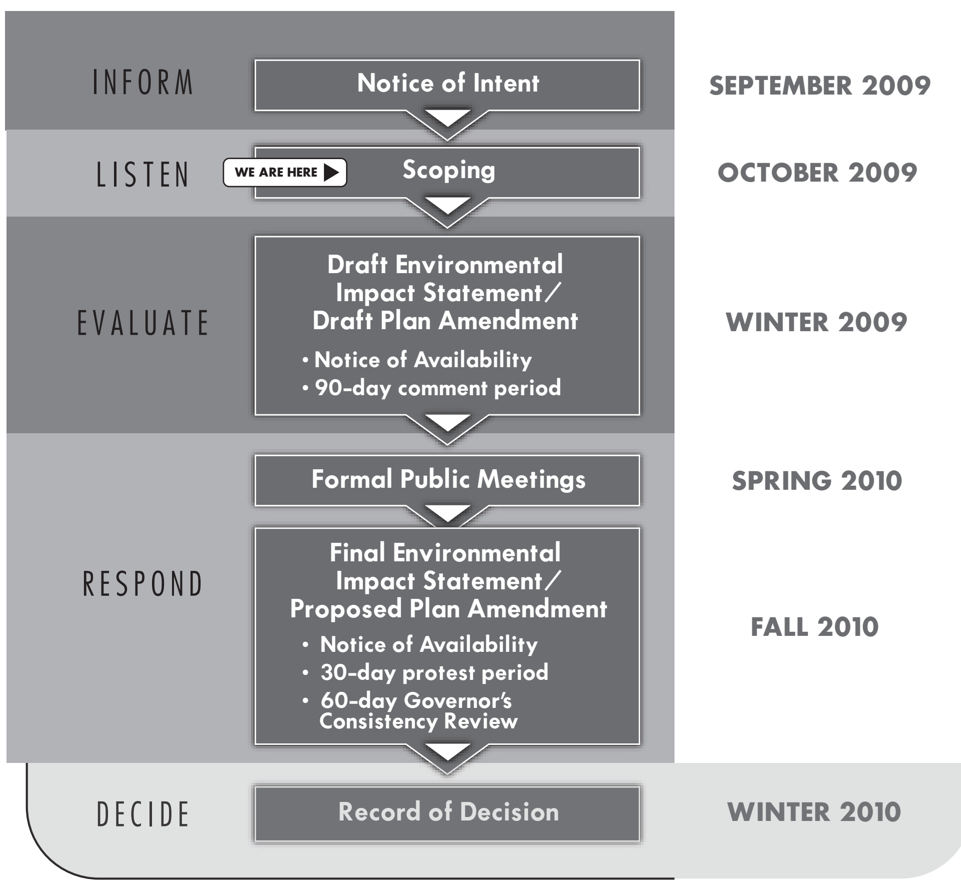
The project team welcomes comments and involvement throughout the project and appreciates your feedback. Comments concerning the scope of the environmental analysis are requested by close of business Monday, **November 9, 2009**. If you have questions or comments about the project, or would like to be added to the project mailing list, please contact the project team in one of the following ways:

- Attend one of the public scoping meetings
- Visit the project website www.blm.gov/ca/st/en/fo/ridgecrest.html
- Send an email to cahaiwee@blm.gov
- Send written comments to:

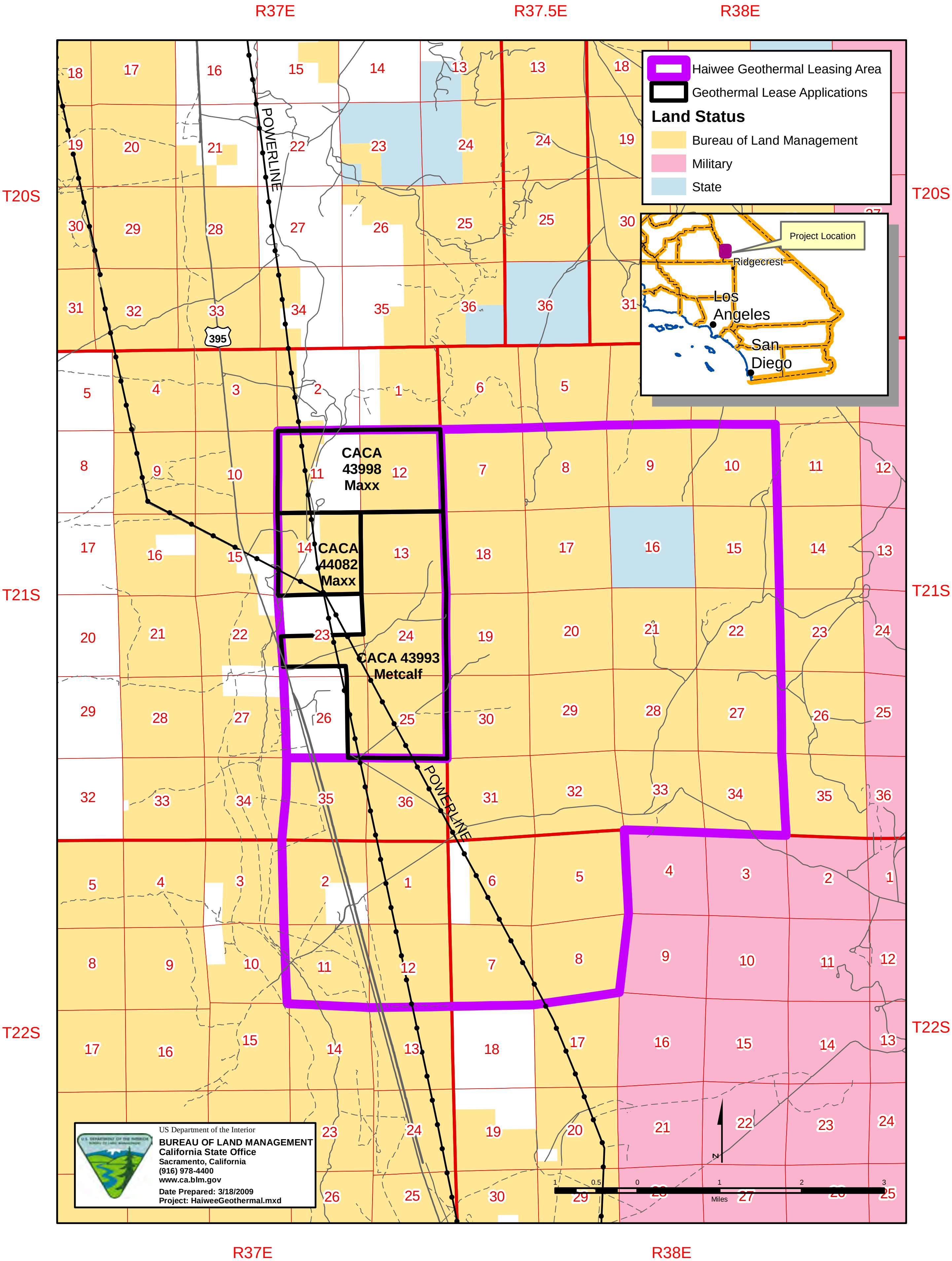
Bureau of Land Management, California Desert District Office,
Attn: John Dalton, Haiwee Geothermal Leasing Area Coordinator
22835 Calle San Juan De Los Lagos
Moreno Valley, California 92553

Disclaimer: Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Project Timeline



Haiwee Geothermal Leasing Area



Comment Form

The Bureau of Land Management (BLM) thanks you for your interest in the Haiwee Geothermal Leasing Area. Scoping meetings are being conducted to share information regarding the proposed action and the decision-making process, and listen to the public views on the range of issues to be considered during the preparation of the Draft Environmental Impact Statement/Draft Plan Amendment. Please take a moment to answer the questions below and return this sheet to the comment table or mail to the address on the back of this form.

We encourage you to provide your comments by filling out and submitting this comment form to the address on the opposite side, or you may e-mail your comments to cahaiwee@blm.gov. All comments (letters and emails) for consideration in preparation of the Draft Environmental Impact Statement must be received by close of business ***Monday, November 9, 2009.***

NAME: ______________________________ **DATE:** ______________

ADDRESS: ______________________________

CITY/STATE/ZIP: ______________________________

EMAIL (optional): ______________________________

Would you like to be added to this project's mailing list to receive future project-related information? ☐ YES ☐ NO

Please indicate your affiliation by checking one of the following boxes:

- ☐ Individual (no affiliation)
- ☐ Private Organization
- ☐ Citizen's Group
- ☐ Federal, State, or Local Government
- ☐ Elected Representative
- ☐ Regulatory Agency

Name of organization, government, group, or agency (if applicable)

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If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act, you must state this prominently in your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives of organizations or businesses, will be made available for public inspection in their entirety.

Please describe any issues that should be considered during resource studies and in environmental resource document preparation.

____

____

____

Please describe any environmental concerns regarding geothermal development. If applicable, please relate these concerns to specific locations, features (landmarks, water bodies, historic or tribal sites, etc.) or resources (plants, animals, water quality, air quality, etc.).

____

____

____

Please provide any additional comments that you may have on the project.

Fold Here

Fold Here

HAIWEE GEOTHERMAL LEASING AREA

BLM, California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
Attn: John Dalton, Haiwee Geothermal
Leasing Area Coordinator

POSTAGE REQUIRED

BLM, California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
Attn: John Dalton, Haiwee Geothermal
Leasing Area Coordinator

APPENDIX F: SCOPING LETTER TO NATIVE AMERICAN TRIBES

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Ridgecrest Field Office
300 S. Richmond Road
Ridgecrest, CA 93555
www.blm.gov/ca/ridgecrest

OCT 07 2009

In Reply Refer To:
8120 (P) CA-650.22

Return Receipt Requested: 7008 1830 0002 2907 6450

Mr. Monty Bengochia, Tribal Council Chair
Bishop Paiute Tribe
50 Tu Su Lane
Bishop CA 93514-8058

Ref: Haiwee Geothermal Leasing Area Proposal

Dear Mr. Bengochia:

It is a pleasure to invite the Bishop Paiute Tribe to consult with the Ridgecrest Field Office, Bureau of Land Management (BLM) as part of our government to government responsibilities regarding a recent geothermal energy leasing initiative being undertaken by BLM in northeast Rose Valley, Inyo County. We would like to apprise you of this proposed project so that any Tribal concerns or issues regarding them can be identified and discussed at the earliest opportunity in the application review process.

The undertaking is known as the Haiwee Proposed Geothermal Leasing Project, and involves the potential leasing of 22,060 acres of BLM managed public lands for geothermal exploration, development, and utilization. An Environmental Impact Statement (EIS) will be prepared, and a series of public meetings and a public comment period are being scheduled.

The geographic location is generally east of US Highway 395 between the Caltrans Rest Stop at Coso Junction on the south and the South Haiwee Dam locale to the north. The eastern boundary is the China Lake Naval Air Weapons Station (NAWS).

The legal locations of the proposed leasing area are: Township 21 South, Range 37 East and Range 38 East; and Township 22 South, Range 37 East and Range 38 East; Mt. Diablo Base and Meridian. The 7.5 minute topographic quad sheets for the area are: Coso Junction and Haiwee Reservoir.

BLM is initiating the NEPA environmental review of this proposal by holding a series of public meetings between October 13 and 20, 2009. A meeting notice is enclosed with details, but briefly, meetings will be held near Lone Pine on Oct. 13, Bishop Oct. 14, Ridgecrest Oct 15, and Furnace Creek Ranch/Timbisha Tribal Offices in Death Valley NP on Oct. 20, 2009. BLM will also utilize and coordinate the NEPA commenting process to satisfy the public involvement process for Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470F) as provided for in 36 CFR 800.2(d)(3).

If you or other members of your Tribe has any comments or concerns regarding the proposed Haiwee Geothermal Leasing Project, we would appreciate receiving any responses by mid-November, 2009. A suggested deadline date for receipt of comments would be Friday November 20, 2009. Responses by letters or email would be acceptable.

In closing, thank you for your considerations regarding this consultation request. If there are any questions, please contact myself, at (760) 384-5400, email Hector_Villalobos@ca.blm.gov; or John Dalton, Desert District Planning and Environmental Coordinator at (951) 697-5311, email John_Dalton@ca.blm.gov. Please address written responses to my attention at: BLM, Ridgecrest Field Office, 300 South Richmond Road, Ridgecrest CA 93555. Thank you.

Sincerely,

Hector Villalobos

Hector Villalobos
Field Manager
Ridgecrest Field Office
Bureau of Land management

Enclosure:: 4

- Public Meeting Notice
- Legal Location Worksheet
- Notice of Intent to Prepare EIS
- Map of Haiwee Geothermal Leasing Area

APPENDIX G: SCOPING LETTERS TO ELECTED OFFICIALS

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley CA 92553-9046

In Reply Refer To:
3210
CAD000.01(P) November 25, 2009

CERTIFIED MAIL #70091410000184211070
RETURN RECEIPT REQUESTED

Linda Arcularius
Supervisor, District 1
Inyo County
225 N. Round Valley Road
Bishop, CA 93514

Dear Supervisor Arcularius:

The Bureau of Land Management (BLM), California Desert District (CDD) is giving notice to initiate a public scoping period to identify issues and formulate alternatives for an Environmental Impact Statement (EIS) for the Haiwee Geothermal Leasing Area located in Inyo County, California. We would like to invite the County of Inyo to participate in this process.

The CDD-BLM directly administers approximately 10.4 million acres of public land within the California Desert Conservation Area (CDCA), which includes the Haiwee Geothermal Leasing Area. The land use plan for the CDCA, based on the concepts of multiple use, sustained yield, and maintenance of environmental quality would be amended to allow, if approved, the Haiwee Geothermal Leasing Area lands to be leased for geothermal exploration, development, and utilization. The leasing of public lands for geothermal resources will require an amendment to the CDCA Plan, which is authorized by the Federal Land Policy and Management Act 202.601 (43 U.S.C. 1712) and 43 Code of Federal Regulations 1610.5-5.

Project Description

The Haiwee Geothermal Leasing Area is approximately 13 miles south of Olancha, California. The proposed project area is east of the Inyo National Forest, west of the Naval Weapons center, and south of the South Haiwee Reservoir, encompassing approximately 22,500 acres of BLM-managed public lands. The BLM has received three noncompetitive geothermal lease applications for approximately 4,500 acres of BLM-managed lands within the Haiwee Geothermal Leasing Area and must determine whether to approve the applications. Adjacent public lands occupying approximately 18,000 acres have also been identified for competitive leasing of geothermal exploration, development, and utilization and BLM must decide whether to offer competitive leases for geothermal resources in the leasing area.

The BLM-managed lands considered for leasing are located in the Mount Diablo Meridian and occupy the following 37 sections:
Township 21 South, Range 37 East, Sections 11-14, 23-26, 35-36
Township 21 South, Range 38 East, Sections 7-10, 15, 17-22,027-34
Township 22 South, Range 37 East, Sections 1-2, 11-12
Township 22 South, Range 38 East, Sections 5-8

National Environmental Policy Act Process

In processing applications the BLM must comply with the requirements of the national Environmental Policy Act (NEPA), which requires that federal agencies review projects under their jurisdiction and consider the environmental impacts associated with the proposed project construction and operation.

Pursuant to the National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations on implementing NEPA, the EIS will describe and evaluate the potential impacts of the Haiwee project, no action, and any other alternatives to the proposed action. The purpose of an EIS is to provide the public and decision makers with sufficient information to understand the environmental consequences of the proposal and to identify and develop appropriate mitigation measures to minimize environmental impacts. The impact analysis presented in the EIS will result in a Record of Decision for the project.

Scoping

One early element of the NEPA process is scoping. Scoping activities are conducted early in the process to:

- determine reasonable alternatives to the proposed action that will be considered in the document
- identify environmental and socioeconomic issues of concern related to the proposed project and
- determine the depth and range of analyses for issues addressed in the document.

This scoping statement has been prepared to enable government agencies, the general public, and other interested parties to participate in and contribute to the analysis process. Public input is important in establishing the scope of analysis for any NEPA document, and the BLM encourages public participation.

Preliminary Resource Management Issues and Concerns

The following issues and concerns have been identified to-date as relating to the proposed action. This list is not meant to be all-inclusive, but rather to serve as a starting point for public input. Once all issues and concerns have been gathered through scoping and BLM consideration of the project, corresponding resource disciplines will be identified to conduct analysis for individual issues and concerns. Issues already identified to be analyzed in the EIS include:

- Native American
- potential land use conflicts including recreation
- potential effects on wildlife
- cumulative impacts considering existing, proposed, and potential geothermal projects in the area

- potential impacts on surface water and groundwater resources
- potential impacts to cultural and historical resources within the analysis area
- potential impacts to visual resources.

The EIS will also address issues such as geology, geothermal resources, vegetation, threatened or endangered species, air quality, noise, transportation, human health and safety, and socioeconomics, as well as any other issues raised during the process.

Alternatives thus far identified for evaluation in the EIS will include the (1) proposed action, (2) no action alternative (not leasing the lands for geothermal exploration, development, and utilization), and (3) leasing fewer than the proposed 22,500 acres of public land.

The BLM will use an interdisciplinary approach to develop the plan in order to consider the variety of resource issues and concerns identified.

Proposed Schedule

The anticipated release of the Draft EIS/Draft Plan Amendment to the CDCA is winter of 2009. The publication of a Notice of Availability in the Federal Register will announce the release of the report and start of the 90-day comment period. Formal public meetings will also be conducted during this time. The Final EIS/Proposed Plan Amendment is expected in Fall of 2010 and another Notice of Availability will be published to announce the release, as well as start of the 30-day protest period and 60-day Governor's Consistency Review. A Record of Decision to open or close leasing of geothermal resources in the Haiwee Geothermal Leasing Area and amendment to the CDCA is expected winter of 2010.

You are encouraged to participate throughout the environmental analysis process to help in identifying the level of analysis needed, alternatives to be considered, issues or concerns that should be assessed, mitigation opportunities, and any other comments or ideas to help ensure that the process is comprehensive. Please submit your comments to John E. Dalton, Resource Management Specialist and Haiwee Project Lead, at John_Dalton@ca.blm.gov

Thank you for your consideration and the opportunity to work effectively with you. We look forward to our interaction and discussions.

Signed By	Authenticated By
Steve Borchard	Charlee C Christe
District Manager	Records Manager

Enclosures (2)
Haiwee Map, NEPA process

CC: Inyo District Supervisors

APPENDIX H: COMMENT LETTERS

ARNOLD BLEUEL
LAROCHELLE MATHEWS &
ZIRBEL LLP
ATTORNEYS AT LAW

GARY D. ARNOLD
BARTLEY S. BLEUEL*
DENNIS LAROCHELLE
JOHN M. MATHEWS
MARK A. ZIRBEL
KENDALL A. VAN CONAS*
SUSAN L MCCARTHY
AMBER A. EISENBREY
STUART G. NIELSON
ROBERT S. KRIMMER

OF COUNSEL
MATTHEW P. GUASCO

300 ESPLANADE DRIVE, SUITE 2100
OXNARD, CALIFORNIA 93036
TELEPHONE: 805.988.9886
FAX: 805.988.1937
www.atozlaw.com

Writer's e-mail
garnold@atozlaw.com

October 7, 2009

Bureau of Land Management
California Desert District Office
Attn: John Dalton, Haiwee Geothermal Leasing Coordinator
22835 Calle San Juan De Los Lagos
Marino Valley, CA 92553

Re: EIS Scoping Meeting
Haiwee Geothermal Project
22,060 Acres

Gentlemen:

Little Lake Ranch, Inc. ("LLR") is a non-profit mutual benefit corporation which owns the Little Lake Ranch property at the far southern end of the Rose Valley, which itself is located in the most southerly region of the Owens Valley in the County of Inyo, California. LLR submits the comments contained herein regarding the Environmental Impact Statement ("EIS") being prepared by BLM in connection with the proposed geothermal exploration and development project located in and around the Haiwee area.

LLR suggests that BLM consider all of the comments, evidence, studies and reports generated in connection with environmental analysis of the water pumping and transfer project ("Coso Project") originally proposed by Coso Operating Company, LLC ("Coso"). The Coso Project was the subject of the Environmental Assessment, No. CA-650-2005-100, case file number CACA046289 ("EA") published by BLM. To the extent that the proponents of the geothermal exploration and projects being studied by the BLM ("Projects") will rely upon the water contained in the Rose Valley underground water basin, all of such data must be considered. The same types of environmental impacts which were studied in the EA and the later Final Environmental Impact Report ("EIR") adopted by the County of Inyo, will also occur under the Projects. You should refer to the entire files assembled by the County of Inyo ("County") in connection with the Coso Project, as well as BLM's own environmental files which separately granted a right-of-way to Coso.

Little Lake Ranch Background.

Little Lake Ranch consists of approximately 1,200 acres ("LLR Property") which is managed by LLR to provide wildlife habitat and wildlife-oriented recreation, including hunting, fishing, and wildlife viewing. The LLR Property includes a shallow 90 acre navigable body of water known as "Little Lake" and the ponds and wetlands areas including the Upper Pond, Lower Pond, Teal Pond, Lava Pond, and Chukar Pond.

Wetlands are extremely limited along the Eastern Sierras. Much of the wetlands habitat that historically occurred in the region has been lost to water diversions and agricultural conversions. Little Lake is one of the few sizable wetlands sites remaining along the Eastern Sierras. This 90-acre lake is used extensively by waterfowl and likely receives more use by diving ducks than any other wetlands in the Eastern Sierra region.

To the extent that the proposed projects rely in whole or in part upon the underground water resources of the Rose Valley, the pumping and transportation of the water is subject to the County's groundwater ordinance and will be cumulative to the water being transported by Coso. Such water transportation would also have a severe and direct impact upon the LLR property. The specific harm to, or impacts upon, the LLR property must be studied.

Project Description.

While the extent of any available geothermal resource is largely unknown during the exploration stage, the existence of the resource should be identified, and its size and composition should be estimated. The amount of electrical production from the geothermal resource should be based upon the size and extent of the reservoir so as to create a sustainable facility. This may reduce the immediate production of electrical energy, but allow for a greater and longer term utilization of the resource, with fewer impacts on the environment as noted below.

The EIS must evaluate the environmental impacts from the alternate designs of available geothermal facilities. The principal designs currently include single-flash systems, double-flash systems, dry steam (depending upon the actual geothermal resource available), binary and any number of hybrid designs incorporating one or more of the foregoing. More exotic designs may further utilize combinations of other energy production methods (fossil fuel, hydroelectric, solar, wind, biomass, etc.), each of which alternate designs pose different environmental impacts. Absent an identification of the projected design of the geothermal facility, it is virtually impossible to accurately assess the ultimate environmental impacts from the utilization of the geothermal resource.

The EIS should identify each alternative design of the proposed facility, and identify the particular environmental impacts associated with each form of a design. Each and all of the designs should be further analyzed to conserve the geothermal resource itself, as well as minimizing any impacts to the environment each of the alternative designs may pose. Each design should consider how toxic emissions will be minimized and the use of water conserved.

In flash-steam facilities, about 15-20% of the fluid would be lost due to flashing to steam and evaporation. Binary power plants utilize a closed-loop system and the geofluids are re-injected with no fluid loss. 85% of the steam used in flash or dry-steam plant is lost to evaporation, when a water-cooled tower is used. The total loss of the "fluids" depends on both the nature of the produced geofuilds, and the type of cooling system, and whether the plant actually re-injects the available fluids. This should be clarified and discussed.

There needs to be a discussion or analysis concerning the proper utilization of geothermal resources. There should be consideration of alternate technologies by which the geothermal reservoirs are managed to allow for the sustainable production of electricity through the conservation of geothermal fluids by the proper design and operation of the production facilities themselves.

There is no question but that water is a very rare and precious commodity in most of the western United States. Large portions of the western United States are subject to current drought conditions. Consumers are being asked to conserve the water they use. Geothermal facilities should be designed, constructed and operated in a manner to avoid the need for imported water and to balance the production of geothermal fluids to the natural recharge of the geothermal resource.

One possible explanation of the problems experienced at some geothermal facilities is their use of water-cooling towers to condense the steam used in the electricity generation process. Unfortunately, by utilizing water-cooling towers, geothermal facilities lose a tremendous amount of the geothermal fluids produced, thereby causing a more rapid depletion of the fluids in the geothermal reservoir. There must be extensive consideration of available alternatives, such as the utilization of an air-cooled system by which 100% of the geothermal fluids can be retained within the system and re-injected into the geothermal reservoir. This alternative may prolong the life of the reservoir and allow for a more sustainable production of electricity from the geothermal plants.

Similarly, the EIS should address the preservation of the geothermal reservoirs through proper long-term management. First, the need to balance the natural recharge of the geothermal reservoirs, compared to the consumption of the fluids from the electrical plants, must be considered. Second, the proper size and production capability of an electrical plant to reduce water consumption merits analysis. In either case, a proper management of the resource could eliminate the need for imported water and allow for a more sustained production over a longer period of time.

The reliance upon imported water is a short-sighted and environmentally risky answer to geothermal reservoir depletion. Because of the scarcity of water throughout the western United States, perhaps such water resources could be better used, rather than simply injecting water into a geothermal reservoir to produce energy. The EIS should address the availability of local water sources for injection, whether such water sources are adequate to supply all competing needs and uses of any projected water used for injection, and whether the imported water source is naturally replenished.

Aesthetics.

Will the depletion of water within the Rose Valley affect habitat and wetlands adjacent to U.S. Highway 395 and the Habitat Project at Little Lake? Will the permanent depletion of the underground water level adversely impact the surface flora and fauna? There should be a baseline study of the surface habitat and all wildlife which rely upon surface water and a functional ecosystem. This study should specifically cover the entirety of the LLR property.

The Rose Valley is essentially a high desert location used largely for recreational purposes. The construction of any manmade structures is particularly visible and detrimental to recreational uses. The cumulative impacts from these structures should be considered.

Agricultural Resources.

The lowering of the water table level in the Rose Valley will exacerbate the costs of all Rose Valley water well owners to pump water, and increase the cost to use available land for agricultural purposes. This needs to be studied.

LLR's Habitat Project includes the use and irrigation of farming plots to enhance wildlife cover and habitat. The ability of LLR to utilize its own property for agricultural or recreational uses is imperiled and needs to be addressed.

Do other agricultural uses or operations exist in Rose Valley? Are they dependent on the natural springs and underground water table for water?

Air Quality.

The loss of valuable wetlands at Little Lake, and perhaps even Little Lake itself as a body of water, could substantially exacerbate wind-raised dust from the Little Lake area. To the extent that the underground water table is lowered, will this have an adverse effect on the surface plants which rely upon the underground water for survival? Will this further contribute to windborne dust and pollution?

The proposed project is located within the Great Basin Unified Air District. The overall air quality is considered poor, principally as a result of wind erosion of the dry Owens lakebed. Will the proposed project reduce water availability to Little Lake, the downstream ponds, creeks and wetlands? Will this adversely impact the air quality of the Rose Valley? These impacts must be studied and evaluated as a potential significant impact.

Will the operation of the proposed project contribute to the non-attainment area for PM_{10} particles? This aspect of the project must be studied and evaluated.

Biological Resources.

Any and all studies of the environmental impacts cannot be limited only to the locations of the physical boundaries of the proposed project or its access routes. The EIS must study all of the areas in and around the LLR property, and the Rose Valley in general, at least to the extent that the loss of water resources would imperil the habitat and vegetation. The permanent loss of water resources within the Rose Valley may have a profound impact upon many biological resources, including at least two endangered species, the Desert Tortoise and the Mojave Ground Squirrel ("MGS").

There are riparian habitats and sensitive natural communities within the LLR property, as well as numerous natural springs and artesian wells throughout the Rose Valley on which wildlife depend. Any decrease in the amount of underground water within the Rose Valley Basin or Little Lake could have a severe impact upon biological resources.

Should long-term baseline studies be prepared before the grant of any permit? These studies could include the actual availability of underground water in storage, historical water levels, recharged and consumption within the Rose Valley Basin, the existence of all wildlife resources, the existence and health of surface vegetation, plant life and habitat, surface flows at Little Lake and its surrounding ponds and creeks, catalog of all springs and artesian wells within Rose Valley, together with their outflows, identification of all water users and their consumption of water within the Rose Valley, current air quality conditions, cultural resources, soils and geology conditions, and the impacts upon such resources as a result of the water pumping project.

Cultural Resources.

BLM has added the Coso Hot Springs as an area of potential effect ("APE") as part of its consideration whether to grant a right-of-way to Coso for its project. A complete analysis of the effects of the proposed project on the Coso Hot Springs must be performed. Information contained in the various environmental studies from the Coso Project is insufficient.

Geology and Soils.

The EIS should examine the possibility of soil subsidence in Rose Valley as a result of the withdrawal of groundwater. Subsidence could occur with extensive long-term overdraft of the groundwater reservoir. This impact must be studied and evaluated. Moreover, the depletion of the underground water basin and surface flows can have a profound effect upon soil erosion, loss of topsoil, and the capability of the surface to sustain life.

Hazards and Hazardous Materials.

What are the impacts to the environment from the operation of the proposed projects? What types of hazardous substances may be generated by the proposed projects and how are they going to be treated or disposed of?

All energy-producing plants emit heat to the atmosphere and environment. This is a natural consequence of power production. Indeed, geothermal power plants emit considerably more heat per unit of energy produced than most power plants, including fossil fuel and nuclear. What are the environmental impacts from heat emissions?

Impacts on geologic resources and seismic issues must be evaluated. The high pressure injection of fluids directly into fault zones has been related to increases in seismic activities. High pressure injection of fluids from outside the geologic system is not the same as where geothermal fluids are withdrawn and then re-injected for a near zero net change, and would represent a much lower risk of increasing seismic activity. This conclusion ignores the dramatic loss of heated liquids from evaporation when WCTs are employed at the facility for cooling purposes. Indeed, if there is no source of make-up water from nearby surface waters or Water Basins, and a WCT system is used, then the GeoReservoir can be substantially depleted of water over time, actually increasing the possibility of seismic activity.

Subsidence can also occur when groundwater is pumped from underground aquifers at a rate exceeding the rate at which it is replenished. Since geothermal development includes re-injection of the geothermal fluids, it is assumed that the potential for subsidence is low. The EIS should address the dramatic loss of heated liquids from evaporation when WCTs are used, and there is a high portion of steam in the geofluids.

Hydrology and Water Quality.

A long-term test pumping should be performed to determine what the short-term, intermediate and long-term impacts from pumping may be. Most of the reports to date rely upon theoretic modeling of the underground basin in the Rose Valley. Prior to the issuance of any permit, should there be long-term pumping of the magnitudes proposed? Would it not be preferable to actually understand the basin dynamics before issuing a permit?

Possible impacts to underground water sources, typically consisting of known underground water basins or aquifers, must be studied. In most cases, the geothermal reservoir, containing heated water or steam, or both, (hereafter called herein "GeoReservoir") exists in the form of a water basin, but it is generally separate and distinct from underground water basins/aquifers ("Water Basins"), which are used by the overlying owners for drinking water, irrigation, domestic uses and other typical residential, agricultural, industrial and commercial uses. As such, there can be much confusion between the relationship of these separate resources. While there may be some hydrological connection between the GeoReservoir and the Water Basins, the EIS should identify the distinction, and evaluate what impacts the use and consumption of the GeoReservoirs may have on the local Water Basins. Are there any connections? If so, what are the environmental impacts? If not, will the Water Basins be used for make-up water in the geothermal plant, and what impacts would this cause on the surrounding environment?

Depending upon the selected design of any geothermal facility, it may require imported water to reach sustainability. This is exactly the case in numerous geothermal facilities around the world. The EIS should consider as an environmental impact the exploitation of a GeoReservoir and the possible need for imported water to reach sustainability. What if the water sources are not readily available or may only lead to mounting environmental problems?

Many geothermal facilities rely upon water cooling towers ("WCTs") to cool working fluids in a binary plant or steam condensate in dry steam, single flash and double flash facilities. In so doing, a substantial portion of the steam (approximately 85% according to published sources) is lost to evaporation during the cooling process, thereby limiting the geofluids which could otherwise be injected.

The EIS should identify throughout the document the different type of fluids that are contained in a GeoReservoir. Numerous different terms are used interchangeably, but should not be. It is not correct to say that all fluids produced at a hypothetical geothermal facility are available for re-injection. Geofluids or fluids can be composed of both liquid and steam. While generally the liquids can be re-injected, that portion of the original geofluids which is steam, may not be re-injected, if the design of the facility uses WCT. Because 85% of the steam component is lost to evaporation in the WCT, a similar large amount of the original geofluids may <u>NOT</u> be available for re-injection. This confusion from the use of suspect terminology should be clarified.

The EIS should consider the environmental impacts from allowing WCTs when compared to systems relying upon air-cooled condensers ("ACCs"). The ACC systems would allow for 100% of the geofluids produced at a geothermal plant to be injected, because there are no evaporation losses of the original steam. By eliminating water loss through the WCTs, the geothermal resource can be better preserved, resulting in more sustainable production and minimizing impacts on available water sources.

If the WCT design facilities are evaluated, then the EIS needs to further consider and evaluate where the make-up water will originate and what impacts the use of such imported water will have on the region from which the make-up water is taken.

Particularly in arid areas, the importation of water from either surface water or surrounding Water Basins may have severe impacts upon the area from which the water is taken. Such water will no longer be available to preserve vegetation, natural habitats, riparian areas, and wetlands. Not only may the habitat suffer, but the wildlife which depends on such habitat may also be impacted.

The removal of water from the Rose Valley Basin may cause each and every property owner relying upon water wells to (a) increase the depth of their wells, (b) increase the capacity and efficiency of the wells, and/or (c) expend more energy to extract the depleted water supplies to the surface for reasonable use. Any drawdowns in the underground water levels may also cause the natural springs through the Rose Valley to go dry.

Land Use and Planning.

Studies of wildlife and existing habitat conditions are mandatory to determine whether the Project, if approved and implemented, may result in the elimination of viable wetlands, habitat and the like.

Noise.

The noise generated from the proposed project must be evaluated and considered. What are the noise levels and do they impact either the persons working at the project or the surrounding wildlife?

Utilities and Service Systems.

The disposal of wastewater and the emissions to the atmosphere from its cooling operations need to be studied carefully to determine whether they do present a hazard to the public or unacceptable levels of pollution.

Project Alternatives.

The EIS will also consider alternatives to the proposed Project. The full range of the alternatives should be studied. At a minimum, the following alternatives should be considered:

1. Identify whether current geothermal technology could be used to better enhance the operations and allow the more efficient use of water resources.

2. How much capacity is appropriate to avoid the depletion of the resource?

3. Would a lower level of electricity generation allow for the geothermal resources to be extended indefinitely?

4. What is the natural recharge of the geothermal fluids on an annual basis? Should the consumption of these fluids be balanced against the natural recharge?

5. Depending upon available technology and the identification of the geothermal resources, what is the best generating facility?

6. Identify all potential alternate sources for water and describe the means by which such waters can be used at the geothermal facilities other than water from the Rose Valley underground aquifer.

7. Reclaimed effluent water flows from the Ridgecrest Treatment Plant, or other nearby facilities, which is already being done in other areas to preserve geothermal resources.

8. Water purchases from the City of Los Angeles Department of Water and Power ("DWP").

9. Reclamation of DWP's water losses from Haiwee Reservoir.

10. Use of surface or underground water from the Indian Wells water basin (while perhaps farther away, there may be fewer environmental impacts).

11. Construction of new water entrapment programs such as reservoirs to utilize available precipitation, snowmelt and rain waters.

12. Water purchases and deliveries from other sources?

13. Rather than relying solely upon water supplied by the Rose Valley, can a combination of one or more alternative sources of water be used to minimize the damage to the Rose Valley Basin?

14. What are the opportunities for conserving and recycling water?

15. Is there some other gas, substance or fluid other than water which may be efficiently used to transfer the heat to the electrical generators?

16. Are "best practices" being used to minimize and reduce water loss, allowing for greater reclamation of its geothermal fluids?

17. What type of geothermal generating plant is being considered to reduce damage to the environment and the use of scarce water resources?

Without a full consideration of alternative technologies, such as air-cooled mechanisms or other engineering designs to reduce the use of water and increase the amount of the geothermal fluids used for injection, the EIS cannot adequately study and comment upon appropriate and prudent steps to mitigate the depletion of water resources. The possible depletion of geothermal reservoirs, and any plans to import water from the surrounding surface and groundwater sources should be considered in all planning stages.

I am enclosing with this letter two (2) computer compact discs ("CDs") on which many of the letters and evidence we have submitted to the County and BLM have been copied. Attached is a list of the documents in the CDs. Each of the letters enclosed in the CDs raises substantial environmental issues in connection with the development of geothermal projects in and round Rose Valley. The CDs also contain letters presented to the County and BLM from numerous local conservation groups and individuals. While all of the letters and the related reference materials refer to the Coso Project, all of such materials are equally applicable to the Projects being studied by BLM. Accordingly, the ESI must fully evaluate the proposed environmental impacts from the Projects under consideration, including all of the evidence and comment letters contained in the enclosed CD(s).

Very truly yours,

ARNOLD, BLEUEL, LAROCHELLE,
MATHEWS & ZIRBEL, LLP

Gary D Arnold

Gary D. Arnold

GDA:jw
Enclosures

REFERENCES:

U.S. Geological Survey, Springs of California, by Gerald A. Waring, published in 1915.

Rockwell Report 1980: *"Geology and Hydrology Technical Report on the Coso Geothermal Study Area"* conducted by Rockwell International dated April, 1980.

The California Desert Conservation Area Plan 1980, as amended.

Environmental Impact Statement published in September, 1980 for the *"Proposed Leasing within the Coso Known Geothermal Reservoir Area"* (Parts 1-5).

Report entitled *"The Recharge Area for the Coso, California, Geothermal System,"* by Robert O. Fournier and J.M. Thompson, 1980.

Environmental Assessment of the Proposed California Energy Company Plan of Exploration, Federal Lease CA-11402, Coso KGRA, dated December 5, 1985.

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Letter dated March 20, 2009 to Randy H. Keller, Assistant County Counsel, from Gary Arnold.

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A report by Jim Pearson, Ph.D. of the historical events in and around Little Lake.

Curriculum Vitae of Jim Pearson, Ph.D.

Brief description of locations and uses of water well on the Little Lake Ranch property.

Chamber Report of Commerce report of largest employers in Ridgecrest.

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09 OCT -2 AM 10:53

September 30, 2009

John Dalton, Haiwee Geothermal Leasing Coordinator
Bureau of Land Management
California Desert District Office
22835 Calle San Juan De Los Lagos
Marino Valley, CA 92553

Re: Haiwee Geothermal Projects

Dear Mr. Dalton:

Please accept this letter as my request on behalf of Little Lake Ranch, Inc. ("LLR") to receive written notice of any hearings, actions, decisions, meetings, studies, applications or procedures concerning and relating to the pending geothermal exploration and development projects located within the Haiwee area near Ridgecrest and Inyo County, California ("Project"). LLR owns approximately 1,200 acres southwest of the proposed Project, including Little Lake and the riparian areas adjacent thereto. To the extent that the Project contemplates the use of water pumped from the Rose Valley in which LLR is also located, the Project could have severe impacts upon LLR.

I am enclosing a copy of a letter I am directing to BLM in Ridgecrest asking for the production of public records in connection with the Project. I am not sure if such request should be directed to you or the Ridgecrest Office. Please advise. Thank you for your attention to the foregoing.

Very truly yours,

ARNOLD, BLEUEL, LAROCHELLE,
MATHEWS & ZIRBEL, LLP

Gary D. Arnold

Gary D. Arnold

GDA:jw
Enclosure
cc: Little Lake Ranch
Hector Villalobos

Little Lake\BLM\BLM Ltr-Notice

*Certified Specialist, Estate Planning, Trust and Probate Law State Bar of California Board of Legal Specialization

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September 30, 2009

U.S. Department of Interior
Bureau of Land Management
Attn: Custodian of Records
300 S. Richmond Road
Ridgecrest, CA 93555

RE: PUBLIC RECORDS REQUEST

To: Custodian of Records

Please provide to the undersigned any and all records and other public documents relating to the pending geothermal exploration and development projects located within the Haiwee area near Ridgecrest and Inyo County, California ("Project"). Such requested records include all documents related to the Project, including, but not limited to, any and all reports, studies, notices, applications, correspondence, memorandums, e-mails, notes during environmental documents, initial studies, permits, licenses, approvals and other writing involving or concerning the Project.

This request is made pursuant to the Freedom of Information Act, U.S.C. §552. Authorized fees will be paid to you pursuant to an itemized invoice. I am sending a duplicate copy of this letter to John Dalton, who is the Haiwee Geothermal Leasing Coordinator for the Project.

Please contact the undersigned should you have any questions or require any additional information.

Very truly yours,

ARNOLD, BLEUEL, LAROCHELLE,
MATHEWS & ZIRBEL, LLP

Gary D Arnold

Gary D. Arnold

GDA:jw
cc: John Dalton
Little Lake Ranch
Little Lake\BLM\BLM Ltr-Records

* Certified Specialist, Estate Planning, Trust and Probate Law State Bar of California Board of Legal Specialization

BIG PINE PAIUTE TRIBE OF THE OWENS VALLEY
Big Pine Indian Reservation

November 19, 2009

John Dalton
Haiwee Geothermal Leasing Coordinator
BLM California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553

Dear Mr. Dalton,

Subject: Comments on Proposed Haiwee Geothermal Leasing Area

The Big Pine Paiute Tribe of the Owens Valley (Tribe), a federally recognized Tribe, thanks you for the opportunity to submit comments during this scoping phase for the proposed leasing of BLM land in Rose Valley for geothermal exploration and development.

Proposed Project

The Proposed Action is: Amend the California Desert Conservation Area (CDCA) Plan to either open or close the 22,000 acre Haiwee Geothermal Lease Area (HGLA) to geothermal exploration, development and utilization. The CDCA Plan was completed in 1980, but has been amended several times since then. The plan recognizes prime areas for geothermal as being in Imperial County and in the Coso Known Geothermal Resource Area (KGRA). It is unclear from the maps and materials that have been presented if the HGLA overlaps with the Coso KGRA, but the fact that the CDCA Plan would require amendment suggests minimal to no overlap. The EIS should disclose the reason for not considering the HGLA previously and for not including it with the Coso KGRA. All previous management designations assigned for the Rose Valley area according to the CDCA will require critical scrutiny in this environmental review.

The CDCA Plan defines a Native American Element, and with regard to this element, the goals were to remain consistent with governing policies and:
1) Identify Native American values through regular contact and consultation with Tribal entities and/or individuals,
2) give *full consideration* to native American values in land use planning and management decisions [italics added for emphasis], and
3) protect and manage Native American values wherever prudent and feasible.
The CDCA Plan acknowledges -- and we concur -- that impacts affecting Native American values are not amenable to mitigation, because these impacts typically involve desecration or sacrilegious treatment of spiritually important sites.

P.O. Box 700 • 825 South Main Street • Big Pine, CA 93513 • Office: (760) 938-2003 • Fax: (760) 938-2942

Tribal Consultation Process

The Tribe is very concerned about the recent lack of timely notification about projects on which BLM has been the lead agency. BLM has initiated environmental review on a number of proposals to develop or consider development of renewable energy throughout the southwest region, and the Tribe has received notices either late in the process or not at all. We respectfully request initiation of the Consultation process before or no later than the start of the public Scoping process. Doing so should ensure both parties comply with the provisions and responsibilities of Section 106 of the National Historic Preservation Act.

Concerning this project in particular, we did not receive notification until the Scoping period was well underway, and although there were meetings scheduled for the nearby communities of Lone Pine and Bishop, we were notified less than one week before these scheduled meetings. BLM had initially informed us that the deadline for comments was October 16. Near that date, the deadline was changed to November 9. Subsequently, the Tribe was invited to submit comments with regard to the Consultation process no later than November 20. It's still not clear to us why there are two due dates, but by phone on November 6, you advised we could submit one comprehensive set of comments by November 20.

Prehistoric and Native American Resources/Need for Cultural Inventory

When BLM and its archaeological consultants survey for cultural resources for this EIS, we request that a Native American Monitor be present.

Geothermal Energy: A Tradeoff

The Tribe in concept favors efforts to reduce dependence on fossil fuels and employ cleaner alternatives when feasible. However, we believe that, for many situations energy conservation measures may serve to reduce both reliance on foreign energy sources and greenhouse gas emissions, thereby precluding the need to increase power generating capacity. All energy development involves tradeoffs; thus we urge BLM to carefully examine those tradeoffs when deciding whether to open the Haiwee area for geothermal exploration and possible development. Geothermal plants typically do emit some of earth's sequestered carbon dioxide into the atmosphere, and geothermal sources do not last forever. The true renewability of earth's heat is not well understood. New power plants require transmission lines, and they establish their own footprint with procurement and waste streams. Power plant operators typically discourage or prohibit access to their facilities, and denial of access may conflict with a Native American value. Finally, geothermal energy production involves water, and water in our desert area is precious. Extraction of water from this arid region could alter a spring and kill or diminish the life forms that depend on that water, and the loss of such habitats is permanent. Therefore, we urge the BLM to constantly assess the tradeoffs. For example, is providing energy for streetlights in a shopping center a good reason to threaten a spring?

Review of Record for Coso Hay Ranch Project

The Tribe raised serious concerns over the proposal by Coso Operating Company to pump relatively large amounts of water from Rose Valley and pipe it to their power generating facility located within the China Lake Naval Air Weapons Station. The project was generally opposed not only by tribes, but also by local land owners (such as the owners of Little Lake Ranch), environmental groups, the Inyo County Water commission, and the Los Angeles Department of Water and Power (LADWP). We recommend BLM review the BLM EIS, the

Inyo County EIR, and all concerns raised about the Hay Ranch project. It should be noted, for example, that pumping at Coso Hay Ranch could seriously impact water availability in the aquifer beneath Rose Valley. Also, LADWP has announced plans to pump water for export from the Rose Valley aquifer. Such ongoing and anticipated activities could seriously confound geothermal development in the vicinity. The voluminous information generated as a result of the Hay Ranch proposal can benefit BLM with regard to assessing impacts to the HGLA, but it may also show that further development in the region will not be feasible.

Thorough Inventory/ Cumulative Effects

The NEPA process must involve thorough inventory and characterization of wetlands (all springs and seeps) and regional hydrology, vegetation, wildlife, rare plant and animal species, geology, aesthetic/scenic values, recreation, and dust generation. Because other large-scale operations occur in the vicinity (LADWP operations, Owens Lake dust mitigation, pumping for export by Coso Hay Ranch, livestock grazing, and others), BLM must analyze each environmental element in terms of cumulative effects imposed by a new project.

Final Comments

If BLM decides to allow leasing for geothermal exploration and development, there will be impacts. We understand further environmental review will occur prior to building power plants. Regardless, tradeoffs need to be carefully examined. Priorities should be to avoid any impacts to Native American values, as well as to avoid as many adverse environmental impacts as possible. Secondly, resource impacts should be minimized if they are deemed necessary and steps should be taken as soon as possible to restore areas. Mitigation plans should be in place to compensate for the lost resources, goods, services, and values. The Tribe recommends a fund for mitigation be established for each developed site and that considerable thought be given to the real cost of mitigating long-term and currently unquantifiable impacts such development will cause. Finally, before geothermal is implemented, BLM should perform a thorough evaluation of royalties.

Sincerely,

Virgil Moose

Virgil Moose
Tribal Chairperson

"Tom Budlong" <TomBudlong@RoadRunner.com>

11/06/2009 08:05 AM

To <John_Dalton@ca.blm.gov>

cc

bcc

Subject Haiwee

John,

Attached, comments on the Haiwee Geothermal Leasing.

I'm also mailing a copy.

Regards,

Tom Budlong

Comments on Haiwee Geothemal.doc

Tom Budlong
3216 Mandeville
Los Angeles, CA 90049

Friday, November 6, 2009

John Dalton
Haiwee Geothermal Leasing
Bureau of Land Management, CDD
22835 Calle San Juan de los Lagos
Moreno Valley, CA 92553

By email to John_Dalton@ca.blm.gov
By Certified Mail, Article No. 7008 2810 0000 5936 1316

Dear Mr. Dalton,

I attended the Scoping Meeting at the Kerr McGee Center in Ridgecrest on October 15, 2009 for possible leasing in the Haiwee Geothermal Leasing Area. The Fact Sheet handed out at the meeting states BLM must make two decisions:

- Whether to approve three noncompetitive lease applications for approximately 4500 acres of BLM lands in the leasing area. [The lessee, as explained at the meeting, is Deep Rose.]
- Whether to offer competitive leases in the leasing area.

This letter is in response to requests for comments.

1) On Nov. 4, I talked with Sean Hagerty who explained the rights associated with leasing: As mentioned in the Sep 11, 2009 Federal Register notice, areas leased under the process that includes this EIS have rights to three "phases" -- exploration, development and utilization. The BLM can lease without these rights by including a 'No Surface Occupancy' stipulation in the lease. Without the 'No Surface Occupancy' in the lease, the BLM cannot deny development after exploration without risking potentially substantial liability. Mr. Hagerty also explained that the BLM can, however, require development be located somewhere on the lease that is not the lessee's choice.

Thus, the EIS must do enough analysis to identify all locations in the lease area that would be acceptable for exploration, development and utilization, locations which would not be acceptable exploration, development and utilization, and locations which could be leased under No Surface Occupancy. I presume the BLM could also remove some areas from all consideration in favor of analyzing them in the future, to reduce the immediate analysis burden.

Presenters at the meeting stated that for analysis purposes the production facility would be assumed to be 2 ea 30MW plants. The EIS should analyze this configuration. If it is anticipated that lessees would prefer other configurations, those configurations should also be analyzed. The EIS should not allow leasing for configurations not analyzed.

2) With respect to the Deep Rose noncompetitive leases:

There is a reasonable question about the financial and technical capability of the Deep Rose venture:

- The applicant, Deep Rose, is proposing drilling to 18-20,000 feet. This is on the order of twice the depth of the nearby Coso Geothermal facility. This was discussed at the meeting. Deep Rose has a leasing permit for the State section 16, within the leasing area boundary, and this depth has been their intention there.
- This is abnormally deep for geothermal facilities.
- Drilling to this depth is extraordinarily expensive. In analyzing the economic risk, the EIS should describe and analyze the financial strength of Deep Rose to determine its adequacy.

- Coso Geothermal, with a proven track record and presumably with extensive knowledge of the resource, has not shown interest in this depth. This pre-drilling exploration is considered prudent when considering geothermal energy extraction, to avoid unnecessary drilling expense and unnecessary degradation of environmental values.
- Deep Rose has no geothermal technical, exploration or development experience.
- It is apparent that Deep Rose has not demonstrated or indicated it has performed systematic pre-drilling exploration.

The Deep Rose exploration should be considered experimental and speculative:

- It is outside normal experience for geothermal energy extraction.
- Deep Rose does not have geothermal development experience.
- Normal exploration prior to drilling apparently has not been done.

To avoid unnecessary disturbance and degradation of public land for such a project the EIS should require that Deep Rose perform prudent pre-drilling exploration common to professional geothermal projects.

The EIS should carefully and realistically review the pre-drilling exploration data to ensure:

- that the probability of completion of the Deep Rose exploration warrants approving the exploration.
- that the probability of discovering an economic resource if the exploration is completed warrants exploration.

Coso Geothermal recently was permitted to use aquifer water for wet cooling to restore production at their facility, instead of converting to dry cooling. The documents leading to this permit include expert opinions with two opposing views. One (Coso Geothermal) concluded that conversion to dry cooling would be impractical. The other (Ronald DiPippo) concluded the opposite. This emphasizes that geothermal design is not a simple science, and that a single feasibility opinion is insufficient. Because of the experimental nature of the project and the complexity of the science and engineering, the EIS process should consult with more than one expert in the field, and include all opinions. The BLM should strongly consider creating a panel of expert geothermal consultants whose members could work together to examine the technical aspects of the project to arrive at consensus, or document lack of consensus.

3) The EIS should describe:

- The source and projected amount of water to support the three phases – exploration, development and utilization.
- The source of water and projected usage rate of possible plant designs for cooling, for production and injection well losses, for losses from other related activities, and for parasitic requirements. Of particular concern is the cooling method, wet, dry or hybrid, projected for a production plant, and whether a plant would expect to draw on aquifer water.

These concerns arise from concerns of ground water extraction by the existing Coso Geothermal operations. The cumulative impact of extraction by Coso Geothermal, Deep Rose, and additional lessees that would be allowed must be analyzed.

4) The EIS should analyze the amount of geothermal related activity the lease area could support.

5) The EIS should describe reclamation on completion of the three phases – exploration, production and utilization. This should include

- Extent to which the property must be returned to undisturbed condition.
- The time allowed for the phases. These periods cannot be open-ended, since that provides a path to delay restoration.
- The time allowed for reclamation after a phase is completed or its time has expired.

- Reclamation bond amounts and conditions.

6) The Federal Register Notice of Sep 11, 2009 lists issues identified thus far, and are included here by reference to the notice. These are:

- Native American concerns
- Land use conflicts, including recreation
- Cumulative impacts considering existing, proposed and potential geothermal projects in the area. (These should include other projects besides geothermal, and not be limited to the boundaries of the leasing area.)
- Potential impacts on:
  - Cultural resources. At the meeting, Don Storm, the BLM archaeologist, described very sensitive prehistoric resources in the area, and some historic resources.
  - Social and economic issues
  - Wildlife. This should include animals and insects.
  - Visual resources. This includes California Watchable Wildlife's Little Lake Overlook.
  - Surface water.
  - Ground water. (See earlier comments in this letter).
  - Geology, including the potential for subsidence and for triggering earthquakes.
  - Mining.
  - Effect on Coso Geothermal.
  - Effect on surface expressions of this geothermal resource.
  - Vegetation
  - T & E species
  - Air quality
  - Noise
  - Transportation
  - Human health and safety

7) The EIS should analyze effects on greenhouse gasses and global warming.

8) The EIS should analyze the ability and capacity for BLM to manage and monitor the activity without impacting its other responsibilities.

9) Native Americans

Native American tribes should be actively solicited for comments. Due to potential cultural differences, this should include active solicitation involving personal contact (phone and face-to-face) encouraging participation, as well as formal notices by mail, email and other methods. My understanding is that this area is generally the intersection of the territory of more than one tribe. An archaeologist should be consulted to determine the tribe or tribes of interest, and an archaeologist should be involved in collecting and analyzing comments, again due to cultural differences.

Sincerely,

Tom Budlong
310-476-1731 Voice
310-471-7531 Fax
TomBudlong@RoadRunner.com

California Native Plant Society

Bristlecone Chapter
P.O. Box 364
Bishop, CA 93515

October 13, 2009

John Dalton
Haiwee Geothermal Leasing Coordinator
22835 Calle San Juan de Los Lagos
Moreno Valley,CA 92553

Re: Proposed Geothermal Project in Haiwee Area (*re*: News Release No. CA-CDD-09-69)

"*Here is an inconvenient truth about renewable energy: It can sometimes demand a huge amount of water.*" New York Times, September 30, 2009

Dear Mr. Dalton:

I wish to list some concerns of The Bristlecone Chapter of the California Native Plant Society regarding additional development of geothermal resources in Inyo County. Neither the chapter nor the state organization are opposed to "renewable" energy development, provided such projects are truly renewable and do not have significant direct or indirect effects on critical habitats or rare species of plants in California. Geothermal plants tend to have a small footprint and potentially adverse direct effects should be avoidable with proper citing of facilities. We are more concerned about the indirect effects, which generally involve non-renewable, consumptive uses of water leading to the degradation of wetland habitats. There is increasing national awareness and concern over inappropriate water use in "renewable" energy projects, as evidenced by the recent article in the *New York Times*, cited above.

The existing Coso Geothermal Plant is an excellent example of the problem. The methods of operation this plant, which involve wet-cooling towers, have resulted in a serious depletion of the geothermal fluids resulting in a decline in the production of electrical power. Inyo County recently approved export of the entire annual recharge of the Rose Valley aquifer to restore the capacity of the plant. According to the EIR for the water export, this level of water diversion will destroy significant wetland habitat for plants and animals in the vicinity of Little Lake, unless the "Hydrological Monitoring and Mitigation Plan" (HMMP) is fully and faithfully implemented by both Coso Operating Company and Inyo County. Implementation of the HMMP is not assured, however. As far as I know, the need for water extraction and export was never addressed in the original environmental assessment of the Coso Geothermal Plant. CNPS believes that it is crucial that we apply lessons from the past to any future geothermal projects.

Specifically,

- Applicants for any new geothermal projects in the Haiwee-Coso area should be required to explicitly address in the EIR whether or not their projects will deplete the geothermal resource through their cooling systems, and whether injection of surface water or groundwater will be required over the life of the proposed project. If applicants state that appropriation of water resources will not be part of the project, that condition should be incorporated into the terms of the lease or license.

- If applicants state that appropriation of surface waters or groundwater either will or may become necessary, then the EIR for the project should specifically address (a) the source of the appropriated water, and (b) all impacts associated with such water appropriation, including potential impacts on all wetland habitats maintained by the appropriated water source. Analysis of such impacts should include detailed biological surveys of the affected wetland habitats—this was never done in the case of the Coso Geothermal Company's water exportation project.

In evaluating applications for new geothermal projects in the Haiwee-Coso area, please keep in mind that the entire annual recharge of the Rose Valley aquifer has already been appropriated by the Coso Operating Company, with the approval of Inyo County. Additional water from Rose Valley can therefore only come from groundwater mining, which will accelerate the degradation of wetlands in the area.

Sincerely,

Steven P McLaughlin

Steven P. McLaughlin,
President, Bristlecone Chapter, CNPS

Cc: Greg Suba, Conservation Program Director, CNPS

CENTER *for* BIOLOGICAL DIVERSITY

VIA U.S. MAIL AND ELECTRONIC MAIL

November 9, 2009

Bureau of Land Management
California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
John_Dalton@ca.blm.gov

Attn: John Dalton, Haiwee Geothermal Leasing Coordinator

Re: Notice of Intent To Prepare an Environmental Impact Statement for the Proposed Leasing of National System of Public Lands for Geothermal Resource Development in the Haiwee Geothermal Leasing Area Located in Inyo County, CA and To Amend the California Desert Conservation Area Plan of 1980

Dear Mr. Dalton

The Center for Biological Diversity ("Center") is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 40,000 members throughout California and the western United States, including members that live and/or visit the vicinity of the proposed Haiwee Geothermal Leasing Area. These scoping comments are submitted on behalf of our board, staff and members.

The development of renewable energy generation and adequate transmission capacity for that renewable energy is a critical component of efforts to reduce greenhouse gas emissions, avoid the worst consequences of global warming, and to assist California in meeting emission reductions standards. The Center strongly supports the development of renewable energy production, and supports the generation of electricity from geothermal power, in particular, and truly necessary transmission upgrades to support that power production. However, like any project, proposed geothermal power projects must be thoughtfully planned to minimize impacts to the environment. In particular, renewable energy projects should avoid impacts to sensitive species and habitats to the greatest extent possible through careful siting, planning, and design. Only by maintaining the highest environmental standards with regard to local impacts, and effects on species and habitats, can renewable energy production be truly sustainable.

The DEIS must include a hard look at impacts to all imperiled species in this area including direct, indirect and cumulative impacts across the species' range. Of particular concern are impact to the Mojave ground squirrel and the conservation area set aside for its

Arizona • California • Nevada • New Mexico • Alaska • Oregon • Montana • Illinois • Minnesota • Vermont • Washington, DC

Lisa T. Belenky ·Senior Attorney · 351 California St., Suite 600 ·San Francisco, CA 94104
tel: (415) 436.9682 ext. 307 *fax:* (415) 436.9683 lbelenky@biologicaldiversity.org *www.BiologicalDiversity.org*

recovery which the proposed project directly impacts. Wildlife habitat through out this area of the California desert is becoming increasingly fragmented and subject to multiple development pressures. As a result, the cumulative analysis must be particularly robust in order to ensure both the survival and recovery of imperiled species.

Of particular concern in this area as well is the water use associated with geothermal energy production. Water is a precious and increasingly scarce resource in California and throughout the southwest. The impacts from water withdrawals in arid environments are well known and can include impacts to surface waters, springs, and seeps that are critical to many desert species from fish to bighorn sheep to rare plants. BLM should ensure that all federal reserved water rights essential to the protection of rare, imperiled and listed species, are fully protected on these and nearby public lands that may be affected by water use in the proposed geothermal leasing area. Specifically, the BLM must protect all water sources needed to ensure species and habitats survive and recover on our public lands.

Antropogenic global climate change has already altered the hydrology of montane regions. In the western United States, the following trends have been observed over the past century: an earlier streamflow by one to four weeks due to early snowmelt, a decrease in the percentage of precipitation that falls as snow, a decrease in mountain snow-water equivalent, increased frequency of heavy precipitation events as well as increased frequency of periods of drought, and a decrease in the duration and extent of snow cover. (IPCC, 2008). On average, early spring snowpack in the Sierra Nevada has decreased by 10% (1.5 million acre-feet). (DWR 2008). Studies project that extreme precipitation events during the winter will increase in the Sierra Nevada by 10-20% by 2040-2060. (Leung et al. 2004). Furthermore, by 2050, the Sierra Nevada snowpack is projected to decrease 25%-40% from its historic average. (DWR, 2008). Longer dry periods will be interspersed with heavy precipitation events, and droughts will increase in frequency.

Climate modeling also indicates that on average, California will experience higher temperatures in all seasons. (IPCC, 2008, Chung et al. 2009 (at page 8, Table 2). Warming temperatures will cause a shift to more winter precipitation from snow to rain, reducing snowpack and leading to shifts in the timing of runoff as well as decreased spring and summer runoff. (Chung et al. 2009 (page 4, 26); Kapnick and Hall, 2009). These changes will also have a profound impact on water availability in the project area.

As a result, in considering the proposed geothermal leasing area the BLM must fully identify and analyze both the potential water needs of the foreseeable geothermal development and the impacts such water use could have on the environment in the context of a changing climate. Alternatives that would require less water use should be considered in order to avoid significant impacts to the environment from the proposed development and comply with both NEPA and the ESA. Specifically, BLM should consider alternatives that would: encourage technological innovation to eliminate or vastly reduce the water needed for geothermal power production; require the use of recycled water where available; and require capture and treatment of all waste water so that it can be safely returned to groundwater basins through infiltration or reused on site.

The DEIS should consider at least one alternative that would *require* the use of the most water efficient technologies by all geothermal projects in the area as well as ensure that when and if new water saving technologies become available they must be adopted even for any existing projects.

Thank you for the opportunity to submit these comments, please do not hesitate to contact me if you have any questions. Please provide all future notices and documents related to this project to me at the address below.

Sincerely,

Lisa T. Belenky, Senior Attorney
Center for Biological Diversity
351 California St., Suite 600
San Francisco, CA 94104
(415) 436-9682 x307
Fax: (415) 436-9683

References:

Chung, et al., Department of Water Resources, May, 2009, Using Future Climate Projections to Support Water Resources Decision Making in California, A Report from: California Climate Change Center, available at http://www.water.ca.gov/climatechange/articles.cfm

Department of Water Resources, State of California. Managing an Uncertain Future: Climate Change Adaptation Strategies for California Water (2008).

Intergovernmental Panel on Climate Change (IPCC). Climate Change and Water. June, 2008.

Kapnick, Sarah and Alex Hall, March 2009, (Draft Paper) Observed Changes in the Sierra Nevada Snowpack: Potential Causes and Concerns, A Report From: California Climate Change Center, CEC-500-2009-016-D, available at http://www.climatechange.ca.gov/publications/cat/

Leung, L.R., Y. Qian, X. D. Bian, W.M. Washington, J.G. Han, and J.O. Roads. 2004. Mid-century ensemble regional climate change scenarios for the western United States. Climate Change 62:75-113.

Jeff Aardahl
<jaardahl@defenders.org>
11/05/2009 09:52 AM

To "John_Dalton@ca.blm.gov" <John_Dalton@ca.blm.gov>
cc
bcc
Subject Haiwee Issue Scoping Letter

John;
The subject letter is attached. Please include it in the official files for the proposed Haiwee Geothermal Leasing Project.

Thank you.

Jeff Aardahl
California Representative

1303 J Street, Suite 270 Sacramento, CA 95814
Tel: 916-313-5800 x110 | **Fax:** 916-313-5812
jaardahl@defenders.org | www.defenders.org

Haiwee_Geothermal_Scoping_Final_Letter.doc

California Office
1303 J Street, Suite 270 | Sacramento, CA 95814 | tel 916.313.5800 | fax 916.313.5812
www.defenders.org

November 5, 2009

Bureau of Land Management
California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
(Sent via electronic mail to: John_Dalton@ca.blm.gov)

Attn: John Dalton, Haiwee Geothermal Leasing Coordinator

Dear Mr. Dalton:

This letter is in response to the Bureau of Land Management's (BLM) public invitation to submit issue scoping comments on the proposed Haiwee Geothermal Leasing Area located in Rose Valley near Coso Junction, California.

On behalf of Defenders of Wildlife (Defenders) and our more than 1,000,000 members and supporters in the U.S., 200,000 of which reside in California, I am writing to provide issue scoping comments to the Bureau of Land Management regarding the proposed Haiwee Geothermal Leasing Area located on approximately 22,000 acres of public land in Rose Valley near Coso Junction, California.

Defenders is dedicated to protecting all wild animals and plants in their natural communities. To this end, Defenders employs science, public education and participation, media, legislative advocacy, litigation, and proactive on-the-ground solutions in order to impede the accelerating rate of extinction of species, associated loss of biological diversity, and habitat alteration and destruction.

In the pursuit of the generation and transmission of electrical energy in California, we support renewable energy projects that are appropriately located, environmentally sustainable, and efficient. Defenders expects all government agencies involved in the review and permitting of proposed renewable energy project will adhere strictly to the highest administrative standards and reach decisions that are fully in the public interest and consistent with laws, regulations and policies regarding management of our environmental resources.

Defenders believes that renewable energy projects can be accommodated in the California Desert, but only if they are carefully designed and located in areas that avoid sacrificing what remains of our relatively intact desert landscape and its associated biological resources and values.

I attended the public scoping meeting held in Ridgecrest, CA on October 15, 2009 and found the meeting to be informative and well organized. At that meeting I raised several questions and issues associated with this proposed project. This letter contains the issues I raised plus additional information that I would like addressed in the planning and environmental compliance process for this proposed project.

California Office
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www.defenders.org

Please address the following issues in the Environmental Impact Statement (EIS) for the Proposed Haiwee Geothermal Leasing Area:

1. Proposed Action: The EIS should contain a description of the reasonable foreseeable development of geothermal energy associated with the proposed action.

2. Alternatives: The EIS should analyze the effects of a reasonable range of alternatives, including the no action alternative. Other than the no action and proposed action, the alternatives should include alternatives that propose a smaller leasing area or areas as a means to avoid sensitive wildlife species and their habitats. Similar to issue #1, alternatives other than the no action should include a description of the reasonable foreseeable development of geothermal energy.

3. Mohave Ground Squirrel (MGS): The proposed leasing area is within the Mohave Ground Squirrel Habitat Management Area which was established in 2006 by BLM in the Record of Decision for the West Mojave Planning Area Amendments to the California Desert Conservation Area (CDCA) Plan.

The Record of Decision stated the purpose of establishing the MGS Habitat Management Area was to "…facilitate protective management for this species and serve to prevent further declines and assist the CDFG." The two primary goals with respect to the MGS are to:

1) Ensure long-term protection of MGS habitat throughout the region.

2. Ensure long-term viability of the MGS throughout its range.

The Record of Decision also changed the Multiple Use Class for public lands south of Owens Dry Lake in order to provide greater habitat protection for the MGS. Specifically, 136,086 acres was changed from Moderate Use Class to Limited Use Class, and 144 acres of Unclassified land was changed to Limited Use Class, for a total increase of 136,230 acres of Limited Use Class entirely within the MGS habitat management area.

Under the provisions of the West Mojave Planning Area amendments approved in 2006 were two requirements with respect to multiple use activities occurring on public within the MGS Habitat Management Area:

1) Habitat loss from any approved project is limited to one-percent of the total over the 30 year life of the plan.

2. Habitat loss will be compensated at a ratio of 5:1 through the acquisition of suitable MGS habitat on private land within the management area and managed for the conservation of the MGS.

The availability of suitable habitat in private ownership that could be used to meet this commitment needs to be addressed in the EIS.

California Office
1303 J Street, Suite 270 | Sacramento, CA 95814 | tel 916.313.5800 | fax 916.313.5812
www.defenders.org

In addition to the MGS conservation area identified above, the CDCA Plan of 1980 established the Rose Valley Habitat Management Area specifically for the MGS. According to the CDCA Plan, this 18,000 acre was to be managed to "Protect, Stabilize and/or Enhance Wildlife Values (CDCA Plan, Table 2, Planned Management Areas for Fish and Wildlife). According to our estimate, approximately 11,000 acres of this area is within the proposed Haiwee Geothermal Leasing Area. The compatibility of geothermal leasing and any associated surface use or development associated with geothermal energy extraction with the management goals for the Rose Valley MGS area needs to be carefully assessed.

We are particularly concerned over cumulative impact to the MGS and its habitat in the Rose Valley and the designated MGS management areas noted above. It appears the office and equipment yard facilities in Rose Valley near Coso Junction have been located on public lands, and recently the Hay Ranch Water Pipeline right of way issued to the Coso Operating Company has resulted in additional habitat losses totaling 32.24 acres. The cumulative impacts to the MGS and its habitat in the Rose Valley needs to be carefully addressed in the EIS in light of the strong conservation commitments BLM has made for this species.

Three non-competitive geothermal lease applications have been received by the BLM in the Rose Valley area. According to our estimate, all of the lands applied for by Metcalf (CACA 43993) and about 75 percent of the lands applied for by Maxx (CACA 44082) are within the Rose Valley Habitat Management Area. The issue of habitat loss in this area needs to be addressed in light of the long-term management goal of "Protect, Stabilize and/or Enhance Wildlife Values."

Wildlife habitat connectivity and species movements that may be affected by development within the proposed leasing area need to be studied and addressed. This is particularly important for the MGS (north-south connectivity) and the Desert Tortoise.

4. Water Resources: Extraction of groundwater in Rose Valley associated with geothermal energy resource development and the short and long term impacts of such extraction needs to be analyzed. The impacts to groundwater and surface water and associated wetlands at Little Lake need to be fully addressed. The recent disclosure that the steam reservoir in the existing Coso geothermal development within the China Lake Naval Air Weapons Station has been impacted by ground water loss due to geothermal power plant operations, and the recent permitting of groundwater pumping and transport from Rose Valley to the Coso Hot Springs area, suggests existing and any future geothermal developments will have a direct effect on water resources.

With regard to Little Lake, the EIS should analyze the potential adverse impacts to BLM administered lands at Little Lake and specifically to the Little Lake Watchable Wildlife Area established by BLM. Certain BLM lands include a portion of Little Lake and the basalt cliffs immediately east of the lake.

National Headquarters
1130 17th Street, N.W.
Washington, D.C. 20036-4604
tel 202.682.9400 | fax 202.682.1331

California Office
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www.defenders.org

We strongly urge the BLM to work closely with the California Department of Fish and Game in all aspects of this proposed leasing project. We look forward to the opportunity to review and comment on the draft environmental impact statement for this effort.

Please contact me if you have any questions regarding our issue scoping comments.

Sincerely,

Jeff Aardahl

Jeff Aardahl
California Representative

National Headquarters
1130 17th Street, N.W.
Washington, D.C. 20036-4604
tel 202.682.9400 | fax 202.682.1331

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
District 9
500 South Main Street
Bishop, CA 93514
PHONE (760) 872-0785
FAX (760) 872-0754
TTY 711 (760) 872-0785

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Flex your power!
Be energy efficient!

September 29, 2009

John Dalton, Haiwee Geothermal Leasing Coordinator
California Desert District Office
Bureau of Land Management
22835 Calle San Juan De Los Lagos
Moreno Valley, California 92553

File: 09-FED
NOI EIS
SCH: none

Dear Mr. Dalton:

Haiwee Area Lease of Bureau of Land Management (BLM) Lands for Geothermal Use - Notice of Intent to Prepare an Environmental Impact Statement (NOI EIS)

The California Department of Transportation (Caltrans) District 9 appreciates the opportunity to review the proposed lease of BLM Lands near Haiwee Reservoir for Geothermal use.

Please consider the following while preparing the EIS:

- Address any potential highway transportation issues relevant to US 395. These may include highway access points for geothermal facilities, construction activities related to transport of materials and commuting of employees. Transportation system improvements including Caltrans permitting could be merited and thus be required of the lessee/project proponent.

Please continue to forward project information relevant to Caltrans. We value our cooperative working relationship in matters concerning project related transportation issues. If you have any questions, I may be contacted at (760) 872-0785.

Sincerely,

Gayle J. Rosander

GAYLE J. ROSANDER
IGR/CEQA Coordinator

c: Steve Wisniewski, Caltrans

Planning Department
168 North Edwards Street
Post Office Drawer L
Independence, California 93526

Phone: (760) 878-0263
FAX: (760) 878-0382
E-Mail: inyoplanning@inyocounty.us

November 4, 2009

Bureau of Land Management
Attn.: John Dalton, Haiwee Geothermal Leasing Area Coordinator
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553

RE: Notice of Intent To Prepare an Environmental Impact Statement for the Proposed Leasing of Geothermal Resource Development in the Haiwee Geothermal Leasing Area Located In Inyo County, CA and To Amend the California Desert Conservation Plan

Mr. Dalton:

Please convey the County's thanks to your team for holding scoping meetings in Inyo County on October 13 in Lone Pine, October 14 in Bishop, and October 20 in Death Valley regarding the above-referenced Environmental Impact Statement (EIS). We understand that the project involves potential leases from the Bureau of Land Management (BLM) for approximately 22,500 acres of land in southwestern Inyo County for geothermal energy exploration, development, and utilization. Based on statements made at the meetings, we further understand that the development scenario to be considered in the EIS will be two 30 megawatt power plants.

As the project area is in the County in the vicinity of other geothermal resources, we will closely follow the Bureau's progress. The following comments summarize issues of particular relevance based on the limited information available at this time.

- Coordination with the County pursuant to the Federal Land Policy and Management Act (FLPMA) of 1976 should commence immediately. County staff is interested in discussing opportunities for joint Federal/State environmental reviews to expedite future geothermal projects, if appropriate, as well. Please contact me at your earliest convenience to begin the coordination process.
- This EIS is an excellent opportunity for the BLM to evaluate potential cumulative impacts at a programmatic level and streamline future permitting, particularly given the interest in solar and wind energy development in the vicinity. In addition to the environmental issues identified in the Notice of Intent, potential relevant environmental issues include aesthetics, utilities and public services, land use and planning, and

population and housing. It is suggested that the EIS identify a menu of mitigation measures that may be utilized if specified triggers are reached to address potential cumulative impacts, should they occur. Given the relatively small development scenario to be considered in the EIS, I am concerned that potential cumulative impacts will be underestimated, and that the EIS will not be adequate for individual future projects, thus leading to burdensome subsequent environmental analyses.

- The County is especially concerned about potential impacts on surface and subsurface waters (and related effects) that may result from the leases the BLM proposes, in addition to reasonably foreseeable past, present, and future projects. As the Bureau is aware, significant concerns have been expressed regarding groundwater pumping and interbasin water transfers in the vicinity, and in particular, for the recent pumping project for the Coso Geothermal Plant. The County has a substantial quantity of information from this effort that may be of assistance in the BLM's EIS.
- The EIS should evaluate potential impacts at the existing Coso Plant from the proposed leases. If the leases affect operations at the Coso Plant, significant socioeconomic and related effects could occur in the County.

Please convey to any potential applicants that the County's land use jurisdiction includes private projects on federal lands, and that County approval of a Conditional Use Permit will be required for exploratory and/or geothermal production projects. Geothermal energy development is regulated by Inyo County Code (ICC) Title 19, and interbasin water transfers are regulated by ICC Chapter 18.77. Please note also that the County will assess increased property valuation due to improvements that may result from the leases.

Thank you. We look forward to working with BLM as an integral partner to develop renewable energy resources for the benefit of local citizens, California, and the nation. I hope that BLM will coordinate with the County to streamline any future renewable energy development proposals to the greatest extent possible. You may call me at (760) 878-0263 or email me at mconklin@inyocounty.us if you have any questions. Please send the Planning Department any future notices regarding this project as well.

Sincerely,

Mike Conklin
Planning Director

cc: Board of Supervisors; Kevin Carunchio, CAO; County Counsel; file

RECEIVED
BUREAU OF LAND MGMT.
09 NOV -6 PM 12: 15
CALIF. DESERT DISTRICT
MORENO VALLEY, CA

Planning Department
168 North Edwards Street
Post Office Drawer L
Independence, California 93526

Phone: (760) 878-0263
FAX: (760) 878-0382
E-Mail: inyoplanning@inyocounty.us

November 4, 2009

Bureau of Land Management
Attn.: John Dalton, Haiwee Geothermal Leasing Area Coordinator
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553

RE: Notice of Intent To Prepare an Environmental Impact Statement for the Proposed Leasing of Geothermal Resource Development in the Haiwee Geothermal Leasing Area Located In Inyo County, CA and To Amend the California Desert Conservation Plan

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- Coordination with the County pursuant to the Federal Land Policy and Management Act (FLPMA) of 1976 should commence immediately. County staff is interested in discussing opportunities for joint Federal/State environmental reviews to expedite future geothermal projects, if appropriate, as well. Please contact me at your earliest convenience to begin the coordination process.
- This EIS is an excellent opportunity for the BLM to evaluate potential cumulative impacts at a programmatic level and streamline future permitting, particularly given the interest in solar and wind energy development in the vicinity. In addition to the environmental issues identified in the Notice of Intent, potential relevant environmental issues include aesthetics, utilities and public services, land use and planning, and

population and housing. It is suggested that the EIS identify a menu of mitigation measures that may be utilized if specified triggers are reached to address potential cumulative impacts, should they occur. Given the relatively small development scenario to be considered in the EIS, I am concerned that potential cumulative impacts will be underestimated, and that the EIS will not be adequate for individual future projects, thus leading to burdensome subsequent environmental analyses.

- The County is especially concerned about potential impacts on surface and subsurface waters (and related effects) that may result from the leases the BLM proposes, in addition to reasonably foreseeable past, present, and future projects. As the Bureau is aware, significant concerns have been expressed regarding groundwater pumping and interbasin water transfers in the vicinity, and in particular, for the recent pumping project for the Coso Geothermal Plant. The County has a substantial quantity of information from this effort that may be of assistance in the BLM's EIS.
- The EIS should evaluate potential impacts at the existing Coso Plant from the proposed leases. If the leases affect operations at the Coso Plant, significant socioeconomic and related effects could occur in the County.

Please convey to any potential applicants that the County's land use jurisdiction includes private projects on federal lands, and that County approval of a Conditional Use Permit will be required for exploratory and/or geothermal production projects. Geothermal energy development is regulated by Inyo County Code (ICC) Title 19, and interbasin water transfers are regulated by ICC Chapter 18.77. Please note also that the County will assess increased property valuation due to improvements that may result from the leases.

Thank you. We look forward to working with BLM as an integral partner to develop renewable energy resources for the benefit of local citizens, California, and the nation. I hope that BLM will coordinate with the County to streamline any future renewable energy development proposals to the greatest extent possible. You may call me at (760) 878-0263 or email me at mconklin@inyocounty.us if you have any questions. Please send the Planning Department any future notices regarding this project as well.

Sincerely,

Mike Conklin
Planning Director

cc: Board of Supervisors; Kevin Carunchio, CAO; County Counsel; file

Jeff Aardahl
<jaardahl@defenders.org>
09/11/2009 02:05 PM

To "John_Dalton@ca.blm.gov" <John_Dalton@ca.blm.gov>
cc
bcc
Subject Geothermal NOI

History: This message has been forwarded.

Hello John:

I plan to participate in the issue scoping for the proposal to issue leases in the Haiwee Geothermal Lease Area. I'd like to obtain some additional background information on the proposed action and perhaps you can help:

1. When and how did BLM establish the "Haiwee Geothermal Leasing Area" referred to in the Federal Register notice?

2. What is the administrative relationship between the Coso and Haiwee geothermal leasing areas?

3. Was the CDCA Plan amended by the record of decision for the Geothermal PEIS specifically for the Haiwee Geothermal Leasing Area?

4. Is the Haiwee Geothermal Leasing Area within the land area addressed by the Coso KGRA leasing decision?

I'd like to receive a copy of the Coso KGRA leasing decision if it is available. If you can think of any other items that would be helpful please let me know. Thanks for your assistance. I look forward to your reply.

Jeff Aardahl
California Representative

1303 J Street, Suite 270 Sacramento, CA 95814
Tel: 916-313-5800 x110 | **Fax:** 916-313-5812
jaardahl@defenders.org | www.defenders.org

"Kevin Doyle"
<Kevin_Doyle@comcast.net>

09/13/2009 03:58 PM

To <John_Dalton@ca.blm.gov>
cc
bcc
Subject Distribution list - Haiwee

History: This message has been forwarded.

Please add me to the distribution list.

Thank You

Kevin Doyle
4 Espira Road
Santa Fe, NM 87508
Kevin_Doyle@comcast.net

Paul Friesema
<pfree@northwestern.edu>
09/11/2009 01:29 PM

To John_Dalton@ca.blm.gov
cc
bcc
Subject Geothermal Resource Development in Haiwee Geothermal Leasing Area

History: This message has been forwarded.

Please put me on the mailing list to receive scoping notices and summaries, etc. all the way through the NEPA process, for the Proposed Leasing of National System of Public Lands for Geothermal Resource Development in the Haiwee Geothermal Leasing Area.Please send material to:

Professor Paul Friesema
Environmental Policy and Culture Program
304 Scott Hall, Northwestern University
Evanston, IL. 60208-1006.

Thanks a lot! Paul

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[LL91310000EI]

Notice of Intent To Prepare an

APPENDIX I: COMMENT TABLE

Commenter	Comments
Purpose and Need	
Big Pine Paiute Tribe of the Owens Valley	Examine tradeoffs of energy development, such as need for water, transmission lines, and potential loss of habitat. Asked the question, "Is providing energy for streetlighting a shopping center a good reason to threaten a spring?"
Scoping Meeting Oral Comment	Questioned the relationship of the many management plans in the project area and in close proximity, such as the California Desert Conservation Area (CDCA), Northern and Eastern Mojave (NEMO) Plan, and West Mojave (WEMO) Plan.
Scoping Meeting Oral Comment	Inquired about the study area, need for 20,000 acres, and amount of surface disturbance expected. Questioned if the anticipated power generation (60 MW for two power plants) would be sufficient to cover expense of construction and drilling.
Tom Budlong	Review pre-drilling exploration data to determine probability of exploratory completion and discovery of economic resource
Tom Budlong	Analyze the amount of geothermal releated activity the lease area could support
Tom Budlong	There is concern regarding the experimental nature of geothermal projects and complieximty of science and engineering the facilities. Requests that a panel of expert geothermal consultants examine the technical aspects of the project to arrive at a consensus, or document lack of consensus.
Project Description	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Identify geothermal plant's need for make-up water. Identify need for imported water.
Big Pine Paiute Tribe of the Owens Valley	Identify the Coso Known Geothermal Resource Area (KGRA) and Haiwee Geothermal Leasing Area. Disclose reason for not considering it in Coso KGRA.
Big Pine Paiute Tribe of the Owens Valley	Identify mitigation plans to compensate for loss of resource, goods, services, and values. Tribe recommends a fund for mitigation be established for each developed site. Consider the real cost of long-term mitigation, unquantifiable development impacts, and evaluation of royalties.
California Native Plant Society	Identify if geothermal projects will deplete geothermal resources through cooling systems and determine if surface water or groundwater will be required over the life of the proposed project. Request terms of leases or licenses incorporate statement of the water appropriation source or that no water appropriation will occur.
Center for Biological Diversity	Identify and analyze both the potential water needs for the foreseeable geothermal development and impacts such water use could have on the environment in context of a changing climate.
Defenders of Wildlife	Incorporate a reasonable foreseeable development of geothermal energy associated with the proposed action.
Inyo County Planning Department (M. Conklin)	Identify a menu of mitigation measures that will be utilized if specific triggers are reached to address potential cumulative impacts. County's approval of a Conditional Use Permit is required for exploratory and/or geothermal production projects, regardless if jurisdiction includes private projects on Federal Lands.
Jeff Aardahl	Describe the establishment of the Haiwee Geothermal Leasing Area, administrative relationship between Coso and Haiwee geothermal leasing areas.
Jeff Aardahl	Discuss the Plan Amendment of California Desert Conservation Area (CDCA) Plan in regards to the Record of Decision for the Geothermal Programmatic EIS and the Haiwee Geothermal Leasing Area. Is the Haiwee Geothermal Leasing Area within the Coso known geothermal resource area (KGRA) leasing area?
Scoping Meeting Oral Comment	Inquired about the three pending lease applications, Reasonable Foreseeable Development (RFD) Scenario for proposed action, lifespan of geothermal power plant, and geothermal leasing application process. Questioned the level of assessment for the EIS and if additional environmental analyses would be conducted for specific geothermal projects within the Haiwee Geothermal Leasing Area.
Scoping Meeting Oral Comment	Inquired about Deep Rose Geothermal Exploration Project and the three pending lease applications.
Tom Budlong	Identify suitable and non-suitable locations for geothermal resource exploration, development and utilization. Analyzepotential geothermal facility configurations. Request the rejection of lease applications with configurations not analyzed in the EIS.
Tom Budlong	Describe the source and projected amount of water to support three phases (exploration, development, and utilization). Describe the cooling method and projected water usage rate for possible plant designs.
Tom Budlong	Describe the reclamation on completion of exploration, production, and utilization phases. Description to include conditon of propoerty, time allotted for each phase, time allowed for reclamation after completion of phases or expiration of lease, and bond amounts and conditions.
Alternatives	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Consider, study, and analyze alternative designs of available geothermal facilities (single-flash system, double-flash system, dry steam, binary and any number of hybrid designs, or more exotic designs). Consider conservation of the geothermal resource itself, minimization of environmental impacts and toxic emissions, and water conservation. Identify current geothermal technology to better enhance operations and more efficient use of water resources. Consider amount of electrical generation and lifespan of resource, as well as the annual natural recharge of geothermal fluids. Identify potential alternative sources of water (such as Ridgecrest Treatment Plant, Los Angeles Department of Water, Indian Wells Water Basin, construction of new water entrapment programs, and conservation and recycled water).
Center for Biological Diversity	Consider alternatives that require less water. Encourage technological innovation to eliminate or vastly reduce the water needed for geothermal power production; require use of recycled water where available; and require capture and treatment of all waste water to be safely returned to groundwater basins.
Defenders of Wildlife	Analyze the effects of a reasonable range of alternatives, including the no action alternative. Consider a smaller leasing area or areas to avoid sensitive wildlife species and their habitats.
Rose Valley Properties	Concerned about lack of a competitive bidding process for the leasing of government lands for other renewable energy development, such as solar, and multiple uses of the land.

Commenter	Comments
Air Quality	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Consider potential impacts caused by windborne dust and pollution, and impacts to air quality in Rose Valley. Address any contributions to non-attainment for PM_{10} particles.
Big Pine Paiute Tribe of the Owens Valley	Concerned about emissions of carbon dioxide into the atmosphere.
Tom Budlong	Analyze effects on greenhouse gases and global warming.
Biological Resources	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Request the study area include Little Lake Ranch property and Rose Valley in general for potential loss of water resources impacting habitat and vegetation. Will depletion of water within Rose Valley affect habitat and wetlands adjacent to U.S. Highway 395 and the Habitat Project at Little Lake? Will the underground water level adversely impact surface flora and fauna? Request baseline study of the surface habitat and all wildlife which rely upon surface water and functional ecosystem. Consider potential impacts to endangered species such as the Desert Tortoise and the Mohave Ground Squirrel. Analyze riparian habitats, sensitive natural communities, natural springs and artesian wells throughout the Rose Valley.
Center for Biological Diversity	Analyze direct, indirect and cumulative impacts across species' range. Of particular concern are impacts to the Mohave Ground Squirrel and the conservation area set aside for its recovery, wildlife habitats in the California desert.
Defenders of Wildlife	The project area is in the Mohave Ground Squirrel Habitat Management Area and Rose Valley Habitat Management Area. Address the loss of habitat and discuss the availability of suitable habitat in private ownership to meet compensation. Address compatibility of geothermal leasing and any associated surface use or development associated with geothermal energy extraction with the Rose Valley Habitat Management Area. Discuss wildlife habitat connectivity and species movement, particularly the Mohave Ground Squirrel and Desert Tortoise.
Defenders of Wildlife	Concerned about cumulative effects to the Mohave Ground Squirrel, Rose Valley Habitat for the squirrel, and management areas.
Defenders of Wildlife	Recommend coordination with California Department of Fish and Game.
Rose Valley Properties	Consider alternative uses of the land such as solar energy.
Scoping Meeting Oral Comment	The project area is within the West Mojave Plan (WEMO). There is concern for the Mohave Ground Squirrel and its conservation area.
Tom Budlong	Request impacts to vegetation, animals and insects be addressed.
Cultural Resources	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Analyze potential impacts to Coso Hot Springs.
Big Pine Paiute Tribe of the Owens Valley	Native American Tribe requests initiation of the Seciton 106 Consultation before or at the start of scoping process and the presence of a Native American Monitor during archaeological surveys. New power plants require transmission lines thay may prohibit access and conflict with Native American values. Noted that impacts affecting Native American values are not amenable to mitigation, because these impacts typically involve desecration or sacrilegious treatment of spiritually important sites.
Scoping Meeting Oral Comment	The Native American Tribes are concerned about the Section 106 Consultation, extraction of resources from the land, and what types of benefits the Tribes would obtain from the proposed action. The Tribes are especially concerned about the connections to the Coso Hot Springs and the water table depth. Some local tribes requested additional information regarding geothermal leasing of lands to the Tribes. Inquired about leasing of lands to Tribes and potential benefits of proposed action to Tribes. Native American Tribes also requested additional involvement.
Tom Budlong	Concerned project area is an intersection of more than one tribes' territory and potential for cultural differences. Requests Native American Tribes be actively solicited for comments, including personal contact and formal notices. Requests that an archaeologist determine interested tribes, and collect and analyze comments.
Geothermal Resources / Geology / Soils	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Examine potential soil subsidence in Rose Valley as a result of groundwater withdrawal. Depletion of underground water basin and surface flows may have profound effect upon soil erosion, loss of topsoil, and capability of surface to sustain life. Address potential impacts on geologic resources and seismic issues related to high pressure injection of fluids directly into fault zones. If water cooling towers (WCTs) are utilized, address dramatic loss of heated liquids from evaporation.
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Identify existence of geothermal resource, size and composition. Requests amount of electrical production from geothermal resource be based upon the size and extent of the reservoir. Address the preservation of the geothermal reservoirs and long-term management. Identify the different types of fluids that are contained in a GeoReservoir (both liquid and steam) and fluids re-injected.
Inyo County Planning Department (M. Conklin)	Consider potential impacts to the existing Coso Plant and operations.
Scoping Meeting Oral Comment	The public was concerned about the seismic activity in the area and questioned if geothermal exploration and development contributed to increased seismic activity. They questioned if injection of water into the rocks would contribute to fracturing. USFS Coordination was also requested.
Scoping Meeting Oral Comment	Questioned if the project area was within a Known Geothermal Resource Area (KGRA), such as Coso, and if viable geothermal resources were present in the project area. Concerned about impacts to the Coso Geothermal Power Plant and operations, as well as the Coso Hot Springs. Inquired about Deep Rose Geothermal Exploration Project and the three pending lease applications. Inquired about the cumulative impacts of numerous geothermal projects (existing and future) in close proximity.

Commenter	Comments
Hazards & Hazardous Materials	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Analyze the potential for wastewater and emission hazards to the public.
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Analyze potential for hazardous substances generation by proposed project, and treatment and disposal of substances. Address potential impacts from heat emissions.
Land Use / Agriculture / Recreation	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Analyze potential impacts to Rose Valley water well owners and nearby agricultural operations in Rose Valley.
Scoping Meeting Oral Comment	Concerned about impacts to motorized recreational roads and requested mitigation for loss of roads from Northern and Eastern Mojave Planning (NEMO) decision.
Scoping Meeting Oral Comment	Questioned the relationship of the many management plans in the project area and in close proximity, such as the California Desert Conservation Area (CDCA), Northern and Eastern Mojave (NEMO) Plan, and West Mojave (WEMO) Plan.
Tom Budlong	Concerned about land use conflicts, including recreation.
Noise & EMF	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Evaluate noise generation from proposed project. Evaluate noise levels and impacts to workers and surrounding wildlife.
Socioeconomics	
Inyo County Planning Department (M. Conklin)	Consider potential impacts to population and housing, and potential for socioeconomic impacts or adverse impacts to Coso Plant.
Rose Valley Properties	Consider potential impacts and mitigation steps for private and public landholders who have mineral and water rights in areas directly surrounded by proposed lands.
Scoping Meeting Oral Comment	Inquired about the creation of jobs and potential for revenue generation for Inyo County. Concerned about restrictions from the California Desert Conservation Area (CDCA) Plan causing delays. Noted the lengthy geothermal leasing application process and need for further project specific environmental analysis. Requested a socioeconomic analysis.
Tom Budlong	Describe and analyze the economic risk of drilling at deep depths (18,000-20,000 feet)
Tom Budlong	Request that applicants, such as Deep Rose, analyze and describe their financial strength to finance the expense of drilling at deep depths.
Traffic & Transportation	
Dept. of Transportation	Address potential highway transportation issues relevant to US 395, such as highway access points for facilities, and transport of construction materials and workforce.
Utilities & Public Services / Public Health & Safety	
Scoping Meeting Oral Comment	The public questioned if adequate electrical transmission was available to transfer the geothermal energy to the load centers. Are there plans to upgrade the existing transmission lines or construct a substation in the area?
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Analyze the potential for wastewater and emission hazards to the public.
Tom Budlong	Concerned about human health and safety.
Visual Resources	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Consider the recreational uses of the Rose Valley and impacts of the construction of structures and geothermal facilities

Commenter	Comments
Water Resources	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Consider water contained in the Rose Valley underground water basin. Analyze potential reduction of water available to Little Lake, the downstream ponds, creeks, wetlands, water wells, and natural springs. Little Lake Ranch provides wildlife habitat and wildlife-oriented recreation, including hunting, fishing, and wildlife viewing. Little Lake also includes a navigable body of water, ponds and wetlands. Any reliance upon underground water resources of the Rose Valley is subject to the County's groundwater ordinance and may have severe and direct impacts upon Little Lake Ranch property. Address the availability of local water sources for injection, and adequacy to supply, and natural replenishment of imported water source. Request long-term pumping studies prior to issuance of any permits. Determine if a connection between the GeoReservoir and Water Basin is present and evaluate potential impacts to use and consumption of GeoReservoirs on local Water Basins.
Big Pine Paiute Tribe of the Owens Valley	Water in the desert area is precious and extraction of water from arid region could alter a spring or kill or diminish the life forms that depend on water, which may lead to permanent loss of habitat.
Big Pine Paiute Tribe of the Owens Valley	The Native American Tribes are concerned about large amounts of water pumped from the Rose Valley by the Coso Operating Company and LADWP. These exports may seriously impact water availiability for geothermal development in the vicinty
Big Pine Paiute Tribe of the Owens Valley	Concerned about the water supply and the availability of water for other development projects, such as the Haiwee Geothermal Leasing Area.
California Native Plant Society	Concerned about the use of water in "renewable" energy projects and indirect effects to wetland habitats. Request analysis of potential impacts from appropriated water and wetland habitats maintained by appropriated water.
Center for Biological Diversity	Concerned about increasing scarcity of water in California and thought southwest. Address need for water use associated with geothermal energy production. Ensure all federal reserved water rights are protected in the project area and nearby public lands affected by water use. Consider impacts of water withdrawals in arid environmental, and impacts to surface waters, springs, and seeps that are critical to many desert species from fish to bighorn sheep to rare plants.
Defenders of Wildlife	Address extraction of groundwater in Rose Valley for geothermal energy development and short and long term impacts of extractions. Address impacts to groundwater and surface water and associated wetlands at Little Lake. Analyze the potential adverse impacts to BLM-administered lands at Little Lake and specifically to the Little Lake Watchable Wildlife Areas established by BLM
Inyo County Planning Department (M. Conklin)	Concerned about potential impacts on surface and subsurface waters, specifically groundwater pumping and interbasin water transfers in the vicinity.
Rose Valley Properties	Requests that no new geothermal development occur until recharge of Rose Valley basis is better known. Consider other projects that impact the basin. Consider water quality impacts from the drilling of wells.
Scoping Meeting Oral Comment	Concerned about the potential for impacts to water resources. Inquired about the need for groundwater provisions, source of water, and water issues with geothermal projects. Concerned about potential impacts to subsurface water, aquifers, wetlands, and water table depth, especially to the Rose Valley, Little Lake, and the wetlands surrounding the lake. There was also concern for the water table depth, aquifers, and protection of watersheds. The Tribes were concerned about impacts to the Coso Hot Springs in close proximity to the project area.

Commenter	Comments
Cumulative Effects	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Consider long-term baseline studies prior to issuance of permit. Analyze actual availability of underground water storage, historical water levels, recharge and consumption within Rose Valley Basin, existence of all wildlife resources, existence and health of surface vegetation, plant life and habitat, surface flows at Little Lake and its surrounding ponds and creeks, catalog of all springs and artesian wells within Rose Valley, identification of all water users and their consumption of water within the Rose Valley, current air quality conditions, cultural resources, and soils and geology conditions.
Big Pine Paiute Tribe of the Owens Valley	The Native American Tribes are concerned about large amounts of water pumped from the Rose Valley by the Coso Operating Company and LADWP. These exports may seriously impact water availiability for geothermal development in the vicinty
Big Pine Paiute Tribe of the Owens Valley	There is concern regarding the cumulative impacts of large-scale operations in the vicinity of the proposed project, such as LADWP operations, Owens Lake Dust mitigation, water exports by Coso Hay Ranch, and livestock grazing. Cumulative effects should included an analysis of inventory and characterization of wetlands (all springs and seeps) and regional hydrology, vegetation, wildlife, rare plant and animal species, geology, aesthetic/scenic values, recreation, and dust generation.
Defenders of Wildlife	Concerned about cumulative effects to the Mohave Ground Squirrel, Rose Valley Habitat for the squirrel, and management areas.
Internal Scoping Comment	Concern for cumulative impacts from a number of applications for ROW grants in the project area. A number of projects and developments in the area that are outside of BLM jurisdiction, such as wind projects, substation at the Coso Hay Ranch Property, transmission line upgrades, and hydroplant at Haiwee.
Inyo County Planning Department (M. Conklin)	In addition to geothermal energy development, evaluate potential cumulative impacts of future permitting for solar and wind energy development. Identify a menu of mitigation measures that will be utilized if specific triggers are reached to address potential cumulative impacts. Concerned that development scenario is relatively small and may underestimate potential cumulative impacts and future projects and development.
Scoping Meeting Oral Comment	Another key concern for the proposed action is cumulative impacts. There are a number of geothermal projects in close proximity to the project area (such as Deep Rose and Coso Geothermal Fields) and public, agencies, organizations, and tribes are concerned about the cumulative effects. BLM also has a number of management plans in the desert (i.e., CDCA, NEMO, and WEMO) and the public questions how these plans would affect the proposed action.
Tom Budlong	Concerned about cumulative effects of groundwater extraction by existing Coso Geothermal operations, Deep Rose, and additional lessees.
Tom Budlong	Concerned about cumulative impacts from existing, proposed and potential geothermal projects in the area; as well as other non-geothermal projects, but not limited to the project area boundaries.
Other Comments	
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Requests consideration of studies, reports, evidence and comments prepared for BLM's Coso Project Environmental Assessment (EA) and Inyo County's Coso Environmental Impact Report (EIR).
Arnold, Bleuel, Larochelle, Mathews & Zirbel, LLP	Request written notice of any hearings, actions, decisions, meetings, studies, applications or procedures concerning Haiwee, and production of public records in connection with Project.
Big Pine Paiute Tribe of the Owens Valley	Consider the tradeoffs of geothermal development.
Inyo County Planning Department (M. Conklin)	Request coordination and involvement in a joint Federal/State environmental review. Consider potential impacts to aesthetics, utilities and public services, land use planning, and population and housing.
Scoping Meeting Oral Comment	The Native American Tribes and Inyo County planners requested additional coordination and notification regarding the project.
Scoping Meeting Oral Comment	Informed project team about Federal Register notice containing non-functional website links and different end dates for comment period. Requested additional notification to the public, local agencies, and Native American Tribes.
Tom Budlong	Concerned about need to drill at deep depths (18,000- 20,000 feet) and the financial risk it would incur. There is also concern for the applicants' experience and knowledge of geothermal resource exploration and development.
Tom Budlong	Analyze the ability and capacity for BLM to manage and monitor the activity without impacting its other responsibilities

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APPENDIX I

Lands Under

Bureau of Land Management

Stewardship

Haiwee Geothermal Leasing Area Lands Under Bureau of Land Management Stewardship:

Fee Ownership

Mount Diablo Meridian,
T. 21 S., R. 37 E.,
sec. 11, lot 1, 2, 9 to 11, inclusive, 14, NW1/4SW1/4NW1/4NE1/4, E1/2NW1/4NW1/4NE1/4, NE1/4NW1/4, SE1/4SW1/4;
sec. 12;
sec. 13;
sec. 14, lots 1 to 3, inclusive, 5 to 10, inclusive, W1/2NE1/4NW1/4, NW1/4SW1/4, S1/2SW1/4, SE1/4SE1/4.
sec. 23, N1/2S1/2, N1/2S1/2S1/2, S1/2SE1/4SE1/4;
sec. 25;
sec. 26, E1/2E1/2;
sec. 35,
sec. 36.

Mount Diablo Meridian,
T. 22 S., R. 37 E.,
sec. 1;
sec. 2, lots 1 and 2 in the NE1/4, lots 1 and 2 in the NW1/4, SW1/4, excluding patent 1084708;
sec. 11;
sec. 12.

Mount Diablo Meridian,
T. 21 S., R. 38 E.,
sec. 7;
sec. 8;
sec. 9;
sec. 10;
sec. 15;
sec. 17;
sec. 18;
sec. 19;
sec. 20;
sec. 21;
sec. 22;
sec. 27;
sec. 28;
sec. 29;
sec. 30;
sec. 31;
sec. 32;
sec. 33;
sec. 34.

HGLA Lands Under BLM Stewardship (cont'd):

Mount Diablo Meridian,
T. 22 S., R. 38 E.,
sec. 5;
sec. 6, lots 3 to 14, inclusive;
sec. 7;
sec. 8.
Containing 21,873.07 acres more or less.

Mineral Only

Mount Diablo Meridian,
T. 21 S., R. 37 E.,
sec. 11, lots 4 to 7, inclusive, 12, 13, NE1/4NE1/4, E1/2NW1/4NE1/4, E1/2W1/2NW1/4NE1/4, SW1/4SW1/4NW1/4NE1/4, E1/2SE1/4SW1/4, S1/2SE1/4;
sec. 14, lot 11, E1/2NE1/4NW1/4;
sec. 23, S1/2S1/2SW1/4, S1/2SW1/4SE1/4
sec. 26, SW1/4, W1/2E1/2.
Containing 1572.27 acres more or less.