



Frontier Observatory for Research in Geothermal Energy – Milford Site, Utah

Task 2A.2 – NEPA, Summary of
Environmental Impacts

February 10, 2017

SUMMARY OF ENVIRONMENTAL IMPACTS

The following table summarizes the impacts anticipated for each of the activities that will be conducted in Phases 2B, 2C and 3.

In all cases, Best Management Practices (BMPs) and A Stormwater Pollution Prevention Plan (SWPPP), and mitigation practices will be employed.

BMPs: Best Management Practices will be employed to ensure safe, professional and environmentally sound operations. The Utah FORGE project will collaborate with the DOE and other project stakeholders and engage consultants, contractors and suppliers with proven records in their fields. Drilling contractors seasoned in geothermal drilling will bring the experience critical to successful drilling projects, including, but not limited to selection of the drill rig, mud pumps and auxiliary equipment suited to the planned operations.

SWPPP: A Stormwater Pollution Prevention Plan (SWPPP) will be developed to support permits to be obtained from the Utah Department of Water Resources and Beaver County.

Environmental Mitigation*: Mitigation measures that have been developed to avoid or reduce impacts to natural resources in geothermal operations will be integrated into the planning, operating and reclamation phases. The most effective environmental mitigation is to identify site-specific issues early and, where possible, avoid by changing plans/sites – and by reducing surface disturbance such as by drilling more than one well from a single pad. The Utah FORGE team will coordinate with the DOE, BLM, and SITLA NEPA staff in these efforts.

Following are selected sources/compilations of Best Management Practices (BMPs), Standard Operating Procedures (SOPs), and Mitigation practices. Every project and location is different. Existing NEPA EAs for geothermal projects are also good sources of reference for approaches to BMPs and mitigation measures.

Winnemucca District RMP/EIS: Winnemucca District Office Best Management Practices and Standard Operating Procedures Appendix B.

BLM 2006: Instruction Memorandum No. 2007-021 – Integration of Best Management Practices into Application for Permit to Drill Approvals and Associated Rights-of-Way

Health, Safety and Emergency Response Plans (Safety Plans): The Utah FORGE project will employ Health, Safety and Emergency Response Plans in compliance with federal OSHA and Utah regulations, CERCLA, Emergency Planning and Community Right to Know Act (EPCRA) and local fire ordinances and rules. Typically, the drilling contractor also maintains its own Plans under which its employees operate. The Utah FORGE team will ensure coordination with the driller plans. Emergency medical, fire, sheriff, and stakeholder management and supervisory phone numbers will be posted at the rig, at each trailer, in the office, and copied to cognizant stakeholders. The plan will cover, but not limited to training of personnel in safety procedures, location of personal safety equipment and Materials Safety Data Sheets (MSDS), safe locations, emergency phone numbers, and other matters and will cover: Medical response, fire, blowout response, H2S monitoring and response, working in confined spaces, lightning

and windstorms, spill response, handling of hazardous/toxic materials, working around hot or moving equipment, vehicle accident response and agency reporting requirements.

Field Rules: Utah FORGE management will also employ Field Rules for working in the Office or at the FORGE EGS site, to cover: speed limits, smoking, parking, no wandering offsite, no dogs, liquor or guns, no hunting, no gathering of cultural/archeological materials, access to keys, office and lab, requirements for visiting the rig (no tennis shoes, wear hard-toe shoes, hardhats, ear protection during drilling), understand safety rules), to whom to refer public inquiries, etc.

*Mitigation From: Council on Environmental Quality NEPA Regulations (40 CFR Parts 1500-1508):

§1508.20 Mitigation.

“Mitigation” includes:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Construction of drill pads	Negligible impact. Temporary increase in dust and diesel exhaust. Dust control watering and gravel as needed.	Negligible impact. No surface waters. Groundwater not potable. A berm will be constructed around drill pad to contain spills.	Negligible impact. Pads A1 and A2 will be graded and graveled. Sump will be lined. Pad will be surrounded by a berm for erosion control. Soil will be stockpiled for site reclamation.	Negligible impact. Construction will comply with Beaver Co. zoning and BLM and state regulatory agency requirements. Site reclaimed at project termination. Pads will occupy up to 13.4 acres, or 10.3% of total potential disturbed acreage.	Negligible impact. Wastes controlled in lined earthen pit and tanks on site, tested and removed offsite if required. No hazardous waste anticipated based on nearby drilling and construction activities.	Negligible impact. Health, Safety and Emergency Response Plans in place. Construction by state approved contractors. Equipment operator licenses required of all construction personnel.	Negligible impact. Temporary site occupancy. Construction activities will comply with BLM requirements. Site will be re-seeded.	Minor impact. Small positive temporary increase in population, employment, sales and tax base.	Negligible impact. Archeological surveys conducted with finding of no significant impact. SITLA and BLM concur; SHPO concurrence pending.	Negligible impact. No sensitive viewpoints. Construction will comply with Beaver Co. zoning and BLM and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Road grading/graveling	Negligible impact. Temporary dust and diesel exhaust. Dust control, watering and graveled as needed.	Negligible impact. No surface waters. Ground water not potable.	Negligible impact. Travel limited to existing roads. Roads graveled and bladed as needed to reduce damage by heavy equipment.	Negligible impact. Travel on existing roads. Improvements will comply with Beaver Co. zoning and BLM and state regulatory agency requirements. Roads represent up to 5.7 acres, or 4.4% of total potential disturbed acreage.	Negligible impact.	Negligible impact. Health, Safety and Emergency Response Plans in place. Appropriate equipment operator licenses required.	Negligible impact. Temporary increase in noise and vehicle traffic. Activities will comply with BLM requirements.	Minor impact. Small positive temporary increase in population, employment, sales and tax base.	Negligible impact. Existing roads already disturbed. Archeological survey indicate activities will not result in new cultural disturbances. SITLA and BLM concurrence; SHPO approval pending.	Negligible impact. No sensitive viewpoints. Construction activities will comply with Beaver Co. zoning and BLM and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Drilling one 7,000 ft. test well	Negligible impact. Temporary effect on graveled pad from diesel generator exhaust and equipment using roads. Drilling and testing activities up to 24 hours/day for up to 85 days. See <u>Attachment 1</u> for estimates of emissions.	Negligible impact. Well design approved by State Engineer. Ground-water not potable. Well cased through shallow ground-water aquifers. Drilling fluids and cuttings contained in lined sump or tanks.	Negligible impact. Well drilled on existing pad. Drilling fluids and borehole cuttings contained on site in lined sump.	Negligible impact. Well located on existing drill pad. Drilling will comply with Beaver Co. zoning and state regulatory agency requirements. Well abandoned as per land owner and State Engineer requirements at project termination.	Negligible impact. Cuttings and drilling fluid contained on site in lined sump or tanks. Removed if hazardous. Pad reclaimed at project conclusion. See <u>Attachment 2</u> for estimates of volumes of waste.	Negligible impact. Potential of H ₂ S discharges low based on nearby drilling, but will be monitored. Temporary increase in noise. Health, Safety and Emergency Response Plans in place. Appropriate safety equipment and training required of all personnel. Drilling supervisor will conduct daily safety meetings and ensure compliance with all safety requirements by on site personnel. Contractor selection will include evidence of safe work practices. See <u>Attachment 3</u> for estimates of noise levels.	Negligible impact. Operations on existing drill pad. Temporary increase in noise from drilling operations and traffic. All activities will comply with BLM requirements. Fluid storage containers fenced and netted as necessary to exclude wildlife.	Minor impact. Small positive temporary increase in population, employment, sales and tax base.	Negligible impact. Drilling to occur on existing pads.	Negligible impact. No sensitive viewpoints. Drill rig and equipment on site for less than 3 months of full 8 year project. Activities will comply with Beaver Co. zoning and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Drilling deep injection/production couplet EGS wells	Negligible impact. Temporary effect on graveled pad from diesel generator exhaust and equipment using roads. Drilling activities up to 24 hours/day for 4 months in each of 2 years. See Attachment 4 for estimates of emissions.	Negligible impact. Well design approved by State Engineer. Ground-water not potable. Well cased through shallow ground-water aquifers. Drill fluids and cuttings contained in lined sump or tanks.	Negligible impact. Well drilled on existing pad. Drilling fluids and borehole cuttings contained on site in sump.	Negligible impact. Well located on existing drill pad. Drilling will comply with Beaver Co. zoning and BLM and state regulatory agency requirements. Well abandoned as per land owner and State Engineer requirements at project termination.	Negligible impact. Cuttings and drilling fluid contained on site in lined sump or tanks. Removed if hazardous. Pad reclaimed at project conclusion. See Attachment 5 for estimates of volumes of waste.	Negligible impact. Potential of H ₂ S discharges low, based on nearby drilling, but will be monitored. Temporary increase in noise. Health, Safety and Emergency Response Plans in place. Appropriate safety equipment and training required of all personnel. Drilling supervisor will conduct daily safety meetings and ensure compliance with all safety requirements by on site personnel. Contractor selection will include evidence of safe work practices. See Attachment 6 for estimates of noise levels.	Negligible impact. Operations on existing drill pad. Temporary increase in noise from drilling operations and traffic. All activities will comply with BLM requirements. Fluid storage containers fenced and netted as necessary to exclude wildlife.	Minor impact. Small positive temporary increase in population, employment, sales and tax base.	Negligible impact. Drilling to occur on existing pads.	Negligible impact. No sensitive view-points. Temporary effects due to drill rig and drilling equipment. Activities will comply with Beaver Co. zoning BLM and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Drilling three 1,000 ft. water wells	Negligible impact. Diesel exhaust from truck-mounted drill rig up to 10 hours/day for up to 1 month. See <u>Attachment 7</u> for estimates of emissions.	Negligible impact. Groundwater not potable. Well design approved by State Engineer. Drilling fluids will be mixed, used and kept in a self-contained circulating system. Cuttings will be collected on site, tested for hazardous materials and if not hazardous as expected, used as material for local construction.	Negligible impact. Drilling fluids will be mixed, used and kept in a self-contained circulating system. Cuttings will be collected on site, tested for hazardous materials and if not hazardous as expected, used as material for local construction.	Negligible impact. Surface disturbance less than about 50 x 50 ft per well. Activities will comply with Beaver Co. zoning and state regulatory agency requirements. Depending on which site is chosen, the water well field will occupy 5.6 or 8.7 acres (or 4.3% to 6.6% of total potential disturbed acreage).	Negligible impact. Drill fluids will be mixed, used and kept in a self-contained circulating system. Cuttings will be collected on site, tested for hazardous materials and if not hazardous as expected, used as material for local construction. See <u>Attachment 8</u> for estimates of volumes of waste.	Negligible impact. Health Safety and Emergency Response Plans in place. Appropriate safety equipment and training required of all personnel. Drilling supervisor will ensure safe operations on site. Small, temporary increase in noise expected from truck mounted rigs designed for drilling in suburban environments.	Negligible impact. Operations on small pad. Temporary increase in noise and traffic during drilling. All activities will comply with BLM requirements. Fluid storage containers fenced and netted as necessary to exclude wildlife.	Minor impact. Small positive temporary increase in population, employment, sales and tax base.	Negligible impact. Archeological surveys conducted with finding of no significant impact. SITLA and BLM concur; SHPO concurrence pending.	Negligible impact. No sensitive view-points. Activities will comply with Beaver Co. zoning and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Drilling ten 500 ft. seismic monitoring wells	Negligible impact. Diesel exhaust from truck-mounted drill rig 8 hours/day for approximately 2 months. See <u>Attachment 9</u> for estimates of emissions.	Negligible impact. Drilling fluids will be mixed, used and kept in a self-contained circulating system. Cuttings will be collected on site, tested for hazardous materials and if not hazardous as expected, used as material for local construction. Wells cased.	Negligible impact. Drilling fluids will be mixed, used and kept in a self-contained circulating system. Cuttings will be collected on site, tested for hazardous materials and if not hazardous as expected, used as material for local construction.	Negligible impact. Surface disturbance less than approximately 50 x 50 ft. per well. Activities will comply with Beaver Co. zoning and state regulatory agency requirements. Sites will occupy up to 0.6 acres, or 0.4% of total potential disturbed acreage.	Negligible impact. Drill fluids will be mixed, used and kept in a self-contained circulating system. Cuttings will be collected on site, tested for hazardous materials and if not hazardous as expected, used as material for local construction. See <u>Attachment 10</u> for estimates of volume of cuttings.	Negligible impact. Health Safety and Emergency Response Plans in place. Appropriate safety equipment and training required of all personnel. Drilling supervisor responsible for site safety. Small, temporary increase in noise expected from truck mounted rigs designed for drilling in suburban environments.	Negligible impact. Temporary increase in noise and traffic during drilling. All activities will comply with BLM requirements. Fluid storage containers fenced and netted as necessary to exclude wildlife.	Minor impact. Small positive. Temporary increase in population, employment, sales and tax base.	Negligible impact. Archeological surveys will be conducted and sites approved by BLM, SITLA and SHPO.	Negligible impact. No sensitive viewpoints. Activities will comply with Beaver Co. zoning and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Office w/ lab, fenced storage and septic tank	Negligible impact. Temporary increase in dust and diesel exhaust due to construction. Site graded and graveled as appropriate to minimize dust. Minor, intermittent vehicle traffic possible by visitors and researchers.	Negligible impact. Groundwater at site not potable. Facilities will include an approved septic tank and water well approved by the State Engineer. Bottled water provided for human consumption.	Negligible impact. Office built on 2-acre near-level site. Site on private land. Will be reclaimed per owner's instructions. Any removed soil will be stockpiled for later reclamation of site as requested by site owner.	Negligible impact. Construction approved by Beaver County. Site will occupy 1.6 acres or 1.2% of total potential disturbed acreage.	Negligible impact. Septic system will comply with all permits and regulations.	Negligible impact. Temporary increase in noise during building. Health Safety and Emergency Response Plans in place. Fence, cameras and lighting installed around compound. Appropriate safety equipment and training provided at office site and required of all personnel working or visiting FORGE facilities. Facilities locked when not in use.	Negligible impact. Temporary increase in noise and traffic during construction. Vegetation from up to two-acres removed.	Minor impact. Small positive temporary increase in population, employment, sales and tax base.	Negligible impact. Archeological surveys conducted with finding of no significant impact. SITLA and BLM concur; SHPO concurrence pending.	Negligible impact. No sensitive viewpoints. Activities will comply with Beaver Co. zoning and state regulatory agency requirements.

Activit	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Electric Power Line/Water Pipeline	Negligible impact. Electric power line and water pipeline will occupy same utility corridor originating at the office site. Temporary increase in dust and diesel emissions. Power line construction contracted to Rocky Mountain Power.	Negligible impact. Extend culvert across mostly dry washes if needed, unless line already built by others.	Negligible impact. Construction along existing road ROW, unless line already built by others.	Negligible impact. Activities will comply with Beaver Co. zoning and BLM and state regulatory agency requirements. The utility corridor will occupy up to 86 acres (based on 100 ft. easement), or 66% of total potential disturbed acreage. Actual disturbed land will be much less if only pipe line occupies corridor.	Negligible impact. None anticipated.	Negligible impact. Common construction field work. Construction contracted to Rocky Mountain Power. Temporary increase in noise during construction. Rocky Mountain Power will be responsible for safety and health of workers in accordance with established state utility Health Safety and Emergency Response Plans.	Negligible impact. Temporary increase in noise and traffic during construction. Vegetation removed at intervals for power poles, unless built by others. Disturbance from 6 inch pipeline laid on ground will be negligible. All activities will comply with BLM requirements.	Minor impact. Small positive temporary increase in population, employment, sales and tax base.	Negligible impact. Archeological surveys of utility corridor conducted with finding of no significant impact. SITLA and BLM concur; SHPO concurrence pending.	Negligible impact. No sensitive viewpoints. Construction will comply with Beaver Co. zoning and BLM and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Fiber Optic Cable (One mile Extension of SunEdison line to office)	Negligible impact. One mile extension of cable to office. Minor dust and diesel exhaust during installation. Installation contracted through cable owner.	Negligible impact. No impact to water quality.	Negligible impact. Trenched install unless hung on power lines.	Negligible impact. Installation will comply with Beaver Co. zoning and BLM and state regulatory agency requirements. Up to 1.6 acres, or 1.3% of the total potential disturbed acreage could be affected.	Negligible impact. None anticipated.	Negligible impact. Common construction field work. Installation contracted through cable owner.	Negligible impact. Temporary increase in noise and traffic. All activities will comply with BLM requirements.	Minor impact. Small positive. temporary increase in population, employment, sales and tax base	Negligible impact. Depending on installation, archeological surveys may be required by the BLM, SITLA and SHPO.	Negligible impact. No sensitive viewpoints. Construction will comply with Beaver Co. zoning and BLM and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Geophysical Surveys (gravity, MT, TDEM)	Negligible impact. Light traffic on existing roads to reach sites may be required. Individual surveys will be completed within approximately 2 weeks.	Negligible impact. No water quality impacts.	Negligible impact. Very short term site occupancy of less than 24 hours. Vehicle traffic restricted to existing roads. Equipment moved cross-country on foot. Very small holes reclaimed.	Negligible impact. Maximum individual site occupancy limited to 24 hours. Activities will comply with BLM and state regulatory agency requirements.	Negligible impact. None anticipated.	Negligible impact. Very low risk to personnel.	Negligible impact. Surveys will comply with BLM requirements. No cross country vehicle traffic will be conducted. Little presence required in field after installation.	Minor impact. Small positive temporary increase in population, employment, sales and tax base	Negligible impact. Sites will be approved by BLM, SITLA and SHPO.	Negligible impact. No sensitive viewpoints. Activities will comply with BLM and state regulatory agency requirements.

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Seismic Reflection Vibroseis Survey	Negligible impact. Very short term site occupancy by two vibroseis trucks. Survey completed within several weeks.	Negligible impact. Survey conducted in fall to avoid wet soils. No water quality impact.	Negligible impact. Survey conducted in fall to avoid damage to wet soils.	Negligible impact. Temporary site occupancy. Activities will comply with BLM and state regulatory agency requirements.	Negligible impact. None generated.	Negligible impact. Very low risk. Work contracted to seismic company. Field operations conducted by trained and qualified personnel.	Negligible impact. Survey to be conducted outside of nesting season as per BLM requirement. Some crushed grass/shrubs at intervals. No reclamation required. Activities will comply with BLM requirements.	Minor impact. Small positive temporary increase in population, employment, sales and tax base.	Negligible impact. Archeological surveys conducted with finding of no significant impact. SITLA and BLM concur; SHPO concurrence pending.	Negligible impact. No sensitive viewpoints. Activities will comply with BLM and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Geophysical Installation and Monitoring	Negligible impact. Limited vehicle traffic on existing roads or via ATVs will be required to reach sites. Equipment will be hand carried for from existing roads for seismometer installation.	Negligible impact. Presence of equipment in field will not impact water quality.	Negligible impact. Small footprints < 20 x 20 ft.	Negligible impact. Equipment and installation will comply with BLM and state regulatory agency requirements. The sites will occupy up to 0.4 acres, or 0.3% of total potential disturbed acreage.	Negligible impact. No hazardous waste generated.	Negligible impact. Very low risk during fieldwork and installation. Tiltmeter Installation conducted by Halliburton approved contractor. Periodic presence in field required to maintain equipment.	Negligible impact. Short term temporary presence in field. Installation of monitoring equipment will comply with BLM and/or regulating agency requirements.	Minor impact. Small positive temporary increase in population, employment, sales and tax base	Negligible impact. Archeological surveys will be conducted and sites approved by BLM, SITLA and SHPO. Equipment limited to approved sites.	Negligible impact. No sensitive viewpoints. Activities will comply with Beaver Co. zoning and BLM and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Well Stimulation	Negligible impact. Temporary diesel exhaust from generators and pumps. See <u>Attachment 11</u> for estimated emissions.	Negligible impact. Groundwater used not potable. Stimulated zones will be below groundwater aquifers at depths greater than about 8000. Wells cased through groundwater aquifers.	Minor impact. Activities conducted on existing drill pad. Temporary potential deep induced micro-seismicity possible. Activities highly monitored. Induced seismicity plan in place.	Negligible impact. Activities conducted on existing drill pad.	Negligible impact. Standard stimulation chemicals will be used. Stimulation company to provide personnel to supervise and conduct activities.	Negligible impact. Potential minor micro-seismicity. Most not felt. Unpopulated area. Seismicity will be heavily monitored. DOE Induced seismicity plan in place. Ground motion and seismometers will be operational. Contractor will provide health and safety briefings to personnel. Stimulation supervisor will be responsible for site safety. Only trained personnel on site.	Negligible impact. Activities conducted on existing drill pad. Temporary increase in noise. Fluid storage containers fenced and netted as necessary to exclude wildlife.	Minor impact. Small positive temporary increase in population, employment, sales and tax base.	Negligible impact. Activities conducted on existing pad.	Negligible impact. No sensitive viewpoints. Activities will comply with Beaver Co. zoning and state regulatory agency requirements.

Activity	Air Quality	Water Quality	Soils/ Geology	Land Use	Solid/ Hazardous Waste	Human Health and Safety	Biological Resource	Socio-economic	Historic/ Cultural	Aesthetic
Construction of Evaporative or dry cooling facilities and piping	Negligible impact. Temporary increase in dust and diesel exhaust due to construction.	Negligible impact. No surface or potable groundwater present.	Negligible impact. Activities conducted on existing pad.	Negligible impact. Activities conducted on existing pad. Activities will comply with Beaver Co. zoning and state regulatory agency requirements.	Negligible impact. No hazardous material required or generated.	Negligible impact. Minor increase in traffic during construction. Hot water stored in appropriate containers. Potential Health, Safety and Emergency Response Plans in place. Only authorized, trained personnel allowed on site.	Negligible impact. Fluid storage containers fenced and netted as necessary to exclude wildlife.	Minor impact. Small positive temporary increase in population, employment, sales and tax base during construction of cooling facilities.	Negligible impact. Activities conducted on existing pad.	Negligible impact. No sensitive viewpoints. Construction will comply with Beaver Co. zoning and state regulatory agency requirements.

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Heat Sweep Testing (injection of groundwater through fractures in deep hot rock and production of heated water up productions well)	Negligible impact. Temporary production of steam from heated groundwater in open pond or tanks if evaporative cooling used. No steam production if dry cooling used. Negligible exhaust from diesel powered pumps unless electric pumps used.	Negligible impact. Produced water to be injected below groundwater aquifers at depths >8000 ft for heat extraction. Water temperature and quality will be monitored.	Negligible impact. Activities conducted on existing pad. No new pipeline construction or additional soil disturbance required.	Negligible impact. Activities conducted on existing pad.	Negligible impact. Produced water will be recirculated.	Negligible impact. Hot water stored in appropriate containers. Potential Health, Safety and Emergency Response Plans in place. Only authorized, trained personnel allowed on site.	Negligible impact. Activities conducted on existing pad. Fluid storage containers fenced and netted as necessary to exclude wildlife.	Minor impact. Small positive temporary increase in population, employment, sales and tax base during testing.	Negligible impact. Activities conducted on existing pad.	Negligible impact. No sensitive viewpoints. No new construction or equipment required.

Key: Negligible impact/Minor Impact

Moderate Impact

Significant Impact