STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT OIL CONSERVATION COMMISSION

APPLICATIONS OF LIGHTNING DOCK GEOTHERMAL HI-01,

CASE NO. 15357 and CASE NO. 15365 / Order No. R-14021-B

AMERICULTURE, INC.'S EXHIBIT LIST

- A. Correlative Rights Figure Progression
- B. OCD Discharge Permit GTHT-001
- C. Order of the Commission R-13675-B (May 9, 2013)
- D. Order of the Division R-13127 (May 29, 2009)
- E. OSE File No. A-36-A, A-36-B, A-64, A-65-A Comb
- F. Animas Water Level Measurement Field Form
- G. Water-Level Elevation Change Sequence in MW-wells
- H. Federal Lease Map
- I. Lightning Dock Geothermal Well Location Map
- J. Well Proximity Map
- K. OCD Groundwater Quality Monitoring Letter
- L. OCD Geothermal Class V Injection Well Legal Determination
- M. Lightning Dock Geothermal Injection Well Applications
- N. AmeriCulture, Inc. Business Lease BL-1418
- O. Joint Facility Operating Agreement
- P. GW Background & Compliance Report 2014 and Addendum (Less Analytical Reports)
- Q. OCD Forms for AmeriCulture well A-568 (A-45-A-S) (prepared by Lightning Dock Geothermal President Roy Cunniff)
- R. Lost Power Opportunity Slides
- S. AmeriCulture, Inc. Assignment of Geothermal Lease GTR-304-1
- T. Discharge Permit and Non-Consumptive Geothermal Power Production Permit with Certified Mail Receipt to Lightning Dock Geothermal, Inc.
- U. AmeriCulture Plan of Operations (prepared by Lightning Dock Geothermal, Inc. President Roy Cunniff)
- V. Lightning Dock Geothermal Energy Slides Witcher power point presentation

New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson

Governor

Joanna Prukop Cabinet Secretary Mark Fesmire Division Director Oll Conservation Division



July 1, 2009

Mr. Steve Brown Los Lobos Renewable Power, L.L.C. 5152 North Edgewood Drive, Suite 375 Provo, Utah 84604

RE: LOS LOBOS RENEWABLE POWER, L.L.C. - LIGHTNING DOCK
GEOTHERMAL NO. 1 (HI-01) DISCHARGE PERMIT (GTHT-001)
NE/4 SW/4 OF SECTION 7, TOWNSHIP 25 SOUTH, RANGE 19 WEST,
NMPM, HIDALGO COUNTY, NEW MEXICO
CLASS V INJECTION WELLS AND GEOTHERMAL PRODUCTION OR
DEVELOPMENT WELLS, TOWNSHIP 25 SOUTH, RANGES 19 AND 20 WEST,
NMPM, HIDALGO COUNTY, NEW MEXICO

Dear Mr. Brown:

Pursuant to the Water Quality Control Commission (WQCC) Regulations 20.6.2.3104 through 20.6.2.3114 NMAC (Permitting and Ground Water Standards) and 20.6.2.5000 through 20.6.2.5299 NMAC (Underground Injection Control), the Oil Conservation Division (OCD) hereby approves the discharge permit for of three (3) Class V geothermal injection wells and authorizes the operation of five (5) production or development wells for the Los Lobos Renewable Power, L.L.C. (owner/operator) for the above referenced site, contingent upon the conditions specified in the enclosed Attachment 1 to the Discharge Permit. The owner/operator of the geothermal power plant is located in the NE/4 SW/4 of Section 7, Township 25 South, Range 19 West, NMPM, Hidalgo County, New Mexico. The Class V geothermal injection wells and the production or development wells are located in Township 25 South, Ranges 19 and 20 West, NMPM, Hidalgo County, New Mexico.

Class V Injection Wells

Well 42-18 is located in the NE/4, NW/4 of Section 18 (1307 FNL and 2123 FWL) Well 51-07 is located in the NW/4, NE/4 of Section 07 (169.2 FNL and 2406.9 FEL) Well 53-12 is located in the SW/4, NE/4 of Section 12 (1574.8 FNL and 3350 FWL)



Geothermal Production or Development Wells

Well 13-07 is located in the SW/4, NW/4 of Section 7 (3781 FSL and 530 FWL) Well 33-07 is located in the SE/4, NW/4 of Section 7 (3721 FSL and 1789 FWL) Well 45-07 is located in the NE/4, SW/4 of Section 7 (2360 FSL and 2278 FWL) Well 47-07 is located in the SE/4 SW/4 of Section 7 (1219 FSL and 2266 FWL) Well 53-07 is located in the SW/4 NE/4 of Section 7 (3775 FSL and 3052 FWL)

Enclosed are two copies of the conditions of approval. Please sign and return one copy to the Oil Conservation Division (OCD) Santa Fe Office within 30 days of receipt of this letter.

Please be advised that approval of this permit does not relieve the owner/operator of responsibility should operations result in pollution of surface water, ground water or the environment. Nor does approval of the permit relieve the owner/operator of its responsibility to comply with any other applicable governmental authority's rules and regulations.

If you have any questions, please contact Carl Chavez of my staff at (505-476-3490) or E-mail carlj.chavez@state.nm.us. On behalf of the staff of OCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Mark Fesmire

Oil Conservation Division Director

MF/cc

Attachments - 1

xc: OCD District Office

ATTACHMENT 1 LIGHTNING DOCK GEOTHERMAL NO. 1 (HI-01) (GTHT-001) DISCHARGE PERMIT APPROVAL CONDITIONS

- 1. Payment of Discharge Plan Fees: All discharge permits are subject to WQCC Regulations. Every billable facility that submits a discharge permit application will be assessed a filing fee of \$100.00 plus a renewal flat fee (see WQCC Regulation 20.6.2.3114 NMAC). The Oil Conservation Division (OCD) has received the required \$100.00 filing fee and the \$1700.00 Class V Geothermal Well permit fee.
- 2. Permit Expiration and Renewal: Pursuant to WQCC Regulation Paragraph 4 of Subsection H of 20.6.2.3109 NMAC, this permit is valid for a period of five years. This permit will expire on August 4, 2014 and an application for renewal should be submitted no later than 120 days before that expiration date. Pursuant to WQCC Regulation Subsection F of 20.6.2.3106 NMAC, if a discharger submits a discharge permit renewal application at least 120 days before the discharge permit expires and is in compliance with the approved permit, then the existing discharge permit will not expire until the application for renewal has been approved or disapproved. Expired permits are a violation of the Water Quality Act {Chapter 74, Article 6 NMSA 1978} and civil penalties may be assessed accordingly.
- 3. **Permit Terms and Conditions:** Pursuant to WQCC Regulation 20.6.2.3104 NMAC, when a permit has been issued, the owner/operator must ensure that all discharges shall be consistent with the terms and conditions of the permit. In addition, all facilities shall abide by the applicable rules and regulations administered by OCD pursuant to the Geothermal Resources Conservation Act (71-5-1 through 71-5-24 NMSA) and the Geothermal Power regulations (19.14.1 through 19.14.132 NMAC).
- 4. Owner/Operator Commitments: The owner/operator shall abide by all commitments submitted in its May 12, 2008 discharge permit application, including attachments and subsequent amendments and these conditions. Permit applications that reference previously approved plans on file with OCD shall be incorporated in this permit and the owner/operator shall abide by all previous commitments of such plans and these conditions for approval.
- 5. Modifications: WQCC Regulations Subsection C of 20.6.2.3107 NMAC, 20.6.2.3109 NMAC and Subsection I of 20.6.2.5101 NMAC address possible future modifications of a permit. The owner/operator (discharger) shall notify OCD of any facility expansion, production increase or process modification that would result in any significant modification in the discharge of water contaminants. The Division Director may require a permit modification if any water quality standard specified at WQCC Regulation 20.6.2.3103 NMAC is being or will be exceeded or if a toxic pollutant as defined in WQCC Regulation 20.6.2.7 NMAC is present in ground water at any place of withdrawal for present or reasonably foreseeable future use or that the Water Quality Standards for Interstate and Intrastate streams as specified in WQCC Regulation 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams) are being or may be violated in surface water in New Mexico.

- 6. Waste Disposal and Storage: The owner/operator shall dispose of all wastes at an OCD-approved facility. Only geothermal RCRA-exempt wastes (i.e., geothermal production fluids, hydrogen sulfide abatement wastes from geothermal energy production, etc.) may be disposed of by injection in a Class II salt water disposal well. RCRA non-hazardous, non-exempt geothermal wastes may be disposed of at an OCD-approved facility upon proper waste determination pursuant to 40 CFR part 261. Any waste stream that is not listed in the discharge permit application must be approved by OCD on a case-by-case basis.
- A. Disposal Of Certain Non-Domestic Waste At Solid Waste Facilities: Pursuant to 19.15.35.8 NMAC disposal of certain non-domestic waste without notification to OCD is allowed at NMED permitted solid waste facilities if the waste stream has been identified in the discharge permit and existing process knowledge of the waste stream does not change.
- B. Waste Storage: The owner/operator shall store all waste in an impermeable berned area, except waste generated during emergency response operations for up to 72 hours. All waste storage areas shall be identified in the discharge permit application. Any waste storage area not identified in the permit shall be approved on a case-by-case basis only. The owner/operator shall not store geothermal waste on-site for more than 180 days unless approved by OCD.
- 7. Drum Storage: The owner/operator must store drums, including empty drums, or drums containing materials other than fresh water on an impermeable pad with curbing. The owner/operator must store empty drums on their sides with the bungs in place and lined up on a horizontal plane. The owner/operator must store chemicals in other containers, such as tote tanks, sacks or buckets on an impermeable pad with curbing.
- 8. Process, Maintenance and Yard Areas: The owner/operator shall either pave and curb or have some type of spill collection device incorporated into the design at all process, maintenance and yard areas which show evidence that water contaminants from releases, leaks and spills have reached the ground surface.
- 9. Above-Ground Tanks: The owner/operator shall ensure that all aboveground tanks have impermeable secondary containment (e.g., liners and berms), which will contain a volume of at least one-third greater than the total volume of the largest tank or all interconnected tanks. The owner/operator shall retrofit all existing tanks before discharge permit renewal. Tanks that contain fresh water or fluids that are gases at atmospheric temperature and pressure are exempt from this condition.
- 10. Labeling: The owner/operator shall clearly label all tanks, drums and containers to identify their contents and other emergency notification information. The owner/operator may use a tank code numbering system, which is incorporated into their emergency response plans.

11. Below-Grade Tanks/Sumps and Pits/Ponds.

- A. All below-grade tanks and sumps must be approved by OCD prior to installation and must incorporate secondary containment with leak detection into the design. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal. Owner/operator must test all existing below-grade tanks and sumps without secondary containment and leak detection annually, or as specified herein. For all systems that have secondary containment with leak detection, owner/operator shall perform a monthly inspection of the leak detection system to determine if the primary containment is leaking. Small sumps or depressions in secondary containment systems used to facilitate fluid removal are exempt from these requirements if fluids are removed within 72 hours.
- B. All pits and ponds, including modifications and retrofits, shall be designed by a registered professional engineer and approved by OCD prior to installation. In general, all pits or ponds shall have approved hydrologic and geologic reports, location, foundation, liners and secondary containment with leak detection, monitoring and closure plans. All pits or ponds shall be designed, constructed and operated so as to contain liquids and solids in a manner that will protect fresh water, public health, safety and the environment for the foreseeable future. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal.
- C. The owner/operator shall ensure that all exposed pits, including lined pits and open top tanks (8 feet in diameter or larger) shall be fenced, screened, netted or otherwise rendered non-hazardous to wildlife, including migratory birds. Where netting is not feasible, routine witnessing and/or discovery of dead wildlife and migratory birds shall be reported by the owner/operator to the appropriate wildlife agency with notification also provided to OCD in order to assess and enact measures to prevent the above from reoccurring.
- D. The owner/operator shall maintain the results of tests and inspections at the facility covered by this discharge permit and available for OCD inspection. The owner/operator shall report the discovery of any system which is found to be leaking or has lost integrity to OCD within 15 days. The owner/operator may propose various methods for testing such as pressure testing to 3 pounds per square inch greater than normal operating pressure and/or visual inspection of cleaned tanks and/or sumps or other OCD-approved methods. The owner/operator shall notify OCD at least 72 hours prior to all testing.

12. Underground Process/Wastewater Lines:

A. The owner/operator shall test all underground process/wastewater pipelines at least once every five (5) years to demonstrate their mechanical integrity, except lines containing fresh water or fluids that are gases at atmospheric temperature and pressure. The owner/operator shall submit a comprehensive listing of process/wastewater pipelines to OCD within three months of the date of the permit issuance. The owner/operator shall test pressure rated pipe by pressuring up to

one and one-half times the normal operating pressure, if possible or for atmospheric drain systems, to 3 pounds per square inch greater than normal operating pressure and pressure held for a minimum of 30 minutes with no more than a 1% loss/gain in pressure. The owner/operator may use other methods for testing if approved by OCD.

- B. The owner/operator shall maintain underground process and wastewater pipeline schematic diagrams or plans showing all drains, vents, risers, valves, underground piping, pipe type, rating, size and approximate location. All new underground piping must be approved by OCD prior to installation. The owner/operator shall report any leaks or loss of integrity to OCD within 15 days of discovery. The owner/operator shall maintain the results of all tests at the facility covered by this discharge permit and they shall be available for OCD inspection. The owner/operator shall notify OCD at least 72 hours prior to all testing.
- 13. Class V Wells: With the exception of Class V geothermal energy injection wells associated with the recovery of geothermal energy for heating, aquaculture, and production of electrical power, the owner/operator shall close all Class V wells (e.g., septic systems, leach fields, dry wells, etc.) that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic sanitary effluent wastes, unless it can be demonstrated that ground water will not be impacted in the reasonably foreseeable future. Leach fields and other wastewater disposal systems at OCD-regulated facilities that inject sanitary effluent and non-hazardous fluid into or above an underground source of drinking water are considered Class V injection wells under the EPA UIC program. Class V wells that inject domestic sanitary effluent waste only must be permitted by the New Mexico Environment Department (NMED).
- 14. Housekeeping: The owner/operator shall inspect all systems designed for spill collection/prevention and leak detection at least monthly to ensure proper operation and to prevent over topping or system failure. All spill collection and/or secondary containment devices shall be emptied of fluids within 72 hours of discovery. The owner/operator shall maintain all records at the facility and available for OCD inspection.
- 15. Spill Reporting: The owner/operator shall report all unauthorized discharges, spills, leaks and releases and shall conduct corrective actions pursuant to WQCC Regulation 20.6.2.1203 NMAC and 19.15.29 NMAC. The owner/operator shall notify both OCD District Office and the Santa Fe Office within 24 hours and file a written report within 15 days. The owner/operator shall notify OCD of any fire, break, leak, spill or blowout occurring at any geothermal drilling, producing, transporting, treating, and disposal or utilization facility in the State of New Mexico by the person operating or controlling the facility pursuant to 19.14.36.8 NMAC.
- 16. OCD Inspections: OCD may impose additional requirements on the facility and modify the permit conditions based on OCD inspections.
- 17. Storm Water: The owner/operator shall implement and maintain run-on and runoff plans and controls. The owner/operator shall not discharge any water contaminant that exceeds the WQCC standards specified in WQCC Regulations 20.6.2.3103 NMAC or 20.6.4 NMAC including

any oil sheen, in any storm water run-off. The owner/operator shall notify OCD within 24 hours of discovery of any releases and shall take immediate corrective action(s) to stop the discharge.

18. Unauthorized Discharges: The owner/operator shall not allow or cause water pollution, discharge or release of any water contaminant that exceeds the WQCC standards listed in 20.6.2.3103 NMAC (Standards for Ground Water of 10,000 mg/L TDS Concentration or Less) or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams) unless specifically listed in the permit application and approved herein.

An unauthorized discharge is a violation of this permit.

- 19. Vadose Zone and Water Pollution: The owner/operator shall address any contamination through the discharge permit process or pursuant to WQCC 20.6.2.4000 through 20.6.2.4116 NMAC (Prevention and Abatement of Water Pollution). OCD may require the owner/operator to modify its permit for investigation, remediation, abatement and monitoring requirements for any vadose zone or water pollution. Failure to perform any required investigation, remediation, abatement or to submit subsequent reports will constitute a violation of the permit.
- 20. Additional Site Specific Conditions Water Quality Monitoring Program: The owner/operator shall implement the following water quality monitoring programs.
 - A. Aquatic Toxicity Testing: Prior to the startup of geothermal operations, the owner/operator shall conduct an aquatic toxicity test (ATT) on the Tilapia fish species present at the AmeriCulture aquaculture facility located down-gradient from the owner/operators proposed Class V injection well locations with all NALCO cooling-tower chemical constituents. The chemicals used in the ATT shall consist of the high range application of all mixed Nalco chemicals proposed during the hearing on December 1, 2008, to determine the LD₅₀ under a worse-case scenario. OCD will use the results of the ATT as a tool to help assess the threat to Aquaculture and wildlife near the facility.
 - B. Ground Water and Surface Water Sampling and Monitoring Requirements:
 - i. The owner/operator shall submit a ground water monitoring program work plan that includes a well installation and monitoring plan and a sampling and analysis plan for the monitor wells to the OCD Santa Fe Office for approval at least 3 months before system startup. The owner/operator shall conduct all water quality monitoring using low-flow purging and sampling methods where monitor well screens do not exceed 15 feet with 5 feet of screen placed above the water table (potential for water table draw-down addressed at subpart 20(B)(iii)). If multiple isolated fresh water aquifers are found to exist, the owner/operator shall include a provision in the work plan for the installation of additional monitor wells

to monitor for contamination in any different fresh water aquifer system(s).

- The owner/operator shall submit a Background and Compliance Report ii. reflecting the first 6 months of sampling conducted to the OCD within 30 days of completion of the first 6 months of sampling that includes the results of the initial sampling conducted in accordance with Permit Conditions 20 and 21 to determine background water quality conditions at the facility and compliance with WQCC 20.6.2.3103 NMAC and Subparagraph WW of 20.6.2.7 NMAC. The report shall specify all monitoring locations, including nested wells, hydrogeology, piezometric and/or potentiometric ground water flow direction, hydraulic gradient and water quality data from all monitoring locations and down-gradient locations from potential point sources at the facility (i.e., cooling tower blow-down combined with spent production water at all Class V Well injection locations). The report shall note all exceedences of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, has been detected.
- iii. The owner/operator shall implement the ground water monitoring program specified in the applicable Tables in Appendix 1. The owner/operator shall monitor static water levels from monitoring locations at least quarterly to assess ground water flow direction and hydraulic gradient at the facility. If draw-down of the water table below the screen level in any monitor well occurs at and/or nearby production or development well locations, the owner/operator shall deepen wells within 30 days to provide for monitoring and the OCD and Office of the State Engineer (OSE) District Supervisor shall be notified within 24 hours of having knowledge of the above. In addition, the Owner/Operator shall provide a written statement of whether the water resource in the Animas Valley is or is not adequate to sustain steady-state production of the geothermal resource within 60 days of the original notification above. The OCD and OSE may require the owner/operator to perform corrective action(s) to private water user wells that are adversely affected by geothermal operations. The OCD and/or OSE may require the owner/operator to implement corrective action(s) to private water wells depending on the situation.
- iv. The owner/operator shall gauge and sample nested monitor well head elevations (accuracy to 0.01 ft.), recorded to establish the natural vertical hydrogeologic gradient(s) within the aquifer(s) or between reservoir(s) and to monitor for any potentially upwelling contamination to nearby downgradient pumping domestic and commercial water supply wells.

- v. The owner/operator shall comply with the Federal Underground Injection Control requirements for Class V Wells (40 CFR 144 subpart G) and WQCC 20.6.2 NMAC injection well construction standards to protect the Underground Source of Drinking Water (USDW). The owner/operator shall immediately shut down the system and contact the OCD for further instructions if the concentration of any water contaminants in the injection fluids exceed the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, as established for the injection formation at the injection well location pursuant to Clause (i) of Paragraph 21.D, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is detected.
- vi. The owner/operator shall construct all monitor wells with at least 15 feet of screen with 10 feet of screen positioned below the water table (~ 60 70 feet bgs). The screen slot size must facilitate the collection of low turbidity samples. Low-flow ground water sampling may be used with stabilization monitoring for temperature, oxygen reduction potential (ORP) and dissolved oxygen (DO) prior to and during sample collection, if wells are constructed for low-flow sampling techniques. Otherwise, the owner/operator shall purge the wells of three well volumes prior to sampling.
- vii. The owner/operator shall triangulate seasonal piezometric surface flow across the facility, including surveying all well locations (TOC and ground elevations, Mean Sea Level) to the nearest 0.01 feet. The owner/operator shall measure static water levels at least quarterly for 2 years to determine ground water flow direction. The owner/operator shall submit plots of ground water flow direction with estimates of hydraulic gradients from quarterly monitoring.
- viii. The owner/operator shall notify the Santa Fe OCD office immediately after having knowledge that the concentration of a monitor well sample exceeds the greater of the water quality standards specified in WQCC 20.6,2.3103 NMAC or background established at that well's location pursuant to the monitoring program described in this paragraph or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is detected. In the event of an exceedence, the owner/operator may be required to shut down the operation for such time as may be necessary to allow the owner/operator and OCD to investigate the cause of the exceedence. If the cause is associated with geothermal operations, the OCD may invoke the permit modification provision for treatment provided herein, and may require additional conditions.

C. Water Supply Wells Monitoring Program:

- i. The owner/operator shall sample all water supply wells in accordance with Table 3 of Appendix 1 prior to owner/operator startup to establish background water quality conditions and thereafter at least annually to demonstrate that the water quality of the water supply wells does not exceed the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, and that no toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is present.
- ii. The owner/operator shall determine the depth to water, ground elevation, and well elevation to an accuracy of 0.01 foot.
- iii. The owner/operator shall notify the OCD Santa Fe office within 72 hours of its determination that the concentration of the ground water sample exceeds the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is detected.
- D. Holding Ponds, Drainage Ditches, Pits and Ponds Monitoring Program: The owner/operator shall sample the holding ponds, drainage ditches, pits and ponds in accordance with Table 4 of Appendix 1. The owner/operator shall notify the OCD Santa Fe office within 72 hours of its determination that the concentration of a water sample taken at an unlined ditch or location listed above exceeds the greater of the standards specified in WQCC 20.6,2.3103 NMAC or background.

 Note: Table 4 analytes consist of metals and general chemistry only. They do not monitor for "toxic pollutants" as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC.

E. Spent Produced Water and Cooling-Tower Blow-Down Water Monitoring Program:

- i. The owner/operator shall submit a flow diagram to the OCD Santa Fe
 Office that depicts where the comingled spent produced water and
 cooling-tower blow-down water will be sampled in-line before injection,
 as well as specification of injection well sample port locations used for the
 in-line sampling at least 30 days before system startup.
- ii. The owner/operator shall sample and analyze the comingled spent produced water and cooling-tower blow-down water daily for 10 business days at system startup, weekly for two months; and thereafter the sampling frequency shall be based on correlation that the owner/operator established with the 3D Tresar Control Monitoring System in accordance with Table 5 of Appendix 1 to this discharge permit. Injection wells shall be sampled

monthly for 6 months in accordance with the analytical suite in Table 2 of Appendix 1.

- iii. The owner/operator shall inject comingled spent produced water and cooling-tower blow-down water only if it meets either the standards for ground water specified at Subparagraph WW of 20.6.2.7 NMAC and 20.6.2.3103 NMAC or the background concentration as established from the first sampling event. In-line sample ports or devices shall be installed at each injection well to enable owner/operator to perform the in-line sampling required herein, to ensure that the specified requirements for spent produced water and cooling-tower blow-down water are met.
- iv. The owner/operator shall not discharge untreated chemicals to storm water and/or "Waters of the State." Any discharge to a rip-rap area(s) is an illegal discharge. The owner/operator shall inform the OCD Santa Fe office within 72 hours of discovery of a discharge to a rip-rap basin. Discharges shall be routed to lined pits or evaporation pond areas whenever possible.
- v. The owner/operator may only discharge into "Waters of the State" in accordance with a National Pollutant Discharge Elimination System (NPDES) Permit issued by EPA Region 6. The OCD must approve the discharge concurrently with EPA. The applicant must comply with all of the Federal NPDES monitoring, treatment, and reporting requirements specified in its NPDES permit.
- F. Annual Water Quality Monitoring Program Report: The owner/operator shall submit an Annual Water Quality Monitoring Program Report by January 31 of each year. The report shall include the following information:
 - i. Cover sheet marked as "Annual Water Quality Monitoring Program Report, name of owner/operator, Discharge Permit Number, API number(s) of well(s), date of report and the name of the person submitting report.
 - ii. Comprehensive summary of all water quality monitoring data.
 - iii. Summary charts and tables depicting the constituents that have ever exceeded the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, has been detected.
 - iv. Description and reason for any remedial or work on well(s), ponds, ditches,
 - v. Copies of the chemical analyses in accordance with Permit Condition 20.

- vi. A copy of any leaks and spills reports submitted in accordance with Permit Condition 15 above.
- vii. A "Miscellaneous" section to include any other issues that should be brought to OCD's attention.
- viii. Discharge Permit Signatory Requirements pursuant to WQCC Regulation Subsection G of 20.6.2.5101 NMAC.

21. Class V Geothermal Injection Wells and Geothermal Production or Development Wells:

A. Well Identification:

i. Class V Geothermal Injection Wells:

Well No. 42-18 (API No. 30-023-20018) Well No. 51-07 (API No. 30-023-20020) Well No. 53-12 (API No. 30-023-20019)

ii. Geothermal Production or Development Wells:

Well No. 13-07 (API No. 30-023-20013) Well No. 33-07 (API No. 30-023-20014) Well No. 45-07 (API No. 30-023-20015) Well No. 47-07 (API No. 30-023-20016) Well No. 53-07 (API No. 30-023-20017)

B. Well Casing and Cementing Requirements:

- i. The owner/operator shall ensure that all casing and cementing meets or exceeds the requirements of 19.14.27.8 NMAC (Casing and Cementing Requirements). Conductor pipe shall be run to a minimum depth of 100 feet.
- ii. Surface casing shall be to a depth of at least 100 feet greater than the deepest fresh water well within one-half mile from the well location.
- iii. Intermediate strings shall be cemented solid to surface.
- iv. Production casing shall either be cemented solid to the surface or lapped into intermediate easing, if run. If production easing is lapped into an intermediate string, the easing overlap shall be at least 50 feet. The lap shall be cemented solid and it shall be pressure tested to ensure integrity.

- The owner/operator shall submit a logging program to OCD for review with ٧. the owner/operator depth setting recommendations for its casing program based on the logging program. The owner/operator prior to setting intermediate or production easing in each of the production and injection wells shall run open-hole logs, pursuant to the logging program, approved by the OCD. Logs must be submitted to the OCD for review with the applicant's recommendations for casing setting depths, and in case of injection wells, for precise definition of the injection interval. The type of tubing installed shall be conducive to the characteristics of the injected fluids determined after initial testing of the injected fluids. The owner/operator shall ensure that the tubing is installed with a packer set within 100 feet of the uppermost injection perforations. The casing-tubing annulus shall be filled with an inert fluid, and a gauge or approved leakdetection device shall be connected to the annulus to detect for leakage in the casing, tubing or packer.
- C. Formation Fracturing Fluids: The owner/operator shall ensure that all fluids used in the fracturing of formations shall not harm human health, wildlife or the environment. The owner/operator shall ensure that all fluids used to fracture shall be swabbed back, collected and properly disposed.

D. Class V Geothermal Injection Wells and Geothermal Production/ Development Wells Monitoring Program:

- The owner/operator shall sample the groundwater at all injection and production/development wells prior to owner/operator startup in accordance with Table 2 of Appendix 1 to establish background water quality conditions.
- ii. The owner/operator shall sample cooling tower effluent (and not the groundwater) at all injection wells monthly for the first six months with dynamic water level (DWL) recordings in accordance with Table 2 of Appendix 1 to demonstrate that the injection fluid meets the standards specified in WQCC 20.6.2.3103 NMAC or background, and that no toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, has been detected.
- iii. If after the first six months the owner/operator demonstrates that the inline injection well samples meet the standards specified in WQCC 20.6.2.3103 NMAC or background, and that no toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, has been detected, then the owner/operator shall then sample ground water annually in accordance with the other annual monitoring events.

- iv. The owner/operator shall determine the depth to water, ground elevation, and well elevation to an accuracy of 0.01 foot. The owner/operator shall notify the OCD Santa Fe office within 72 hours of its determination that the concentration of the ground water sample exceeds the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is detected.
- E. Well Workover Operations: The owner/operator shall obtain OCD's approval prior to performing remedial work, pressure test or any non-routine work. The owner/ operator shall request approval on form G-103 "Sundry Notice" pursuant to 19.14.52 NMAC, with copies provided to both the OCD Artesia District II Office and the Santa Fe Office.
- F. Production/Injection Method: The production/injection method that the owner/operator shall follow is as follows: High temperature (>250 °F) geothermal water shall be brought to surface from the Horquilla Formation or geothermal reservoir at approximately 3,400 feet below ground level by five (5) production or development wells at approximately 3,000 gpm per well. Hot water shall be routed in parallel and in series through approximately 50 binary cycle (self-contained heat exchanger, evaporator and condenser) power generation units. Condensed produced or effluent water (approximately 225 °F) shall be routed directly to three (3) Class V geothermal wells and into the same depth within the Horquilla Formation or geothermal reservoir.
- Well Pressure Limits: The owner/operator shall ensure that the operating surface G. injection and/or test pressure for each injection well measured at the wellhead shall be at a flow rate and pressure (psi) that will not exceed 0.2 psi per foot of depth from the surface to the top of injection interval, unless the owner/operator secures OCD approval for an increase based on demonstration that the increase will not involve a hazard of formation fracture and/or adversely affect public health, the environment and the correlative rights of any geothermal operators in the high temperature geothermal reservoir. The Owner/Operator shall report the intended maximum injection pressure to the Division for approval after testing the injection formation and prior to the commencement of injection in accordance with Form G-112. Re-injected fluids shall be confined to the aquifer where production is occurring and shall not adversely impact another aquifer(s). The owner/operator shall have working pressure limiting devices or controls to prevent overpressure. The owner/operator shall report any pressure that causes damage to the system to OCD within 24 hours of discovery.
- H. Mechanical Integrity Testing: At least once every five years and after any well work over, the geothermal reservoir will be isolated from the casing or tubing annuals and the easing pressure tested at a minimum of 600 psig for 30 minutes.

A passing test shall be within +/- 10% of the starting test pressure. All pressure tests must be performed in accordance with the testing schedule shown below and witnessed by OCD staff unless otherwise approved.

Testing Schedule:

2009: Prior to system start-up, a 30 minute casing pressure test at a minimum of 600 psig (set packer above easing shoe to isolate formation from easing), and

2013: A 30 minute casing pressure test at a minimum of 600 psig (set packer above easing shoc to isolate formation from easing)

- I. Capacity/Reservoir Configuration and Subsidence Survey: The owner/operator shall provide information on the size and extent of the geothermal reservoir and geologic/engineering data demonstrating that continued geothermal extraction will not cause surface subsidence, collapse or damage to property or become a threat to public health and the environment. This information shall be supplied to OCD in each annual report. OCD may require the owner/operator to perform additional well surveys, tests, etc. A subsidence monitoring section is required in the annual report and shall include well top-of-casing and ground elevation surveying (Accuracy: 0.01 ft.) before start-up and on an annual basis in order to demonstrate that there are no subsidence issues. If the owner/operator cannot demonstrate the stability of the system to the satisfaction of OCD, then OCD may require the owner/operator to shut-down, close the site and properly plug and abandoned the wells. The owner/operator shall report any subsidence to the OCD Santa Fe office within 24 hours of discovery.
- J. Production/Injection Volumes: After placing a geothermal well on production, the owner/operator shall file in duplicate a monthly production report form G-108, with the OCD Santa Fe office by the 20th day of each month and also with the annual reports. The owner/operator shall also document the production from each well and each lease during the preceding calendar month.
- K. Analysis of Injection and Geothermal Reservoir Fluids: After placing any well on injection in a geothermal resources field or area, the owner/operator shall file in duplicate a monthly injection report, form G-110, with the OCD Santa Fe office by the 20th day of each month and also with the annual report. The owner/operator shall specify the zone or formation into which injection is being made, the volume injected, the average temperature of the injected fluid and the average injection pressure at the wellhead.
- L. Area of Review (AOR): The owner/operator shall report within 24 hours of discovery of any new wells, conduits or any other device that penetrates or may

penetrate the injection zone within one-quarter mile from a Class V Gcothermal Injection Well. Note: AOR applies specifically to Class V Injection Wells.

- M. Annual Geothermal Temperature and Pressure Tests: The owner/operator shall test its production or development wells at least annually and submit the results to the OCD Santa Fe office on form G-111 within 30 days of the completion of the test. The owner/operator shall record the flowing temperatures and flowing pressure tests at the wellhead for a minimum of 72 hours of continuous flow at normal producing rates. The owner/operator shall then shut in the well for 24 hours and record the shut-in pressures at the wellhead. The owner/operator shall submit the results of these tests in duplicate to the OCD Santa Fe office.
- N. Loss of Mechanical Integrity: The owner/operator shall report to the OCD Santa Fe Office within 24 hours of its discovery of any failure of the casing, tubing or packer or movement of fluids outside of the injection zone. The owner/operator shall cease operations until proper repairs are made and the owner/operator receives OCD approval to re-start injection operations.

O. Bonding or Financial Assurance:

- i. Class V Geothermal Injection Wells: The owner/operator shall maintain at a minimum a cash bond (i.e., Assignment of Cash Collateral Deposit or Multi-Well Cash Financial Assurance Bond Geothermal Injection) in the amount of \$50,000.00 to restore the site and/or plug and abandon wells, pursuant to OCD rules and regulations.
- ii. Geothermal Production or Development Wells: The owner/operator shall maintain at a minimum a cash bond (i.e., \$10,000.00 Multi-Well (4 wells) and/or \$5,000.00 (1 well) Geothermal Plugging Bonds). If warranted, OCD may require additional financial assurance for closure of the power plant or facility (see Permit Condition 34 below).
- P. Annual Geothermal Well Report: The owner/operator shall submit an Annual Geothermal Well Report by January 31 of each year. The report shall include the following information:
 - i. Cover sheet marked as "Annual Geothermal Well Report, name of owner/operator, Discharge Permit Number, API number(s) of well(s), date of report and the name of the person submitting report.
 - ii. Comprehensive summary of all geothermal well operations, including description and reason for any remedial or work on the well(s). The

owner/operator shall include copies of the form G-103s that it submitted to the OCD Santa Fe office.

- iii. Production and injection volumes in accordance with Permit Condition 21.J, including a running total to be carried over each year. The owner/operator shall report the total mass produced, dry steam produced, flow rates, temperatures and pressures, average injection pressures, temperatures, etc.
- iv. A copy of the chemical analyses in accordance with Permit Condition 21.K.
- v. A copy of any mechanical integrity test chart, including the type of test, (i.e., EPA 5-Year casing test), date, time, etc., in accordance with Permit Conditions 21.H.
- vi. A copy of the annual subsidence survey data results in accordance with Permit Condition 21.I.
- vii. Brief explanation describing deviations from normal production methods.
- viii. A copy of any leaks and spills reports submitted in accordance with Permit Condition 15 above.
- A copy of analytical data results from annual groundwater monitoring including the QA/QC Laboratory Summary.
- x. An updated Area of Review (AOR) summary (WQCC Regulation 20.6.2 NMAC) when any new wells are drilled within 1/4 mile of any UIC Class V Geothermal Injection Well.
- xi. A "Miscellaneous" section to include any other issues that should be brought to the OCD's attention.
- xii. Discharge Permit Signatory Requirements pursuant to WQCC Regulation Subsection G of 20.6.2.5101 NMAC.
- 22. Transfer of Discharge Permit: Pursuant to WQCC Regulation Subsection H of 20.6.2.5101 NMAC, the owner/operator and new owner/operator shall provide written notice of any transfer of the permit. Both parties shall sign the notice 30 days prior to any transfer of ownership, control or possession of a facility with an approved discharge permit. In addition, the purchaser shall include a written commitment to comply with the terms and conditions of the previously approved discharge permit. OCD will not transfer brine well operations until proper

bonding or financial assurance is in place and approved by the OCD. OCD reserves the right to require a modification of the permit during transfer.

- 23. Closure: The owner/operator shall notify OCD when operations of the facility are to be discontinued for a period in excess of six months. Prior to closure of the facility, the owner/operator shall submit for OCD approval, a closure plan including a completed C-103 form for plugging and abandonment of the well(s). Closure and waste disposal shall be in accordance with the statutes, rules and regulations in effect at the time of closure. OCD may require additional financial assurance if surface water and/or ground water is impacted pursuant to WQCC Regulation Paragraph (11) of Subsection A of 20.6.2.3107 NMAC.
- 24. Certification: Los Lobos Renewable Power, L.L.C. (Owner/Operator), by the officer whose signature appears below, accepts this permit and agrees to comply with all submitted commitments, including these terms and conditions contained here. Owner/Operator further acknowledges that OCD may, for good cause shown, as necessary to protect fresh water, public health, safety and the environment, change the conditions and requirements of this permit administratively.

Conditions accepted by: "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment."

Company Name - print name above	· ·
Steven Brown MANAGER	
Company Representative - print name	
Company Representative - signature	

APPENDIX 1

WATER QUALITY MONITORING PROGRAM

Table 1 Ground Water Monitoring Program

ApproximatesWellifecation	Shallow MW (water table) located ~100' downgradient (North) of Class V IW 42-18 and associated pits (OCD)	Shallow MW (water table) located ~100' downgradient (North) of Class V IW 51-07 and associated pits (OCD)	Shallow MW (water table) located ~100° downgradient (North) of Class V fW 53-12 and associated pits (OCD)	Shallow MW located ~1500' (Northwest) of DW 45-07 directly downgradient from facility (OCD)	Shallow MW (water table) located ~1000' upgradient (South) of the nursery greenhouses 3 & 4 to monitor background (OCD)	Shallow MW (water table) located ~100' downgradient (North) of DW 53-07 and associated pits (OCD)	Shallow MW (water table) located ~100' downgradient (North) of DW 13-07 and associated pits (OCD)	
Analytical. SüiteMethio	Analyze for dissolved fraction of all 20.6.2.3103 NMAC Constituents	VOCs (8260B) SVOCs (8270C)	PAHs (8310)	Metals - dissolved (6010B/6020) including	(by approved EPA methods) Mercury (7470A/7471A)	General Chemistry (Methods specified at 40 CFR 136.3)	Uranium (6010B/6020), Radioactivity (E903/E904)	Radon (by EPA Method or method approved by OCD)
Media	ωĐ	GW	MS	МD	MΩ	ΜĐ	ΒS	
Frequency.	Annual	Annual	Annual	Annual	Annual	Annual	Annual	
, Dr	MW-1 1	MW-3 ¹	MW-2 ¹	MW-4 ¹	MW-5 ¹	MW-6 ¹	MW-7 1	

MW-8 1 NW-1 1 NW-2 1	Frequency M Annual C Annual C Annual C	Media GW GW	Suite/Method Shallow MW (water table) located ~100° downgradient (North) of DW 33-07 and associated pits (OCD) Similar to monitoring & sampling plan from Los Lobos. Los Lobos. Los Lobos. Los Lobos. Los Lobos. Los Lobos.
NW-3 ¹	Annual	GW	Similar to monitoring & sampling plan from Los Lobos.

Table 2
Geothermal Injection Wells and
Production/Development Wells Monitoring Program

Ayocooping Welling of 1000	As Proposed in Application				·						
Amalytical	Analyze for dissolved fraction of all		VOCs (8260B)	SVOCs (8270C)	PAHs (8310)	TPH (418.1)	Metals - dissolved (6010B/6020) including	Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods) Mercury (7470A/7471A)	General Chemistry (Methods specified at 40 CFR 136.3)	Uranium (6010B/6020), Radioactivity (E903/E904)	Radon (by EPA Method or method approved by OCD)
Wedte	GW	GW	GW	ΒØ	GW	GW	GW	ВW			
someone de la contraction de l	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual			
	DW 13-07 ^{1.3}	DW 33-07 ^{1,3}	DW 45-07 ^{1,3}	DW 47-07 ^{1,3}	DW 53-07 ^{1.3}	IW 42-18 ^{1,3}	IW 51-07 ^{1.3}	IW 53-12 ^{1,3}			

Water Supply Wells Monitoring Program

Approximate Location	Similar to monitoring & sampling plan from Los Lobos.														
Analytical Suite/Method:	Analyze for dissolved fraction of all		VOCs (8260B)		SVOCs (8270C)		PAHs (8310)		TPH (418.1)	Metals - dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods)	Mercury (7470A/7471A)	General Chemistry (Methods specified at 40 CFR 136.3)	Uranium (6010B/6020),	Radioactivity (E903/E904)	Radon (by EPA Method or method approved by OCD)
Media	GW	ВW		ĞΨ			GW		GW	M D					
Frequency	Annual	Annual		Annual			Annual		Annual	Amual					
D*	TG 52-07	AmeriCulture	No. 1 Federal	AmeriCulture	State Well	No. 2	McCants No. 1	State	Burgett No. 1 State	Burgett Greenhouse No. 2					

Oil Conservation Division * 1220 South St. Francis Drive * Santa Fe, New Mexico 87505 * Phone: (505) 476-3440 * Fax (505) 476-3462* http://www.emnrd.state.nm.us

Table 4
Holding Ponds, Drainage Ditches, Pits and Ponds Monitoring Program

	Brequency	Wealth	Amilytical Sufference Approximate Egotion
GH Holding Pond No. 1	Quarterly ⁴	SW	Metals-dissolved (6010B/6020) including Similar to monitoring & sampling plan Bromide, Lithium, Rubidium, and Tungsten from Los Lobos.
GW Holding Pond No. 2	Quarterly ⁴	SW	(by approved EPA methods)
Drainage Ditch No. I (East)	Quarterly ⁴	ΝS	General Chemistry (Methods specified at 40 CFR 136.3
Retention Pond No. 1	Quarterly ⁴	NS.	
Bermed Canal No. 1	Quarterly ⁴	SW	
Pit Associated	Within 30	SW	
with Well 13- 07	days of use		
Pit Associated	Within 30	SW	
Pit Associated	Within 30	SW	
7	days of use		
Pit Associated	Within 30	SW	
with DW 47-07	days of use		
Pit Associated	Within 30	SW	
with DW 53-07	days or use	2337	
Pit Associated	Within 30	≯	
with IW 42-18	days of use		
Pit Associated	Within 30	SW	
with IW 51-07	days of use		

Analytical Approximate Location Suite/Method		
Wedia	SW	
Frequency.	Within 30	days of use
	Pit Associated	with IW 53-12 days of use

Table 5 Cooling Tower Effluent Monitoring Program

Approximate Location	Similar to monitoring & sampling plan from Los Lobos.		
r Snifë/Nëthod	Effluent Metals - dissolved (6010B/6020) including Similar to monitoring & sampling plan Bromide, Lithium, Rubidium, and Trom Los Lobos. Tungsten (by approved EPA methods)	BOD ₅ (405.1/5210B) COD (410.2)	General Chemistry (Methods specified at 40 CFR 136.3
Medi	Efflue		
Proquency ***	Daily ⁵		:
-, τ ω -,	Cooling Tower Effluent		

BOD₅: Biochemical Oxygen Demand

COD: Chemical Oxygen Demand Dewelopment/Production Well

DWL: Dynamic Water Level

GH: Greenhouse

GW: Ground Water

IW: Injection Well MSL: Mean Sea-Level

MSL: Mean Sea-Level MW: Monitor Well

NW: Nested Well

SW: Surface Water

* Quarterly Static Water Level (SWL): MSL to nearest 0.01 feet prior to sampling event Static Water Level SWL:

Wells must be installed in advance of system startup and sampled.

Semi-Annual groundwater monitoring event must be completed no more than 30 days prior to the start of the irrigation season but no later than April 30 of each year. Monitoring must be conducted no later than 30 days after the conclusion of the irrigation season but no later than November 15 of each year.

system start-up. Thereafter, monthly sampling for the first six months with dynamic water level (DWL) recording is required. After One time sampling event with static water level (SWL) mean sea-level (0.01 ft. accuracy) measurements in advance of six months of monthly monitoring, the sampling shall be conducted at least annually.

Sample quarterly while in use. If organics are evident, sampling with analytical methods similar to MWs shall be implemented during the sampling event.

Daily for 10 business days at system startup; thereafter weekly for two months; thereafter based on establishing correlation with the 3D Tresar Control Monitoring System.

spreadsheet. The data must be presented in table form listing all of the impacted wells, date inspected, product thickness measured to 0.01 of a foot, and amount of product/water recovered. If PSHs are observed in a monitoring well, then appropriate steps must be Note: All wells with phase-separated hydrocarbons (PSHs) must be checked at a minimum of once per month and recorded on a taken to recover the PSHs using the best available technology.

STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION FOR THE PURPOSE OF CONSIDERING:

APPLICATION OF LOS LOBOS RENEWABLE POWER, LLC FOR APPROVAL TO INJECT INTO A GEOTHERMAL AQUIFER THROUGH TWO PROPOSED GEOTHERMAL INJECTION WELLS AT THE SITE OF THE PROPOSED LIGHTNING DOCK GEOTHERMAL POWER PROJECT, HIDALGO COUNTY, NEW MEXICO.

Case No. 14948 Order No. R-13675-B

ORDER OF THE COMMISSION

This case came before the Oil Conservation Commission (Commission) for consideration on March 19, 20, and 26, 2013, and the Commission having considered the evidence in support and opposition to these applications, on the 16th day of April, 2013,

FINDS THAT:

- 1. Los Lobos is developing a utility-scale binary (two closed loops) geothermal power facility.
- 2. On or about December 13, 2012, Los Lobos submitted applications to the Oil Conservation Division (OCD) to place two geothermal wells (wells LDG 55-7 and LDG 53-7) on injection for well testing and potential future re-injection of geothermal fluids. The form of these applications was a Form G-112 packet, pursuant to 19.14 NMAC, specifically 19.14.93.8 NMAC.
- 3. Well LDG 55-7, a well that has been in existence since 1985, is located in Unit J, 2390 feet from the South line and 2412 feet from the East line, Section 7, Township 25 South, Range 19 West, Hidalgo County, New Mexico.
- 4. Well LDG 53-7, completed in November 2011, is located in Unit G, 1525 feet from the North line and 2228 feet from the East line, Section 7, Township 25 South, Range 19 West, Hidalgo County, New Mexico.
- 5. Each Los Lobos G-112 application contains (a) a plat showing the location of the proposed injection/disposal well and the location of all other wells within a radius

of one mile from said well, and indicating the perforated or open-hole interval of all other wells within a radius of one mile from said well, together with the ownership of all geothermal leases within the one-mile radius; (b) the log of the proposed injection well, if available; and (c) a diagrammatic sketch of the proposed injection well showing casing strings, including diameters and setting depths, quantities used and tops of cement, perforated or open-hole interval, tubing strings, including diameters and setting depths, and the type and location of packers, if any.

- 6. Each Los Lobos G-112 application (without the above attachments) was sent to all other geothermal lease owners within a one-half mile radius of the proposed injection well.
- 7. AmeriCulture, Inc. wrote a letter to OCD dated December 26, 2012 regarding the pending G-112 applications. The letter protested the use of either Well LDG 55-7 or Well LDG 53-7 as injection wells. The protest asserted that AmeriCulture, Inc.'s State Well No. 1 is in direct hydraulic connection with the production interval in Well LDG 55-7. The protest regarding Well LDG 53-7 asserted a possibility of migration of disposed geothermal power plant "fluids" to one or more of AmeriCulture, Inc.'s production wells.
- 8. OCD's Director, pursuant to 19.14.93.9 NMAC, scheduled a Hearing Examiner hearing on January 24, 2013. The hearing was initially postponed to allow Los Lobos' hydrologist to be present at the hearing, and was then continued to February 21, 2013, to allow AmeriCulture, Inc.'s new counsel time to prepare. Los Lobos then applied for the matter to be heard directly by the Commission. The matter was set for the Commission hearing on March 19, 2013. Notice of the hearing was issued on February 20, 2013. Notice was posted on OCD's website and published in the Hidalgo Herald.
- 9. OCD proposed draft Conditions of Approval that were filed with the Commission.
- 10. Los Lobos presented evidence that its proposal is in the interest of conservation and will prevent waste. Los Lobos proposes to reinject all water produced for geothermal power plant operations into the same geothermal reservoir from which it was produced. Los Lobos presented testimony that if its field testing reveals that there is, in fact, a structural "boundary" between the proposed production wells and injection wells, it would be financially imprudent to build the geothermal power facility project using the proposed configuration of production wells and injection wells. Los Lobos also presented a report from John Shomaker & Associates, Inc. that during pump and injection testing in 2012, water levels had reached, or nearly reached, equilibrium by the end of the test.
- 11. Los Lobos presented evidence that its proposal protects correlative rights. Under the principle of correlative rights, and New Mexico's geothermal statutes and rules, all lease holder and mineral owners have a right to develop the resource in proportion to their corresponding acreage. Los Lobos leases more than 2500 acres of

geothermal mineral acreage. AmeriCulture, Inc. has a state geothermal lease for 10 acres and shares 15 acres of geothermal mineral with Los Lobos pursuant to a Joint Facility Operating Agreement.

- 12. Los Lobos presented evidence that Well LDG 53-7 and Well LDG 55-7 are cased, cemented, and equipped in such a manner that there will be no danger to any natural resource (including geothermal resources, useable underground water supplies, and surface resources).
- 13. Los Lobos presented evidence that even if AmeriCulture, Inc.'s State Well No. 1 is in direct hydraulic connection with the production interval in Well LDG 55-7, injection into Well LDG 55-7 is unlikely to create any significant drawdown or effects at AmeriCulture, Inc.'s State Well No. 1.
- 14. Los Lobos presented evidence of consistent concentrations of analytes from the geothermal fluid flow intervals in Wells LDG 45-7, LDG 53-7, and LDG 55-7, and demonstrated that analyte concentrations are not substantially different from those in the shallow alluvial wells within the geothermal fluid up-flow areas, such as AmeriCulture, Inc.'s wells.
- 15. Los Lobos presented evidence that the geothermal fluid production zone in Well LDG 53-7 and Well LDG 55-7 is the same, and that the geothermal fluid flow intervals occur in the same geological formations and are not directly connected to the alluvial aquifer at 400 feet below ground surface in AmeriCulture, Inc.'s State Well No. 1.

The Commission concludes that:

- 16. Due notice of the hearing on this application has been given, and the Commission has jurisdiction of the parties to this case and the subject matter thereof.
 - 17. Los Lobo's proposal complies with 19.14.93.8 NMAC.
- 18. Los Lobos' proposal is in the interest of conservation and will prevent waste.
 - 19. Los Lobos' proposal will protect correlative rights.
- 20. Well LDG 53-7 and Well LDG 55-7 are cased, cemented, and equipped in such a manner that there will be no danger to any natural resource including geothermal resources, useable underground water supplies, or surface resources.

IT IS THEREFORE ORDERED THAT:

1. The application of Los Lobos to place Wells LDG 53-7 and LDG 55-7 on injection is hereby granted subject to the Conditions of Approval attached as Exhibit A.

- 2. The OCD shall review the approved application in five years to ensure continued compliance with the Geothermal Resources Conservation Act, NMSA 1978, Section 71-5-1 *et seq.* and 19.14.93.8 NMAC.
- 3. The Commission retains jurisdiction over this case for the entry of such further orders as the Commission deems necessary.

DONE at Santa Fe, New Mexico on the 9th of May, 2013.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

TERRY WARNELL, Member

ROBERT BALCH, Member

JAMI BAILEY, Chair

SEAL

Exhibit A

Conditions of Approval

- 1) <u>G-104 Form:</u> The operator shall submit a final G-104 Form with all other associated G-Form information (i.e., G-105, G-106, and G-107) with required logs and well test information (19.14.55.8 NMAC) for this G-112 submittal (19.14.63 NMAC and 19.14.93 NMAC) to the Oil Conservation Division (OCD) for approval prior to injection into Well 53-07 or Well 55-07.
- 2) Water Quality Sampling Plan: The operator shall provide a water quality sampling plan (plan) to OCD for approval prior to injecting any produced geothermal fluid into Well 53-07 or Well 55-07. The operator shall comply with OCD's approved ASTM sample procedure(s) with environmental water quality sampling and analytical laboratory testing that complies with EPA Quality Assurance/Quality Control (QA/QC) and Data Quality Objectives (DQOs).

The operator shall sample for the constituents specified in Tables 1 through 3 of its Discharge Permit (GTHT-01) using the specified methods. The operator shall collect environmental water quality samples from Production Well 45-07 before, during and just before the end of well testing. Injection Well 53-07 and Injection Well 55-07 shall be sampled before and immediately at the end of well testing. During Production Well 45-07 well testing, the operator shall collect a sample and notify the OCD within 24-hours of discovery whenever daily production well field testing water quality parameters (i.e., temperature, oxidation/reduction, pH, and Specific Conductivity) vary by +/- 25%. The operator shall request permission from each water supply well owner (see Table 3 of GTHT-01 to allow the operator to conduct water quality testing, including the analytes and methods specified in Tables 1 through 3, water quality analyte suites, and monitor well static water-levels during testing to help assess the capacity of the reservoir to sustain production of geothermal fluids for the extraction of heat and any heat loss observed during well testing.

- 3) <u>Water Quality Sample Method:</u> When sampling for Water Quality Control Commission (WQCC) DP parameters, the operator shall sample any source of injected fluids, Injection Well 53-07, Injection Well 55-07, and Water Supply Wells utilizing ASTM E-947-83 (Standard Specification for Sampling Single-Phase Geothermal Liquid or Steam for Purposes of Chemical Analysis) whenever possible.
- Water Quality Monitoring Parameters: The operator shall monitor for the analyte suites listed in Tables 1 through 3 as specified in Condition of Approval 2 (COA 2) above. The operator shall assess the potential for the effluent from any source of injected fluids into Injection Well 53-07 and Injection Well 55-07 to adversely affect ground water quality at any place of withdrawal for the present or reasonably foreseeable future in water supply wells located within one-half mile from Injection Well 53-07 or from Injection Well 55-07. OCD may require the operator to implement corrective

action(s) if water quality exceeds the greater of the WQCC ground water standards specified at 20.6.2.3103 NMAC or background at any place of withdrawal of ground water for the present or reasonably foreseeable future use. The operator shall conduct operations in such manner so as to protect fresh water and in a manner consistent with the requirements specified in GTHT-01.

- 5) <u>Water Quality Background:</u> The operator shall obtain ground water quality data from any source of injected fluids and Injection Well 53-07 and Injection Well 55-07 as specified in COAs 2 through 4 to help determine background geothermal reservoir water quality conditions.
- 6) <u>Correlative Rights:</u> The operator shall monitor the geothermal reservoir for sustainable production well capacity for the long-term extraction of heat to efficiently produce power, prevent waste, and protect correlative rights of nearby geothermal lease owners sharing the reservoir. The operator shall implement commercially reasonable efficient geothermal engineering power generation design, operations, and environmental best management practices to address applicable regulations and to prevent pollution. Any deviation from a closed loop binary system, such as use of a wet cooling tower, shall require the operator to request a hearing before the Oil Conservation Commission.
- Geothermal Waste: The operator shall minimize geothermal waste of heat from geothermal reservoir fluids treated and/or stored at surface, and prevent the reinjection of high turbidity cooled geothermal reservoir fluids treated and/or stored at surface back into the reservoir. "Geothermal Waste" includes the inefficient, excessive, or improper management of reservoir thermal fluid production, use, or dissipation of geothermal fluid heat (e.g., transporting or storage methods that cause or tend to cause unnecessary surface heat loss of the geothermal resource, and/or reinjection of cold reservoir fluids back into the geothermal reservoir resulting in inefficient and/or decreased geothermal reservoir temperature(s)). In addition, the operator shall not locate, space, construct, equip, operate, produce, or vent any well in a manner that results or tends to result in unnecessary heat and/or evaporative losses or in reducing the ultimate economic recovery of geothermal resources.
- 8) Water Evaporation: The operator shall accurately monitor and estimate evaporation losses (See COA 12) to the water resource(s) including, all geothermal production fluid evaporative losses from surface management operations to ensure that its water rights are adequate to replace the net loss of the ground water resources due to its surface fluid management operations. Surface fluid management operations shall include annual production well testing, well work over, repair, maintenance, and/or anytime geothermal reservoir fluids are exposed to ambient air conditions.

The operator shall monitor the in-flow/out-flow rate(s) and fluid level in ponds/pits to maintain adequate free board, prevent overflow, and to detect leaks and spills. The operator shall record evaporation fluid loss volumes and shall total cumulative losses from ponds/pits at least daily during well testing. The operator shall report pond/pit volumes daily to OCD whenever a pond or pit is used.

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The operator shall report to OCD when evaporative losses from surface management of produced geothermal fluids exceed the operator's available water rights during well testing and/or during geothermal operations.

If the Office of the State Engineer issues an opinion finding that existing ground water rights may be impaired, OCD, upon receipt of that opinion, shall require the operator to submit a "Water Replacement Plan" (see COA 12) to resolve the situation. The operator shall conduct annual production well testing as specified in GTHT-1. The operator shall provide information on the size and extent of the geothermal reservoir as specified in GTHT-1.

9) <u>Mechanical Integrity Testing Initial Reporting:</u> The operator shall submit an initial G-103 Sundry Notice for an injection well Mechanical Integrity Test (MIT) before initial injection into Injection Well 53-07 or Injection Well 55-07 to be approved by the OCD, and give OCD at least five business days' prior notice of when the MIT is scheduled so that the OCD has the opportunity to witness the test.

The operator shall ensure that the UIC Class V Geothermal Injection Well 53-07 and Well 55-07, MITs performed subsequent to well work over, unless it occurs after the 4th year, since the last EPA MIT, shall not disrupt the 5-year MIT schedule. In general, the well shall be tested every 5 years regardless of well work over MITs conducted between the required EPA MIT 5-year MIT schedule. The operator may proceed at its own risk when attempting to perform an MIT with external equipment on the well head, i.e., BOPE, which could be the cause of a well MIT failure.

Mechanical Integrity Testing Subsequent Reporting: The operator shall submit a subsequent G-103 Sundry Notice to report MIT results for OCD approval in accordance with COA 9 above and prior to injection into Well 53-07 or Well 55-07 (19.14.54.8.C(2) NMAC).

If OCD does not witness the MIT, the Operator shall submit the original MIT chart with required information, test type, witness signatures, and chart recorder calibration information with MIT chart for approval prior to injecting into a well. This submittal shall start the OCD Underground Injection Control (UIC) Program 5-Year MIT injection well monitoring schedule. The operator shall file a G-103 Sundry Notice in a timely manner whenever an injection well is no longer needed as an injection well. OCD may modify GTHT-01 when this occurs. The operator shall file a new G-112 Form with the OCD for approval if the same well is needed for use as an injection well at a later date. OCD may again modify GTLT-01 if this occurs.

For injection wells under completion, the operator may submit a Cement Bond Log (CBL) and Casing Integrity Test (CIT) performed during and/or after Well 53-07 completion or Well 55-07 completion to the OCD attached to a "Subsequent" G-103 Form to satisfy the MIT requirement prior to injection into Injection Well 53-07 or injection into Injection Well 55-07.

- approved G-104 and G-112 Permits shall also comply with the terms and conditions of GTHT-01. The operator shall request a minor "Modification" to the permit for any changes to its permit to include any new and/or removed existing UIC Class V Geothermal injection/disposal well(s) prior to commercial power production operations and/or as needed at least 30 days in advance of plans for OCD approval.
- 12) Water Replacement Plan (WRP): The operator shall furnish OCD information sufficient to demonstrate that its proposed plan(s) and/or any modified plan(s) of operation will not result in a "diversion" of ground water beyond water rights owned or leased by the operator, and that water temperature at the location from which the water will be produced is greater than 250 degree Fahrenheit bottomhole temperature. Bottomhole temperature shall mean the highest temperature measured in the well or bore hole, and is normally attained directly adjacent to the producing zone, and commonly at or near the bottom of the borehole.

This information shall include the information specified by The Office of the State Engineer (OSE) and shall be submitted to the OCD in order that OSE may render an opinion pursuant to NMSA 1978 Section 71-5-2.1 as to whether a "Water Replacement Plan(s) - WRP" is necessary based on available water rights and planned extraction and injection operations.

In the event that OSE (a) opines that a WRP is necessary, (b) declines to opine, or (c) the temperature of produced water is less than 250 degrees Fahrenheit, in which case, all Production Well 45-07 operations (and/or all applicable project production well locations) shall be subject to OSE Jurisdiction. The operator shall also continue to comply with all applicable OCD Jurisdictions.

- Applicable Regulations: The operator shall comply with the terms and conditions of GTHT-01, the Geothermal Resources Conservation Act (Chapter 71, Article 5 NMSA 1978, and OCD's Geothermal Regulations (Title 19, Chapter 14 NMAC). The operator shall comply with the applicable sections of Water Quality Control Commission Regulations (20.6.2.5000 5006 NMAC) while any Underground Injection Control (UIC) Class V Geothermal Injection and/or Disposal Wells are being used as injection wells. The operator shall ensure that all of its geothermal field activities comply with the applicable provisions of 20.6.2 NMAC and 20.6.4 NMAC.
- **Termination of Injection Authority:** The operator shall comply with the above Conditions of Approval or OCD may after notice and hearing (or without notice and hearing in event of an emergency, subject to the provisions of NMSA 1978 Section 71-5-17) terminate the operator's injection permit.

<u>Disclaimer:</u> Please be advised that approval does not relieve Los Lobos Renewable Power, L.L.C. from responsibility if its operations pose a threat to ground water, subsurface trespass, water supply/diversion, surface water, human health, or the environment. In addition, approval does not relieve Los Lobos

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Renewable Power, L.L.C. of responsibility for compliance with any other federal, state, or local laws and/or rules or regulations.

STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 14246 ORDER NO. R-13127

APPLICATION OF RASER POWER SYSTEMS, LLC, FOR APPROVAL OF A DISCHARGE PLAN PURSUANT TO THE WATER QUALITY ACT, HIDALGO COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 9:00 a.m. on December 1, 2008, and April 7, 2009 at Lordsburg, New Mexico, before Hearing Officer David K. Brooks.

NOW, on this 29th day of May, 2009, the Division Director, having considered the testimony, the record and the recommendations of the Hearing Officer,

FINDS THAT:

Background and Procedure

- (1) Due public notice has been given, and the Division has jurisdiction of the subject matter of this case.
- (2) Los Lobos Renewable Power, LLC ("Applicant" or "Los Lobos"), a subsidiary of Raser Power Systems, LLC, filed an administrative application with the Environmental Bureau of the Division for approval of a discharge plan pursuant to the New Mexico Water Quality Act [NMSA 1978, Sections 74-6-1 through 74-6-17] and applicable rules of the Water Quality Control Commission ("WQCC"), for a geothermal power generating facility ("the facility") to be located in the NE/4 SW/4 of Section 7, Township 25 South, Range 19 West, NMPM, in Hidalgo County, New Mexico.
- (3) After initial public notices were given, Americulture, Inc. ("Americulture" or "Protestant") protested the application. The Director of the Division ("the Director")

determined, pursuant to 20.6.2.3108.K NMAC, that there was substantial public interest in this application, and designated a hearing officer to conduct a public hearing in accordance with 20.6.2.3110 NMAC. The hearing was convened only to consider approval, disapproval or conditional approval of the proposed discharge plan. No issue under the Geothermal Resources Conservation Act [NMSA 71-5-1 through 71-5-24] was addressed in this proceeding.

- (4) At the initial hearing on December 1, 2008, Applicant and the Division each appeared through counsel and presented evidence in support of the proposed discharge plan. Protestant appeared through a non-attorney corporate representative and presented evidence in opposition.
 - (5) The evidence at the initial hearing showed that:
 - (a) applicant intends to locate one of three proposed Class V injection wells included in the discharge plan at a location different from that indicated in the application and in the original public notice; and
 - (b) the Division staff had not yet obtained all of the technical information it needed from Applicant and had not finalized its recommendations for conditions to be included in a final draft permit.
- (6) In order to provide public notice of the changed location of one of the injection wells and to allow the Division to complete a recommended draft permit, the Hearing Officer recessed the hearing. The hearing re-convened pursuant to a new hearing notice on April 7, 2009, at which time Applicant, the Division and Protestant appeared and presented additional evidence, and the Division offered in evidence a revised draft permit. After the hearing, the Division staff filed a further, non-substantive revision of its draft permit. Because the Division did not file its final draft permit 30 days prior to the hearing, the Hearing Officer re-opened the record to allow Protestant to file comments on the final draft permit. The Protestant filed comments, and the administrative record was finally closed on May 4, 2009.

The Evidence

Applicant's witnesses, Michael Hayter and Roger Perry, testified that Applicant proposes to construct a binary-cycle geothermal power generating facility, including five geothermal production wells ("the production wells") that will lift geothermal water from approximately 3,400 feet below the surface, presumably from the Horquilla Limestone formation, and three water injection wells ("the injection wells") that will re-inject the spent geothermal waters, together with waste water from the plant's cooling tower, into the source formation. Applicant anticipates that the subterranean heat source will re-heat the injected water and allow it to be re-produced for further geothermal use.

- (8) The cooling tower water will be produced from a water supply well located in proximity to the facility. It will be treated with biocides and anti-corrosion agents.
- (9) Applicant presented a witness, Jennifer Wright, from NALCO, the company which designed the chemical treatment program for the cooling tower water. Ms. Wright testified that the chemical agents that would be introduced into the cooling tower water, in the quantities that would be used, would not cause the water to exceed WQCC water quality standards, nor introduce any toxic pollutants. Ms. Wright also described the 3D-TRASER system that would monitor and control the levels of chemical agents used in the water treatment process to prevent introducing excessive amounts of these agents.
- (10) The Division's witness, Carl Chavez, an environmental engineer, described the Division's application review process and the provisions of the proposed draft permit, including the groundwater monitoring requirements included in the draft permit and the tables attached thereto.
- (11) Protestant presented the testimony of James Witcher, a hydro-geologist with substantial experience studying the area where the facility will be located. Mr. Witcher offered a detailed interpretation of the region's geology. He specifically testified that the geothermal water so far discovered and produced in the area could not have originated in or moved through the Horquilla Limestone, the formation which Applicant's witness posited as their geothermal source formation, because the chemical qualities of waters produced from Protestant's wells and other geothermal wells in the vicinity indicate that those waters have never moved though a carbonate reservoir.
- (12) Though he did not give any specific opinions about hydrologic connections between formations, Mr. Witcher expressed concerns about the injected water's potential to migrate into aquifers from which Protestant and others are producing fresh water. He recommended that the proposed discharge plan be rejected until the Applicant can present further evidence of geologic conditions that could only be obtained by drilling one or more test wells.
- (13) Mr. Witcher also expressed a concern that the monitor wells required in the proposed draft permit would be ineffective to monitor water in the aquifers as they were intended to do because of the draw-down of the water table that would result from the proposed operation.
- (14) Both Applicant's and Protestant's witnesses testified that no testing had been done on the water in the Horquilla Limestone formation. There was discussion of water tests indicating concentrations of total dissolved solids (TDS) in the range of 1,000 to 1,500 milligrams per liter (mg/l), but it was uncontested that these results were from tests of shallower formations, and not of Horquilla.

- (15) No party presented any specific evidence regarding hydrologic connection or lack thereof between the Horquilla and any of the shallower aquifers in the vicinity.
- (16) Protestant is in the business of commercial production of Tilapia fish for human consumption. Protestant has a fish farm close to the facility. During the hearing, Protestant's corporate representative, Damon Seawright, made various non-specific observations about water quality considerations that might affect the particular species of fish that Protestant produces, but Mr. Seawright was not sworn, did not testify as a witness and offered no expert or factual testimony, or other evidence, about these matters.
- (17) In addition to the parties who entered appearances, several residents of Hidalgo County made comments at the hearing. All supported Los Lobos' application.

Division Director's Findings and Conclusions

- (18) Each of the following findings shall constitute findings of fact to the extent that they address factual issues, and conclusions of law to the extent that they address legal issues.
- (19) The proposed permit authorizes construction and operation of lined reserve pits at the wells, evaporation ponds, and other elements, in addition to the three Class V injection wells. However, there was no controversy at the hearing concerning these pits, ponds or other elements, and the Director accordingly accepts the conclusion of the Division staff, as evidenced by the staff's endorsement of the draft permit, that these elements present no hazard to any underground source of drinking water.
- (20) The controversy at the hearing focused exclusively on the proposed injection wells. The governing standard for determining whether these wells should be permitted is set forth in 20.6.2.3109.C NMAC. That subsection reads, in pertinent part, as follows:

[t]he secretary shall approve the proposed discharge plan, modification or renewal if the following requirements are met:

- (2) the person proposing to discharge demonstrates that approval of the proposed discharge plan, modification or renewal will not result in either concentrations in excess of the standards of 20.6.2.3103 NMAC or the presence of any toxic pollutant at any place of withdrawal of water for present or reasonably foreseeable future use, except for contaminants in the water diverted as provided in Subsection D....
- (21) The referenced Subsection D provides, in pertinent part, as follows:

The secretary shall allow the following unless he determines that a hazard to public health may result:

- (1) the weight of water contaminants in water diverted from any source may be discharged provided that the discharge is to the aquifer from which the water was diverted or to an aquifer containing a greater concentration of the contaminants than contained in the water diverted; and provided further that contaminants added as a result of the means of diversion shall not be considered to be part of the weight of water contaminants in the water diverted . . .
- (22) Since the injection wells in this case will discharge the same water that was diverted into the same aquifer from which it was diverted, Subsection D of 20.6.2.3109 NMAC applies in this case and counsels approval of the application *unless* the addition of cooling tower water introduces toxic pollutants or other water contaminants that could introduce or cause the water in the injection zone to exceed standards.
- (23) There was some discussion during the second hearing about the possibility of injection into an "intermediate zone" between the shallow aquifers from which ground water is now being produced and the geothermal source formation. This possibility, however, need not be considered since the draft permit would not authorize such injection. Paragraph 21.F of the draft permit specifically provides that the injected fluids will be injected into "the geothermal reservoir." From a reading of the entirety of Paragraph 21.F, it is plain that it authorizes injection only into the reservoir from which the geothermal water was produced, be it the Horquilla or some other formation. Injection into an "intermediate formation" would require a permit modification.
- (24) The testimony of the NALCO witness, Ms. Wright, established, *prima facie*, that the proposed chemical treatment of the cooling tower water will not cause an exceedance of standards or introduce any toxic pollutant. Protestant offered no contrary evidence. Speculation by a party representative speaking in the role of counsel is not evidence.
- (25) The Division proposes further conditions in the draft permit to insure that addition of the treated cooling tower water to the injected fluids will not cause an exceedance of water quality standards or introduce toxic pollutants. Clause (ii) of Paragraph 20.E of the draft permit requires frequent testing and analysis of the fluids to be injected, prior to injection. Clause (v) of Paragraph 20.B expressly requires immediate shut-down "if the concentration of the injection fluids exceed the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant . . . is detected." Applicant has indicated that it will accept these permit conditions.
- (26) There is an ambiguity inherent in the use of the term "background" in Paragraph 20.B since the draft permit requires numerous different background tests at

different locations. To resolve this ambiguity, the relevant provision of Clause (v) of Paragraph 20.B of the draft permit should be changed to read:

if the concentration of <u>any water contaminants</u> in the injection fluids exceeds the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background [as established for the injection formation at the injection well location pursuant to Clause (i) of Paragraph 21.D], or if any toxic pollutant... is detected.

- (27) Protestant's corporate representative, Mr. Seawright, suggested that use of a water tower for cooling, with the attendant necessity to dispose of waste water, might not be the best available technology for the facility, since air cooling could be used. Applicant's witnesses, however, testified that air cooling would not be practical for this facility. Protestant offered no evidence to the contrary. Indeed, Protestant's sole witness, Mr. Witcher, expressly disclaimed any expertise in power plant cooling technology.
- (28) Based on Findings (22) through (27), the Director concludes that operation of the proposed Class V injection wells in accordance with the proposed draft permit, as modified in Finding (26), will comply with the applicable standards of Subsections C and D of 20.6.2.3109 NMAC *unless* the injection process causes excursion of the injected fluids, or migration of other waters, into another aquifer (distinct from the source formation) so as to cause an exceedance of standards or background in that aquifer.
- (29) Subsection D of 20.6.2.3109 should not be construed to permit re-injection into a source aquifer if the injected fluids cannot be effectively confined to that aquifer or if the injection process itself causes an exceedence of standards in another aquifer.
- (30) The evidence in this case is not sufficient to demonstrate the characteristics of, or even the identity of, the injection formation, nor does it demonstrate whether or not hydrologic communication exists between the injection formation and other aquifers in the vicinity that are or may be underground sources of drinking water. The low injection pressure (75 psi) proposed according to the testimony of Applicant's witnesses may suggest that induced migration from the injection zone is unlikely, but does not, in this unknown environment, necessarily demonstrate that it will not occur.
- (31) These considerations would tend to support the approach recommended by Protestant's witness, Mr. Witcher, of requiring Applicant to drill exploratory wells and furnish additional data prior to approval of permits for the proposed Class V injection wells.
- (32) However, Applicant presented testimony that it would be difficult to secure financing for the necessary exploratory work absent issuance of a permit.
- (33) The Division's approach, as evidenced by the draft permit, and the testimony of the Division's witness as to the reasoning supporting certain permit

conditions, has been to impose permit conditions which will allow early detection and response if any excursion of injected fluids or induced migration is discovered.

- (34) In view of the unknown geologic environment and the difficulty of obtaining more definitive information, the Director concludes that the Division's approach is a viable one. Accordingly, if the permit conditions are sufficient to allow timely detection and intervention of any process that may cause an exceedence of standards or applicable background in another aquifer, or at another location, the Division can properly conclude that the standard for permit approval established by Subsection C of 20.6.2.3109 NMAC is satisfied.
- In any injection well, the first line of defense for preventing excursion of the injected fluids into a formation other than the approved injection formation is the well's casing program. The casing program provided in the draft permit (Paragraph 21.B) is extremely general, doubtless because, as pointed out by Protestant's witness, Mr. Witcher, one does not know where to set casing until one has some knowledge of the stratigraphy. However, the casing program should not be left to chance, or to Applicant's unsupervised discretion. Accordingly, Paragraph 21.B of the draft permit should be amended to require Applicant, prior to setting intermediate or production casing in each of the production and injection wells, to run open hole logs, pursuant to a logging program approved by the Division, and submit the logs to the Division for review together with Applicant's recommendations for casing setting depths, and, in the case of injection wells, for precise definition of the injection interval. Furthermore, Paragraph 21.B should be further amended to require injection to be accomplished through tubing suitable for the character of the injected fluids, to be determined after initial testing of the fluids to be injected. The tubing should be installed in a packer set within 100 feet of the uppermost injection perforations. The casing-tubing annulus should be filled with an inert fluid, and a gauge or approved leak-detection device should be attached to the annulus in order to detect leakage in the casing, tubing or packer.
- (36) Although the evidence in this case indicates that injection pressures will be sufficiently low that formation fracture problems are unlikely, Paragraph 21.G of the draft permit, relating to well pressure limits, should be amended to specifically require the Applicant, after testing the injection formation, to report the intended maximum injection pressure to the Division for approval prior to commencement of injection. The injection pressure shall not exceed 0.2 psi per foot of depth from the surface to the top of the injection interval, unless the Applicant secures Division approval for an increase based on demonstration that the increase will not involve a hazard of formation fracture.
- (37) Paragraphs 20 and 21 of the draft permit, and the tables attached to the permit, require an extensive ground water monitoring program, and require notification to the Division within 72 hours if any test reveals an exceedence of the higher of WQCC standards or background at any monitoring location, or if any toxic pollutant is encountered. The Division's witness, Mr. Chavez, testified that this monitoring program would be sufficient to provide prompt detection of any introduction of pollutants into existing, identified aquifers resulting from operation of the injection wells. With certain

qualifications indicated below, the Director concludes that the monitoring, testing and reporting requirements of the draft permit are adequate to meet the standards of the applicable WQCC regulations.

- (38) In order to address concerns that were articulated at the hearing or in the responses filed, or that arise from the terms of the draft permit, the groundwater monitoring provisions of the draft permit should be modified as follows:
 - (a) Protestant has requested that its Americulture State Well No. 2 be added to the list of water supply wells to be monitored and tested, as set forth in Table 3 attached to the draft permit. Although no evidence was presented to indicate that monitoring this additional well would produce better or different data, Mr. Chavez testified that the Division staff did not object to adding this well to the list of wells to be tested, and this requested change to the draft permit should be made.
 - (b) Protestant's witness, Mr. Witcher, articulated concerns that the drawdown of the water table resulting from operation of the facility would render the monitoring wells ineffective (Transcript of 4-7-09 hearing at 143-45). Neither Applicant nor the Division presented any responsive evidence concerning this issue. Accordingly, Clause (i) of Paragraph 20.B of the draft permit, which requires Applicant to prepare a monitoring plan for approval of the Division, should be amended to direct Applicant to specifically address Mr. Witcher's concerns in its monitoring plan, and to describe measures to be promptly taken to remedy the problem if the monitoring wells cease to function.
 - (c) To avoid any ambiguity, since the draft permit requires extensive background sampling at various locations, the 72-hour notification provision in Clause (viii) of Paragraph 20.B of the draft permit should be amended to require that the notification requirement is triggered if:

"the concentration of a monitor well sample exceeds the greater of the water quality standards specified in WQCC 20.6.2.3103 NMAC or the background established at that well's location pursuant to the monitoring program described in this paragraph, or if any toxic pollutant is detected, . . ."

(d) Protestant objected to the notification provision as inadequate to remedy any exceedence that might be detected at a location other than an injection well, and pointed out that while Clause (v) of Paragraph 20.B of the draft permit requires shut-down of the facility if an exceedence is detected at an injection site, no comparable requirement exists if an exceedence is detected elsewhere. A distinction between the response required to an exceedence at the injection site and an exceedence at another location is appropriate, since an exceedence at another location would not necessarily be attributable to the operation of facility. However, in this case, where the geologic evidence the

Division would normally require to demonstrate that the injected fluids will be confined to the injection zone is absent, the Division must rely on the adequacy of the permit's requirements for early detection and remedial action to justify a finding that an exceedence in another formation will not result. Accordingly, Clause (viii) of Paragraph 20.B should be amended to expressly require that, in the event of an exceedence as described in that clause occurs, the Applicant, if so ordered by the Division, shall shut down the operation for such time as may be necessary to allow the Division to investigate the cause of the exceedence. If the Division determines that the operation of the facility contributed to the exceedence, it can then invoke the permit modification provisions of Paragraph 5 of the draft permit, as explained by the Division's witness, Mr. Chavez, in his testimony at the hearing.

- (39) The Director determines that the draft permit, if modified in accordance with Finding Paragraphs (35) through (38), meets the standard for permit approval provided in 20.6.2.3109.C(2) NMAC.
- (40) Paragraph 20.A of the draft permit requires that Applicant conduct an aquatic toxicity test on the Tilapia fish species present at Protestant's facility. Applicant indicated that it will accept this condition. Accordingly, there is no issue about this requirement except that Protestant has argued that Applicant should be required to make a more extensive demonstration that the injected fluids cannot harm Protestant's fish or those who consume Protestant's fish. Such a showing would be required only by applicable WQCC rules only if there were evidence that the injected fluids might contain one or a combination of the potential "toxic pollutant" substances specifically listed in 20.6.2.7.WW NMAC, which is not the case here.
- (41) There are some additional provisions of the draft permit that were not explained at the hearing, and that seem to have questionable relevance, and should be modified or deleted:
 - (a) Paragraph 6 contains an apparently erroneous reference to Class II (oil and gas-related) wells, which are not contemplated in connection with this facility. This provision should be corrected or deleted.
 - (b) Paragraph 13 requires closure of all Class V wells, without excluding the Class V injection wells that are the subject of the permit. This provision should be deleted unless there are other Class V wells to which it applies, in which event it should be corrected to make clear to what it applies, and to expressly exclude the Class V injection wells contemplated by the permit.
- (42) The Division staff should be instructed to revise/correct the draft permit as set forth in this Order. The Applicant's discharge plan should be approved subject to the conditions set forth in the draft permit and the additional conditions described herein.

IT IS THEREFORE ORDERED THAT:

- (1) Pursuant to 20.6.2.3109 NMAC, the application of Los Lobos Renewable Power Systems, LLC, a subsidiary of Raser Power Systems, LLC, for a discharge permit for construction and operation of a binary-cycle, geothermal power generating facility to be located in the NE/4 SW/4 of Section 7, Township 25 South, Range 19 West, in Hidalgo County, New Mexico, is hereby granted.
- (2) Applicant shall be authorized, subject to approval of Applications for Permits to Drill (APDs) by the Division's Artesia District Office, to construct three Class V injection wells at the following locations in Hidalgo County, New Mexico:

Well No. 42-18, to be located 1307 feet FNL and 2123 feet FWL (Unit C) in Section 18, in Township 25 South, Range 19 West, NMPM

Well No. 51-07, to be located 169 feet FNL and 2407 feet FEL (Unit B) in Section 7, in Township 25 South, Range 20 West, NMPM

Well No. 53-12, to be located 1575 feet FNL and 3350 feet FWL (Unit K) of Section 12, in Township 25 South, Range 19 West, NMPM

- (3) Subject to approval of construction and authorization for start-up, Applicant is authorized to employ the above described wells for injection of produced geothermal waters and power plant cooling tower effluent into the source formation from which the injected geothermal waters were produced.
- (4) Approval of this application is subject to the conditions of the final permit, which shall include the conditions provided in the draft permit presented in evidence at the hearing of this case, as amended pursuant to this Order, and the additional conditions described in this Order.
- (5) The staff of the Division's Environmental Bureau is directed to revise the draft permit to incorporate the changes and additions described in the finding paragraphs of this Order, and to present the revised draft permit to the Director for signature and transmission to the Applicant for acceptance.
- (6) Jurisdiction of this case is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.



STATE OF NEW MEXICO OIL CONSERVATION DIVISION

MARK E. FESMIRE, P.E.

Director

IMPORTANT—(REAL ANSTRUCTIONS ON BACK BEFORE FILLAGE OUT THIS FORM)

APPLICATION FOR PERMIT TO EXPAND PLACE AND PURPOSE OF USE OF UNDERGROUND WATERS 3-12739 \$25.00

7/1- N- 2 26 2 2 26 2 3 66 2 65 3 60MD

1. Name of Water Right Owner <u>Rosette Inc</u> Mailing Address <u>PO BOX 25</u> 6-A City and State <u>Animas, NM 88020</u>	: NO. <u>A-36</u>	-A, A-36-B,	M-04, M-	65-A COMB
2. Source of water supply, located (artesian or shall			in, me of undergro	und hasini
3. Right was acquired for Geothermal, Gr. File No,			-	
4. Area from which water rights are to b	e severed,(a)	acres descri	bed as follo	us:
Subdivision of Section (District or Hydrographic Survey)	Section (Map No.)	- · · · · · · · · · · · · · · · · · · ·	Range	Acres
SW1/4NE1/4	- <u>7</u>	25S	<u>19W</u>	150.252
NW1/4SE1/4	$\frac{7}{2}$	<u>25S</u>	<u>19W</u>	
				
(b) Quantity of water to be transferr	ed, <u>530.256</u> acre (consumptive u		d from well	
in the _1/4 _1/4 _1/4 Section:			N.M.P.M.	
or Tract No of Map No.		_	ached List	
(d) If there are other sources of wat	er for these 1	ands, describe by	file No	- 5
		_		
5. Application is made to change place o				_
use to conform with Section 71-5-2.1 NMS.				to applicant:
with drainwater that is otherwise dispos				
6. Acreage to which transfer is to be ma	de (a) <u>150.252</u>	acres described as	TOTTOWS:	
Subdivision of Section				-
(District or Hydrographic	Section	Township	Range	Acres
Survey)	(Map No.)	(Tract No.)		
SW1/4NW1/4	7	258	19W	38.87
W1/2SE1/4NW1/4	7	25S	19W	8.63
SE1/4NW1/4	7	258	19W	28.436
E1/2SW1/4	7	25S	19W	74.316
SW1/4NE1/4	777777777777	25S	19W	Greenhouses
NW1/4SE1/4		258	<u>19W</u>	
(b) Water to be used thereon for $\frac{\Psi_{f,12}}{\text{dest}}$	hermal, Greenh	ouse irrigation, I	rrigation, Re	elated
purposes;				
(c) If there are other sources of water	er for these la	ands, describe by	File No	-
7. Additional statements or explanations	This amended	application is sub	mitted to ame	end the
appolicant's existing water rights to ap				
that involves the incidental loss or ext				
Fahrenheit, and to apply for the applica				
irrigation of other irrigable lands held		_		of use of
underground water that is listed in the		02 attachment, Sta		Conditions of
Approval for wells A-36-AB-S-15 through place of use as Section 7. Township 15 S				
greenhouses and related lands is Section				che Applicant a
dieemouses and leighted tailes is seekis.	,, 1041Julip p	Doubles and		
I, Dale Burgett, affirm that the foregoin			t of my know.	Ledge
and belief and that I am the owner and he (sole, partial, a		water rights.		~~~~
All King of	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		OFF	ICIAL SEAL
- / ale ouges	rmittee,		📳 🛮 Elisa T	T. Dominguez 🤾
) (]	(<i>)</i>	TARY PUBLIC (
Ву:		My Comp	-	OF NEW MEXICO
		Two count	~~~~	
Subscribed and sworm to before me this _	_		_ A.D.,200	
My commission expires 10/14/05	Elisa 2.	Dominguez	ary Public	
		O NOE	wer Euwill	

ACTION OF STATE ENGINEER

After notice pursuant to statute and by authority vested in me, this application is approved provided it is not exercised to the detriment of any others having existing rights, further provided that all rules and regulations of the State Engineer pertaining to the drilling of shallow wells be complied with; mark **The XXXIII THE PROVIDED REPORT OF THE PROVIDED REPO
neer pertaining to the drilling of shallow wells be complied with; xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
conservation of water within the state, subject to the following conditions:
SEE ATTACHED
CONDITIONS OF APPROVAL
2000
Proof of application of water to beneficial use shall be filed on or before November 30
Witness my hand and seal this 28th day of November A.D., 2005 John R. D'Antorio, Jr., P.E., State Engineer
Charles L. Jackson, MPA
District Manager

INSTRUCTIONS

This form shall be executed, preferably typewritten, in triplicate and must be accompanied by a \$50.00 filing fee. Each triplicate copy must be properly signed and attested. If applicant is not recorded owner of water right, Change of Ownership affidavit must accompany this application. If additional space is required use a separate sheet or sheets and attach securely hereto.

Note: It is unlawful, after a transfer is completed, to apply water on the lands or uses from which right has been severed, or to use more water than the owner had a valid right to use before transfer was made. Supplementary water rights, by their very nature, cease to exist for those lands from which rights are transferred; also they cannot be transferred to other lands as new or primary water rights.

All blanks in Section 1 - 8 shall be filled out fully and accurately. Sec. 2 - 4, describe all essential features of the water right or rights involved in the proposed change. Sec. 5, explain fully why change is desired or necessary. Sec. 6, describe well (or wells) to which transfer is to be made and if it is an existing well. Sec. 7, describe lands and uses to which transfer is to be made and set forth any other rights appurtenant thereto. Sec. 8, explain any features or conditions not made clear in previous sections.

ATTACHMENT STATE ENGINEER CONDITIONS OF APPROVAL

FILE: A-36-A, A-36-B, A-64, A-65-A Combined

APPLICATION: A-36-A, A-36-B, A-64, A-65-A Combined

APPLICANTS: Rossette, Inc.

1. Permit number: A-36-A, A-36-B, A-64, A-65-A Comb

Priority: May 27, 1948, December 31, 1936

Decree: License and Certificate, A-64-Amended, A-65-A

and A-64 Combined

Source: Animas Valley Underground Water Basin

Point of Diversion: A-36-A, SE1/4SW1/4NE1/4;

A-36-B, SE1/4SW1/4NE1/4; A-64, NE1/4SE1/4SW1/4; A-65-A, SE1/4SE1/4SW1/4; A-65-A-S, SW1/4SW1/4NW1/4; A-36-AB-S, SW1/4SW1/4NE1/4; A-36-AB-S-2, NE1/4NE1/4SE1/4;

A-36-AB-S-3, SW1/4SW1/4NE1/4; A-36-AB-S-4, SE1/4SW1/4NE1/4;

A-36-AB-S-5, SW1/4SW1/4NE1/4; A-36-AB-S-6, NW1/4NW1/4SE1/4; A-36-AB-S-7, NE1/4NW1/4SE1/4;

A-36-AB-S-8, NE1/4NW1/4SE1/4; A-36-AB-S-12, SW1/4SW1/4NE1/4; A-36-AB-S-13, SE1/4SE1/4NW1/4;

A-36-AB-S-20, NW1/4NW1/4SE1/4, all of Section 7, Township 25 South, Range 19 West, N.M.P.M,

A-36-AB-S-15, SW1/4SE1/4SE1/4; A-36-AB-S-16, SE1/4SE1/4SE1/4; A-36-AB-S-17, SW1/4SE1/4SE1/4; A-36-AB-S-18, SW1/4SE1/4SE1/4;

A-36-AB-S-19, SW1/4SE1/4SE1/4, all of Section 6, Township 25 South, Range 19 West, N.M.P.M,

A-36-AB-S-10, NW1/4SW1/4NW1/4; A-36-AB-S-11, NW1/4SW1/4NW1/4;

A-36-AB-S-14, NW1/4SW1/4NW1/4; all of Section 12, Township 25 South, Range 20 West, N.M.P.M.

Purpose of Use: F:

From: Geothermal, Greehouse Irrigation and

Related Purposes

To: Greenhouse Irrigation, Irrigation and Related purposes that includes the incidental loss or extraction of

heat from water that is 250°

Fahrenheit or less

Place of Use: From:

SW1/4NE1/4 and NW1/4SE1/4, Section 7,

Township 25 South, Range 19 West,

N.M.P.M.

To: SW1/4NW1/4, W1/2SE1/4NW1/4,

File: A-36-A, A-36-B, A-64, A-65-A Combined

SE1/4NW1/4, E1/2SW1/4, SW1/4NE1/4, and the NW1/4SE1/4 all of Section 7, Township 25 South, Range 19 West, N.M.P.M.

Amount of Water:

Not to exceed 530.256 acre-feet per annum measured at the wells

- 2. The average yearly diversion shall not exceed 530.256 acre-feet per annum which shall not cause a consumptive use to exceed 1.576 acre-feet per acre per annum measured at said wells for greenhouse irrigation, irrigation and related purposes that includes the incidental loss or extraction of heat from water that is 250 degrees Fahrenheit or less on 150.252 acres of land and/or use in greenhouses under this permit.
- 3. The wells and water distribution systems shall be equipped with totalizing meters of a type approved by and installed in a manner and at locations acceptable to the State Engineer.
- 4. Rosette Inc.The water distribution system meter shall be placed before any discharge and/or branch in the distribution system, wells that are tied into the distribution system shall be tied in prior to the meter. Any wells that tie into the system after the meter or wells that are not tied into the distribution system shall be individually metered.
- Meter readings shall be submitted to the State Engineer, District 3 Office, P.O. Box 844, Deming, NM 88031 on or before the 10th day of each month.
- The permittee shall utilize the best technology and management practices currently available to conserve water.

Witness my hand and seal this 28th day of November, 2005.

John R. D'Antonio, Jr., P.E., State Engineer

Charles L. Jackson, MPA

District Manager

Office of the state Engineer
District 3

Water Level N. Jurement Field Form

Distric	1			Vd boxiiocoM	F	McMillan/Frisch	McMillan/Frisch	McMillan/Frisch	McMillan/Frisch									
	205	18"	3/25/1964	OS I wolod IW	VVL DEIOW L3D	62:39	65.37	65.21	65.21									
	Well Depth	Casing Size	Date Drilled		INIP COLLECTION	0.52	0.52	0.52	0.52									
Longitude	108 50' 42.6"	25.20.1.242		0 M 10 d 1947	WL Delow IVIP	65.91	62.89	65.73	65.73									mp.
Latitude	32 9' 41.2"	Location	Elevation	4	Cut	2.09	2.11	2.27	2.27									ıst side top of pu
	Ī		1		HOIG	89	89	89	89									Access port ea
A-58-AB		Kerr/Thomas		į	ıme	9:35	9:40	9:25	08:6									MP 0.52 feet above LS - Access port east side top of pump.
OSE File Number OSE Site Number	Site ID Number	Owner		Water Level Data	Date	2/20/2015	2/20/2015	5/12/2015	5/12/2015									Comments:

Office of the State Engineer
District 3

Water Level M. Jurement Field Form

Dist			:	Measured by	McMillan/Frisch	McMillan/Frisch	McMillan/Frisch	McMillan/Frisch	Manning/Frisch	Manning/Frisch	McMillan/Frisch													
6	180	7/26/1976		WL below LSD	74.9	74.14	74.82	74.83	75.03	75.04	75.08	75.09	75.15	75.15	75.11	75.1	75	75.02	75.22	75.21				
- - - - -	Well Depth Casing Size	Date Drilled		MP Correction	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5				
Longitude	108 52 46.5 25.20.10.222			WL below MP	75.4	74.64	75.32	75.33	75.53	75.54	75.58	75.59	75.65	75.65	75.61	75.6	75.5	75.52	75.72	75.71				
Latitude	32 09 8.1 Location	Elevation		Cut	9.0	0.36	0.68	0.67	4.47	2.46	0.42	0.41	2.35	2.35	0.39	0.4	1.5	0.48	0.28	0.29			face	
				Hold	92	75	76	76	80	78	76	76	78	78	76	76	77	76	76	76			ove land sur	
A-135 20	320909108523701 Vallev View Chruch			Time	9:07	9:10	9:40	9:45	11:00	11:02	9:30	9:34	10:29	10:32	10:40	10:45	10:15	10:20	9:50	9:55			MP - Top of Casing 0.5' above land surface	COLUMN COMPANY CONT.
OSE File Number OSE Site Number	Site ID Number Owner)	Water Level Data	Date	1/24/2014	1/24/2014	2/27/2014	2/27/2014	6/30/2014	6/30/2014	7/22/2014	7/22/2014	10/8/2014	10/8/2014	12/11/2014	12/11/2014	2/20/2015	2/20/2015	5/12/2015	5/12/2015			Comments:	

Office of the state Engineer
District 3

Water Level M. Jurement Field Form

A-45-A(A-45-52)

OSE File Number

M/F Pumping Nearby M/F Pumping Nearby McMillan/Frisch Manning/Frisch McMillan/Frisch McMillan/Frisch Manning/Frisch Measured by MP Correction WL below LSD 2/20/1979 71.66 71.70 71.79 71.80 71.95 71.94 71.88 71.90 71.69 71.45 71.84 71.84 71.71 72.34 71.47 140 وة Date Drilled Well Depth Casing Size 1.70 1.70 1.70 1.70 1.70 1.70 1.70 1.70 1.70 1.70 1.70 1.70 1.70 WL below MP 24.20.26.211 108 51 26.4 Longitude 73.60 73.39 73.36 73.40 73.49 73.54 73.65 73.64 73.58 73.41 73.15 73.50 73.54 74.04 73.17 32 08 55.7 Location Elevation Latitude 0.59 1.46 1.46 1.35 1.36 0.40 0.64 1.60 1.83 0.85 1.51 1.50 0.42 0.61 Crt 0.04 PP 74 75 74 75 75 75 75 75 75 74 74 74 74 75 74 320858108512002 Pumping Nearby Americulture Pumping 10:38 10:10 10:08 11:13 11:15 10:35 10:00 10:05 10:05 Time 9:30 9:35 8:05 Water Level Data OSE Site Number Site ID Number 12/11/2014 12/11/2014 10/8/2014 10/8/2014 2/20/2015 2/20/2015 5/12/2015 5/12/2015 Comments: 2/27/2014 1/24/2014 2/27/2014 7/22/2014 6/30/2014 Owner

Office of the State Engineer

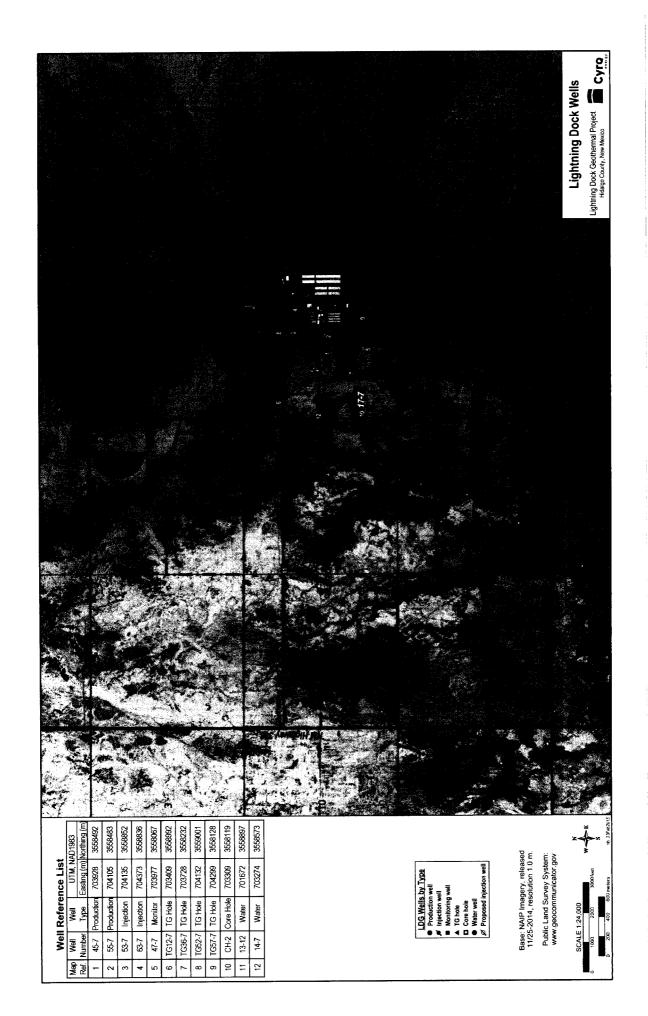
Water Level M., urement Field Form

District 3 McMillan/Frisch McMillan/Frisch McMillan/Frisch McMillan/Frisch McMillan/Frisch McMillan/Frisch Measured by WL below MP MP Correction WL below LSD 75.86 75.76 75.75 75.82 74.8 74.8 Date Drilled Casing Size Well Depth 32 9' 11.85" | 108 49' 52.39" 25.19.6 443 Longitude 76.76 76.86 76.75 76.82 75.8 75.8 Location Elevation Latitude 3.14 1.18 1.24 1.25 Cnt 2.2 PP의 8 78 78 78 78 78 State Geothermal State/Burgett 10:45 10:35 10:55 Time Water Level Data OSE File Number OSE Site Number Site ID Number 12/11/2014 12/11/2014 Comments: 2/20/2015 5/12/2015 2/20/2015 5/12/2015 Owner

Water Level N. surement Field Form

Office of the State Engineer District 3 16 1/25/1954 305 Casing Size Date Drilled Well Depth 108 50 13.3 25.19.7.342 Longitude Latitude 32 08 28.1 Location Elevation 320821108500501 A-0119 LDG A-64 Water Level Data **OSE File Number** OSE Site Number Site ID Number A TAG Number Owner

Measured by	McMillan/Frisch	McMillan/Frisch	McMillan/Frisch	McMillan/Frisch	McMillan/Frisch	Manning/Frisch	Manning/Frisch	McMillan/Frisch											
WL below LSD	64.55	62.79	63.65	63.53	63.50	63.19	63.18	63.39	63.41	0.00	62.10	62.07	60.60	60.63	60.62	60.10	60.12		
MP Correction	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45		0.45	0.45	0.45	0.45	0.45	0.45	0.45		
WL below MP	65.00	66.24	64.10	63.98	63.95	63.64	63.63	63.84	63.86	0.00	62.55	62.52	61.05	61.08	61.07	60.55	60.57		
Cut	25.00	0.24	2.90	1.02	1.05	2.36	2.37	1.16	1.14		1.45	0.48	1.95	0.92	0.93	1.45	1.43		
Hold	06	99	29	65	65	99	99	65	65		64	63	63	62	62	62	79		S West Side
Time	8:30	8:35	11:25	11:27	11:29	11:49	12:02	11:45	11:47	No Reading Bees	11:20		11:00			11:15	11:20		MP - Notch 0.45' above LS West Side
water Level Data Date	1/24/2014	1/24/2014	2/27/2014	2/27/2014	2/27/2014	6/30/2014	6/30/2014	7/22/2014	7/22/2014	10/8/2014	12/11/2014	12/11/2014	2/21/2015	2/21/2015	2/21/2015	5/12/2015	5/12/2015		Comments:



GoogleEarth 2013 April 2015 CONTRACT NO.: OTG 52-7 FIGURE NO.: Lightning Dock oG3S \triangle MW-5 DATE: \triangle MW-2 Cyro KP DATUM: REV. NO.: SCALE: 3 PROJECTION: CHK'D BY: DWN BY: \triangle MW-6 \bigcirc 47-7 Lightning Dock Geothermal HI-01, LLC △MW-4 18 Greenhouse Drive Animas, NM 88020 Lightning Dock Geothermal HI-01, LLC Intermediate-Depth Well Geo-Science Solutions, LLC **EXPLANATION** WELL LOCATIONS Production Well ▲ Monitoring Well Injection Well Corrales, NM 87048 Other Wells PO Box 3100

1" ~ 700'

GoogleEarth 2013 OTG 52-7 \circ G 3 S \triangle MW-5 Cyro \triangle MW-6 \otimes 47-7 Lightning Dock Geothermal HI-01, LLC \triangle MW-4 18 Greenhouse Drive Animas, NM 88020 ▶ Intermediate-Depth Well Geo-Science Solutions, LLC **EXPLANATION** Production Well ▲ Monitoring Well Injection Well Corrales, NM 87048 Other Wells PO Box 3100

April 2015

Lightning Dock

CONTRACT NO.:

DATUM: REV. NO.:

월 곱

Lightning Dock Geothermal HI-01, LLC

WELL LOCATIONS

FIGURE NO.:

scale: 1" ≈ 700'

CHKD BY:
PROJECTION:

GTHT - _001_

LDG 13-7

June 16, 2015

Mr. Jim Griswold Environmental Bureau Chief NMOCD 1220 South St. Francis Drive Santa Fe, NM 87505 505.476.3465 Jim.Griswold@state.nm.us

RE: Forms G-101, G-104, and G-112 for proposed injection well LDG 13-7 at Lightning Dock Geothermal HI-01, LLC, Hidalgo County, New Mexico

Dear Mr. Griswold:

On behalf of Lightning Dock Geothermal HI-01, LLC, Geo-Science Solutions, LLC hereby submits the attached G-101, G-104, and G-112 forms to drill new injection well LDG 13-7 as an integral part of the development of the Lightning Dock Geothermal project. Attached to the forms are a Drilling Handbook prepared by Capuano Engineering Company which includes a well schematic, a table of all wells within a one-mile radius, and a well location figure.

Mr. Randy Dade in your Artesia office will receive the third copy of these documents. Thank you very much for your assistance in the development of this important energy project. Should you have questions regarding this application package, please do not hesitate to contact me by email at dwjanney160@gmail.com or by phone at 505.508.9187. We ask that you treat the items marked "CONFIDENTIAL" as such as long as possible.

Respectfully submitted,

David W. Janney, PG

Agent for Lightning Dock Geothermal HI-01, LLC

Cc: Randy Dade - NMOCD Artesia

Kacie Peterson - Lightning Dock Geothermal HI-01, LLC Michelle Henrie - Lightning Dock Geothermal HI-01, LLC

Attachments

Two (2) Forms G-101, G-104, and G-112 with appropriate attachments including a Drilling Handbook, a well schematic, list of wells within one mile, and a location figure

STATE OF NEW MEXICO

OIL CONSERVATION DIVISION

ENERGY MO M	NERALS DEPA	RIMENT	R. Q. BO SANTA FE, NET	4 1616 V MEXICO 8718 I		Arvised 10-1-28
NO. OF COPY & REC	EIVED					
DISTI BUTIO					3. Interes	NO Type of Lance
7m		APPL	ICATION FOR PER	MIT TO DRILL, DEEP	EAR.	Private res
M.M.B.M.		OR PLI	IG BACK-GEOTH	ERMAL RESOURCES N	PELL S. State	Land Mrs.
USGS.			*		1	mmmm.
Cond Office						
In. Type of Work	Orial 🖸		Deepen []	Plug Back []	7. Unit A	Account Spice
b. Type of Well	Geotherma Low-Temp	Thermal		Temp Observation injection/Disposal C	& Para a	. NM-34790
Lightning Doc	k Geotherm	al HI-01, LLC		¥	9. Well He	LDG 13-7
Address of Operate Kearns Bldg. 1		Street, Ste. 600, Sa	alt Lake City, UT 8	4104		and Poot, or Wastest ming Dock KGRA
4. Location of Wall	UNIT LETTE	AE_LOCAT	'KO <u>504</u> PEET	FROM THE West		
AMD 1537 P	EET FROM TH	Northway	sec 7 rue, 2	5 South ace 19 Wes		
					12 Come Hida	
				1,500 feet	Quaternary alluvium/Tertiary volca	20. Rotory or C.L. Mud Rotary
21. Mondon (Show 4190		T, edt.) 21A. Kjer	& Status Fing. Sund	218. Drilling Contractor TBD		es. Date West will start
•		•	NOPOSED CASHIE A	NO CEMENT PROGRAM		*
SIZE OF HOL	8 1	HZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST, TOP
12.25	77	9.625"	36#	90'	6	GR
8.5"		7"	23#	500.	67	GR
6.12	;"	5"	11.5#	1.500	None	1400

Drill a geothermal injection well on Federal lease NM-34790.

Please see attached location plat Form G-102.

Please see attached drilling handbook prepared by Capuano Engineering Company.

IN ABOVE SPACE DESCRIBE PROPOSED PROBRAMS IF BYS ARM, the bound present propost, if any.	point is to arreas or plug hods, give data as prount prod	tuctore butte and dequated now graduation
I hereby certify that the infratacina phone is true and complete	to the best of my knowledge and belief.	
David W. formey, 16 m	Agent for Lightning Dock Geothermal HI-01, LLC	6/15/2015
(This short for State Use)		
CONDITIONS OF APPROVAL IF ANY	T-4	BATE

GEOTHERMAL RESOURCES WELL LOCATION AND ACREAGE DEDICATION PLAT

All distances must be from the buildr boundaries at the Section, Lease Lightning Dock Geothermal HI-01, LLC Fed. Geothermal NM-34790 LDG 13-7 County Unit Letter Section Range 25 South 19 West Hidalgo Attest Footage Location of Well: 504 West 1537 feet from the North feet from the Ground Lewil Dev. Producing Figuretion Dedicated Acrespe: 4190 NA NA 10 Acres 1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below. 2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty). 3. If more than one lease of different ownersip is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling, etc? If answer is "yes," type of consolidation... ☐ Yes ☐ No If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Division. CERTIFICATION I bereby certify that the information ed hevein is true and complete to t best of my knowledge and belief. 32 08 533062 108 50 36.1274 Name David Janney, PG Postsion Agent for Lightning Dock Geothermal HI-01, LLC Geo-Science Solutions, LLC Date June 15, 2015 1470 1050 1001 2219 PLAS

OIL CONSERVATION DIVISION

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

P. O. BOX 2088 SANTA FE, NEW MEXICO 87501.

Form G-104 Adopted 10-1-74 Revised 10-1-78

CERTIFICATE OF COMPLIANCE AND AUTHORIZATION TO PRODUCE GEOTHERMAL RESOURCES

OWNER OR OPERATOR Name Lightning Dock Geothermal HI-0	1. LLC		
Address 136 S. Main Street, Ste. 600,			
TYPE OF WELL Geothermal Producer	Low-Temperature Thern	nal Inje	ection/Disposal 🗸
REASON FOR FILING New Well Recompletion Change in Ownership Other (Please Explain)	on of Purchaser		
DESCRIPTION OF WELL Lease Name Not Applicable	Well No. LDG-13-7	Name of Reservoir Lightning Do	ock
Kind of Lease (Fee, Fed. or State) Federal	Lease Number NM-34	790	
LOCATION Unit Letter E; 1537	feet from the	North	line and
Section 7 Township	25S	Range 19W	
County Hildago			
TYPE OF PRODUCT Dry Steam	Steam and Water Water	Low Temp. Thermal Water	
DESIGNATION OF PURCHASER OF P Name of Purchaser Public Service Company of			
Address of Purchaser 414 Silver Ave. Suite 4 Albi	uquerque, NM 87102		
Product Will Be Used For Residential and commerce			
CERTIFICATE OF COMPLIANCE	•		
I hereby certify that all rules and regu promulgated by the Oil Conservation subject well, and that the information gi	Division of New Mexico, h	ive been complied with, w	ith respect to the
Signed Deville Ham	rey, P6	Agent for Lightning Dock Position Geothermal HI-01, LLC	Dute 6/15/2015
-	V	Percitieses	Dute

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION P. O. BOX 2088 SANTA FE, NEW MEXICO 87501

Form G-112 Adopted 10-1-74 Revised 10-1-78

APPLICATION TO PLACE WELL ON INJECTION-GEOTHERMAL RESOURCES AREA

						1		·			
Operator Lightning Doc	ck Geother	mal HI-0	ı, LLC					Street, Suite 600	Salt La		
Losse Name Federal NM-34790)			Well Ng.	.7	Field Lig	ghtning	g Dock		Coun Hi	dalgo
Location Unit Letter	Е	: Wett is 1 or	Cated .	1537 =	eet Fra	m The N	lorth	Line And 504	Foet	From The	<u>Vest</u>
	en							_ NMPM.			
				CASING	AND T	UBING D	ATA				
NAME OF STRING	3	SIZE	SETTING	G DEPTH	SA	CKS CEN	MENT	TOP OF CEMEN	т	TOP DETE	RMINED BY
Conductor Pipe		9.625"	90) '		6 су		GR		flow to	surface
Surface Casing		7"	500			67	•	GR		flow to	surface
Long String		5" Íiner	1.500			None		None		NA	
Tubing				 			nd Dept	h of Tubing Packer			
All and Al Daniel and Al Later			<u> </u>		LNA	Top of F	Orm		Dott	of Formation	
Name of Proposed Inject			rocks				OHERNY	₹•			1
Quaternary alluvit				erforations	or Ope	480'	Propos	ed interval(s) of inject	_1,500 ion	<u> </u>	
5" liner	,,, 02,,,		1	slotted l			1 .	-1,500'			
ts This a New Well Drille Injection?	d For	If Answer i				s Well Ori	iginally (Orilled? Has Well Ever Other Than th			Zone?
Yes List All Such Perforated	Intervals and	Sacks of Cer	ment used	to Seal O	ff or Sq	ueeze Eac	:h				<u> </u>
Not Applicable								,	•		
Depth of Bottom of Dee in This Area Unkown		iter Zone		njection for Disposal?				No, for injection o	of spent	geothermal	water
Anticipated Daily	Minimum	Maxin	mum	Open or	Closed	Туре	Is in	pjection to be by Gravi	ty or	Approx. Pre	ssure (psi)
Volume Gallons - Answer Yes or No Whether	720,000		00,000	System (Open	12:20124		sure? Gravity urat Water in Injection	10 104	<100	**************************************
to such a Degree as to be						Injected	Zon		1	nary on file	
or Other General Use— Name and Address of Sur	face Owner (c	or Lessee, if !	State or F					_110	1 Sullii	nary on me	with OCD
Rosette, Inc. P.O. Box	-										
List Names and Addresses				Mile of	This Inj	ection We	iit				
There are no other ge	othermal lea	ase owners	or operat	ors withi	n one-l	nalf mile	of the p	roposed well.			
						,		-			
	,						····				
Have Copies of this Application to Each Operator Wi		٦		👿 no	t anni	icable					
Half Mile of this Well? Are the Following Items /	Allached to	Plat of Area	, 40 L	110		Electrical	Log		Diagran	nmatic Sketch	of Weji
this Application (see Rule		Yes [⊃ No	∑∑ See	G-102	Yes	_	No 🖾	Yes	□ No	See drilling hanbook
	l hereby certi				true an			best of my knowledge			- Handook
8 - 1.1							••	The second second			*
David Works	uner	P6	Age	ent for Lig	ghtning	Dock G	eothern	nal HI-01, LIC Ji	ine 15.	2015 (Date)	
	-										

GTHT -___001___

LDG 15-8

STATE OF NEW MEXICO

OIL CONSERVATION DIVISION P O MOX 1988

Inc	:	101		
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a Type of Work Dr.	ı. [3]		Deepen 🗆	Plug Back	\Box		None None	ement Yause
b. Type of Well Geo	thermal Pro	ducer 🗀		Temp Observation		ł.	1 burn or i	este Vanie
4, 1, pe 101 1141	Temp The			Injection/Disposal	CR	:	Fed. I	NM-34790
Name of Upristor						- 	9 Well 70	
Lightning Dock Geo	thermal HI	-01, LLC						LDG 15-8
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Kearns Bldg, 136 S.	Main Stree	t, Ste. 600, S	alt Lake City, UT	84104			Lightni	ing Dock KGRA
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Kearns Bldg. 136 S. Location of Well Unit TWO 2141 PEET FOR THE PROPERTY OF	CETTER	South of	SEC. 8 TWO	25 South age 19 25 South age 19 19 Proposed Depth 1,500 feet TBD AND CEMENT PROGR	cros Cam	A. Formatio	Hidalge Tertiary volcanic 22. Approx 7/1/2015	20. Notary or C.T. Mud Rotar Date Work will trans
Kearns Bldg. 136 S. Lecation of Well UNIT LNO 2141 FEET FOR THE STREET FOR THE	CETTER	South NE OF	SEC. 8 TWP FROPOSED CASING WEIGHT PER FO	25 South age 19 25 South age 19 19 Proposed Legit 1,500 feet TBD AND CEMENT PROGR	cros Cam	A. Formation	Hidalge Tertiary volcanic 22. Approx 7/1/2015	20. Natary or C.T. Mud Rotar Date Work will start

Dril

Please see attached location plat Form G-102.

Please see attached drilling handbook prepared by Capuano Engineering Company.

I hereby certify that the information above	e is true and complete	to the best of my knowledge and belief.		
my David W for	vey, P6 TH	Agent for Lightning Dock Geothermal HI-01, LLC	6/1-2015	
(This said for State C				

0.80K 2413 SAHTA FE, WWW.XX ATHAR

GEOTHERMAL RESOURCES WELL LOCATION AND ACREAGE DEDICATION PLAT

	GEOTHERM				sarins of the Section.		
Operator				Lease			Well No.
Lightning Dock (Geothermal HI-0)1, LLC			ed. Geothermal N	M-34790	LDG 15-8
	ction .	Township	5 C4h	itange 19 We	County	lidalgo]
L L	8	1	5 South		St 1 1	Iroaigo	
Actual Footage Location 345		West	line :	2141	feet from the	South	fine
Ground Level Dev.	feet from the Producing Fort			Pool			neg Vereste:
4230	NA			NA			10 Acres
I. Outline the	acreage dedical	ed to the sub	ject well by	colored pencil	or hachure marks o	on the plat below	
2. If more the and royalty	an one lease is (dedicated to	the well, o	utline each and	identify the owner	rship thereof (bot	ili as to working interest
communita	zation, unitizatio	n, force-pool	ing, etc?			rests of all owne	rs been consolidated by
, —				onsolidation			
necessary.)							yerse side of this form if
No allowable forced-pooling,	will be assign or otherwise) o	ned to the or until a non	well until standard u	all interests handle since sin	ive been consolidach interests, has t	lated (by commonent by	nunitization, unitization, the Division.
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	į			į,		Position Agent for Lightning	Dock Geothermal HI-01, LLC
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	} }			} 1		Date May 29, 20	15
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OIL CONSERVATION DIVISION

P. O. BOX 2088

SANTA FE, NEW MEXICO 87501

Form G-104 Adopted 10-1-74 Revised 10-1-78

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

CERTIFICATE OF COMPLIANCE AND AUTHORIZATION TO PRODUCE GEOTHERMAL RESOURCES

OWNER OR OPERATOR Name Lightning Dock Geother	rmal HI-01. LLC						
Address 136 S. Main Street, S	ite. 600, Salt Lak	e City, UT 84101			***************************************		
TYPE OF WELL Geothermal Producer	. la	ow-Temperature The	rmal	Injection/	Disposal 🗸		
REASON FOR FILING New Well Recompl Change in Ownership Other (Please Explain)	ction	orchaser					
DESCRIPTION OF WELL Lease Name Not Applicable	Well No	LDG-15-8	Name of Reservoir				
Kind of Lease (Fee, Fed. or State) Federal		Lease Number <u>NM-</u> :	34790				
LOCATION Unit Letter ;		feet from the _		South West	line and		
Section 8	Township	25S	_Range	40144			
County Hildago			Hida ta anima a a a a a a a a a a a a a a a a a a				
TYPE OF PRODUCT Dry Steam	Steam a Water _	nd Water	Low TempThermal Water				
DESIGNATION OF PURCHAS Name of Purchaser Public Service Con							
Address of Purchaser 414 Silver Ave. Su	iite 4 Albuquerqu	e, NM 87102					
Product Will Be Used For Residential and	commercial pow	er					
CERTIFICATE OF COMPLIA	NCE	•			,		
I hereby certify that all rules promulgated by the Oil Con subject well, and that the info	servation Divisio	n of New Mexico,	have been con	iplied with, with res	pect to the		
Signed De valle for	energy P6		Agent _Position& +	for Lightning D hestel HI Oflic	Cark Date 6/2/2015		
Approved	<i>U</i>		Position		Date		

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION P. O. BOX 2088 SANTA FE, NEW MEXICO 87501

Form G-112 Adopted 10-1-74 Revised 10-1-78

APPLICATION TO PLACE WELL ON INJECTION-GEOTHERMAL RESOURCES AREA

						T:						
Operator Lightning Dock	Geother	mal HI-0	I, LLC	•		Address 136 S.	Main	Street, Suite 600	Salt La	ke City, U	T 84101	
Loase Name Federal NM-34790				Well No. 15-8		Field Lightning Dock				County Hidalgo		
Location	ī			2141							Voot	
								Line And 345	Foet	Fram The V	vest	
Line, Section	8	_ Township.	253	<u> </u>	tanga	19W		_ NMPM.				
					,	UBING D						
NAME OF STRING		SIZE	SETTIN	G DEPTH	SA	CKS CEN	MENT	TOP OF CEMEN	iT	TOP DETER	RMINED BY	
Conductor Pipe		9.625"	9	0'		6 су		GR		flow to s	urface	
Surface Casing		7"	15	0' -		20	•	GR		flow to	surface	
Long String								None				
		<u>5" liner</u>	1.50	20'		None .	24 (242)	None None	l	NA		
Tubing		Name, NA			, Model and Depth of Tubing Packer							
Name of Proposed Injection	Formation	n			מצייי	Top of F	ormatio	n	Bottom	of Formation		
Quaternary alluvium	/Tertiar	y volcanie	c rocks			150'			1.500) <u></u>		
Is Injection Through Tubing	, Casing, o	r Annutus?		Perforation		n Hole?		ed interval(s) of inject -1,500'	tion			
5" liner Is This a New Well Drilled F		I & Consumer	la Na Es	slotted		· Mall Oal		- 1,300 Drilled? Has Well Ever		da na la A	7000	
Injection?	· ur	li Ainwei	15 190, FC	X WHAT PUT	puse wa	3 Well Of		Other Than t	he Propos	ied injection 2	Zone? NA	
List All Such Perforated Int	ervals and	Sacks of Ce	ment use	d to Seal O	if or Sq	uesze Eac	:h		•	······································		
Not Applicable			1 =									
Depth of Bottom of Deepes in This Area Unkown	(Fresh Wa	ISE ZONE	or Wat	Injection f er Disposati	See R	ules 501	and 502	No, for injection	of spent	geothermal v	water	
Anticipated Daily Mi	nimum	Maxi	Cystem			Pre		is injection to be by Gravity Pressure? Gravity		y or Approx, Pressure (psi)		
Volume Gallons 7	20,000		0.000 Open					lara W	Are Water Analyses Attached?			
to such a Degree as to be Un or Other General Use—	ilt for Do	meslic, Stoc	, irrigation, No			Zon	Zone		nmary on file with OCD			
Name and Address of Surface	Owner (c	or Lessoe, if	State or						1 04111	mary on the		
Rosette, Inc. P.O. Box 16												
List Names and Addresses of					-							
Thère are no other geotl	nermal_le	ase owners	or oper	<u>itors withi</u>	n one-l	ialf mile	of the p	roposed well.				
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	aa Dee								· · · · · · · · · · · · · · · · · · ·		***************************************	
Have Copies of this Applicati Sent to Each Operator Withir Half Mile of this Well?		Yes [😡 no	t appl							
Are the Following Items Alta this Application (see Rule 50		Plat of Area	_	G2 (-		Electrical	_			malic Sketch	of Well See drillin	
* •		Yes L	<u>No</u>		e G-102	Yes		No 🖾	Yes	LJ No	hanbook	
- 0 /	creby Certi	ry mal the i	informati	ua above is	true an	a complet	e to the	best of my knowleds	e und bei	orf.	*	
Dirichton	44,16	5	Aı	ent for Li	chtning	Dock G	eothern	nal HI-01. LLC J	une 1, 20	014		
Signature	11			-	_ ~	(Title)		-		[Date]		

NOTE: Should waivers from all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Division will hold the application for a period of 20 days from the date of receipt by the Division's Santa Fe office, if at the end of the 20-day waiting period no protest has been received by the Santa Fe office, the application will be processed, if a protest is received, the application will be set for hearing, if the applicant so requests SEE RULE 503,

GTHT -___001____

LDG 76-7

STATE OF NEW MEXICO ENERGY NO MINERALE DEPARTMENT

OIL CONSERVATION DIVISION

form 6-191 Acupted 10-1-16 Mexitod 10-1-78

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F.4		APPL	LICATION FOR F	ERMIT TO DRILL, D	EEPEN,	STATE	
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Cperator							
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ls Type of Work	Drill 🍱		Deepen 🗆	Flug Back		None None	cment Yame
b. Type of Well	Geothermal Produ	ucer 🔲		Temp Observation		t Fum or t	ease Name
	Law Temp Therm	wi C		Injection/Disposal	CR.	Fed. 1	NM-34790
2 Name of Operator Lightning Do	ck Geothermal HI-0)I, LLC	ggggen ggggentherg) primities en myn i genther igg, argellelig g			7 Well No.	LDG 76-7
Kearns Bldg.	136 S. Main Street,	Ste. 600, S	alt Lake City, U	T 84104		•	root, or William ng Dock KGRA
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				139 Proposed Orpin		Hidalgo	
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4210		21A A.	T F ZTETON WAS 100	Au 218 Desting Coatra	octor	7/1/2015	Date Work will start
•			PROPOSED CASING	AND CEMENT PROCE	RAM		••
SIZE OF HO	LE SIZE OF	CASING	WEIGHT PER FO	OT SETTING DE	TH SACK	S OF CEMENT	EST TOP
12.2	5.'L	9.625"	36#	90'		6	GR
				150		20	CD.
		7" .	<u> 23#</u>	150'			GR

Drill a geothermal injection well on Federal lease NM-34790.

Please see attached location plat Form G-102.

Please see attached drilling handbook prepared by Capuano Engineering Company.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM	. If promoter to be seepen or plut back, give data on present produc	Cive June and Bropping New Breductive
t hereby certify that the tolormation above it true and c	ompines to the best of my knowledge and beloef.	
ines David Wife no sur con	Agent for Lightning Dock Geothermal HI-01, LLC	6/1/2015
(Past take for State Car)		
YE CZYORNA	TITL #	AIF
CONDITIONS OF APPROVAL, IF ANY:	V	

GEOTHERMAL RESOURCES WELL LOCATION AND ACREAGE DEDICATION PLAT

		All dista	nces must be	nort	inc outer boundarin	ns of the Sectio	n,		
Operator				Leas				Well No.	
	k Geothermal HI-0	1. LLC			Fed.	Geothermal 1	VM-34790	LC	OG 76-7
·	Section	Township		\$ ×	Kange	Consty			
Unit Letter	7	1 CANDON P	25 South		19 West	1 .	Hidalgo		
	<u> </u>	l	23 30atti		15 West		mango		
Actual Fuotage Loca	tion of Well:	-			1007		Carrella		
1128	feet from the	East	line	bas	1896	feet from the	South	line	
Ground Level Dev.	freducing Fore	nation		ruol				Dedicated Acresse:	
4210	NA				NA			10	Acres
					Land man of an L		on the pirt	helmu	
1. Outline t	the acreage dedicate	ed to the s	aplact Mell (y co	mica beach of h	activite maiks	on the bias	DCIOW.	
	than one lease is a	ledicated t	o the well,	outli	ne each and iden	tily the own	ership thereo	f (both as to work	cing interest
and roya	ilty).					-			
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3. If more	than one lease of	different c	iwnersip is c	ledic:	ited to the well,	, have the int	etests of all	omueia necu couz	SHUSICO DY
cominun	itization, unitizatlo	n, force-po	oling, etc?						
☐ Yes	□ No If an	SUCT IS "VO	la savi " e	conso	lidation				
If namus is	"no," list the own	ners and to	act descripti	ano	which have actua	ally been con	solidated. (U	se reverse side of	this form if
	NO BRE THE OWI	1-12 0110 11	and and any						
necessary.)_									
No allowab	de will be assign	ed to the	e well unti	i all	interests have	been consoli	dated (by	communitization,	unitication,
forced-pouli	ng, or otherwise) o	r until a no	on-standard i	mit.	eliminating such	interests, has	been approv	ed by the Divisio	n.
totcea-boom							• •		
					1	1		CERTIFICATION	1
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OIL CONSERVATION DIVISION

P. O. BOX 2088

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

Approved ____

SANTA FE, NEW MEXICO 87501

form G-104 Adopted 10-1-74 Revised 10-1-78

Date____

CERTIFICATE OF COMPLIANCE AND AUTHORIZATION TO PRODUCE GEOTHERMAL RESOURCES

OWNER OR OPERATOR Name Lightning Dock Geothermal HI- Address 136 S. Main Street, Ste 600.				
TYPE OF. WELL Geothermal Producer	Low-Temperature Ther	mal	Injection/	Disposal 🗸
REASON FOR FILING New Well Recompletion Change in Ownership Other (Please Explain) Designat	ion of Purchaser			
DESCRIPTION OF WELL Lease Name Not Applicable	Well No. LDG-76-7	Name of Reservoir	Lightning Dock	
Kind of Lease (Fee, Fed. or State) Federal	Lease Number NM-34	1790		
LOCATION Unit 1896 Letter 1128	feet from the feet from the		South East	line and
Section Township	25S	Range	19W	
County Hildago				
TYPE OF PRODUCT Dry Steam	Steam and Water Water		v Temp. rmal Water	-
DESIGNATION OF PURCHASER OF I Name of Purchaser Public Service Company of				and a state of the
Address of Purchaser 414 Silver Ave. Suite 4 Alb Product Will		•		
Be Used For Residential and commerce	¥.			
CERTIFICATE OF COMPLIANCE			of all many case	••
I hereby certify that all rules and regi- promulgated by the Oil Conservation subject well, and that the information g	Division of New Mexico, h	ave been comp	plied with, with resp	neet to the
Signed David Wyfarray, 1	<u></u>	Position Dock	forley bising Geother and Mark)ute 6/1/201 5

Position ____

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION P. O. BOX 2088

APPLICATION TO PLACE WELL ON INJECTION-GEOTHERMAL RESOURCES AREA .

ON DIVISION . Form G-117
088 Adopted 10-1-76
Revised 10-1-78

SANTA FE, NEW MEXICO 87501

Operator Lightning Dock	Lightning Dock Geothermal HI-01, LLC						Main	Street, Suite 600	Salt La	ke City, U	Г 84101
Lease Name Federal NM-34790				Well No. 76-	·7	Field		g Dock		County	
Location	I I	, Wall It I o		1896 🕳	##1 Frc-	L		Line And	Ess.	Erom The F	ast
Line, Section						19W		_ NMPM.	- Fuet	right the	
				CASING	AND T	UBING D	ATA				1
NAME OF STRING		SIZE	SETTING			CKS CEN		TOP OF CEMEN	T	TOP DETER	MINEO BY
Conductor Pipe		9.625"	90	((б су		GR		flow to s	urface
Surface Casing		7"	150	_ 150' 2		20		GR		flow to	surface
Long String		5" liner	1.500)'	No			None		NA	
Tubing					`	Model a	nd Dept	in of Tubing Packer			
Name of Proposed Injection	Formation	1	<u> </u>		L NA	Top of F	ormatio	n	Bottom	of Formation	
Quaternary alluvium	n/Tertiar	y volcanie	rocks			150'			1.500),	
is Injection Through Tubin	g, Casing, o	r Annulus?	Pi	rforations	or Ope	n Hote?		ed Interval(s) of Inject			
5" liner Is This a New Well Drilled				slotted I		5	<u> </u>	'+1,500'	<u> </u>		
Injection? Yes Other Than the Proposed Injection Zone? NA											
Not Applicable	tervals and	Sacks of Ce	ment used	to Seal Of	ff or Sq	Jesze Eac	;h		•		
Depth of Bottom of Deeper in This Area Unkown	it Fresh Wa	ter Zona		njection fo Disposal?				No, for injection of	of spent	geothermal v	vater
Anticipated Daily Mi	inimum	Maxi	mum	Open or System	Closed	Туре	is II	njection to be by Gravi	-	Approx. Pres	
Volume Gallons 7 Answer Yes or No Whether I	20,000		0.000	1 C	Open	nierted		ural Water In Injection	Are W	<100	Nached?
to such a Degree as to be Ur or Other General Use—						,	Zone No		Summary on file with OCD		
Name and Address of Surfac	e Owner (o	r Lesson, If	State or F						1 22121		
Rosette, Inc. P.O. Box 16											
List Names and Addresses of			=	-							
There are no other geot	nermai le:	ise owners	or operate	ors within	п опе-п	an mue	or the p	roposed well.			
								*			
									·		
Have Copies of this Applicati Sent to Each Operator Within		Yes [☑ not	t appli	cable					-
Are the Following Items Att. this Application (see Rule 50		Plat of Area				Electrical	Log	. 57		nmalic Sketch	See drilling
		Yes L	No No		G-102 j	Yes	<u> </u>	No 🖾	Yes	<u> </u>	Nanbook
& will	errby Certi	iy inat ine (t best of my knowledge	ट अन्य छ्ट	uet.	~
Signorum	May F	<u>~</u>	Age	nt for Lig	htning	Dock Go	eothern	pal HI-01. LLC 1	ane 1, 20	014 (Date)	

NOTE: Should waivers from all operators within one-half mile of the proposed injection well not occumpany this application, the New Mexico Oil Conservation. Division will hold the application for a period of 20 days from the date of receipt by the Division's Santa Fe office, if at the end of the 20-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests SEE RULE 503.

GTHT -___1

LDG 63A-7

June 29, 2015

Mr. Jim Griswold Environmental Bureau Chief NMOCD 1220 South St. Francis Drive Santa Fe, NM 87505 505.476.3465 Jim.Griswold@state.nm.us RECEIVED OCD

2015 JUL -1 A 8: 19

RE: Forms G-101, G-102, G-104, and G-112 for proposed injection well LDG 63A-7 at Lightning Dock Geothermal HI-01, LLC, Hidalgo County, New Mexico

Dear Mr. Griswold:

On behalf of Lightning Dock Geothermal HI-01, LLC, Geo-Science Solutions, LLC hereby submits the attached G-101, G-102, G-104, and G-112 forms to drill new injection well LDG 63A-7 as an integral part of the development of the Lightning Dock Geothermal project. Attached to the forms are a Drilling Handbook prepared by Capuano Engineering Company which includes a well schematic, a table of all wells within a one-mile radius, and a well location figure.

Mr. Randy Dade in your Artesia office will receive the third copy of these documents. Thank you very much for your assistance in the development of this important energy project. Should you have questions regarding this application package, please do not hesitate to contact me by email at dwjanney160@gmail.com or by phone at 505.508.9187. We ask that you treat the items marked "CONFIDENTIAL" as such as long as possible.

Respectfully submitted,

David W. Janney, PG

Agent for Lightning Dock Geothermal HI-01, LLC

Cc: Randy Dade - NMOCD Artesia

Kacie Peterson - Lightning Dock Geothermal HI-01, LLC Michelle Henrie - Lightning Dock Geothermal HI-01, LLC

Attachments

Two (2) Forms G-101, G-102, G-104, and G-112 with appropriate attachments including a Drilling Handbook, a well schematic, list of wells within one mile, and a location figure

STATE OF NE STATE OF NE		OIL CONSER A. O. SANTA FE, N		Form 0-10? Adopted 10-1-30 Revised 10-1-30			
OSTF; BUTTON: Fire I NAME M; US.C.S.	10			ERMIT TO ORILL, OF HERMAL RESOURCE		S. IMPRIATE STATE C	POR OF LAME PREE
: A. Type of Well G	irit 🔯 bothermal Proc per-Temp There	Nucer 🖸	Ompan []	Plug Back Temp Observation Injection/Disposal	0	None Fed. N	
Lightning Dock G	eothermal HI-	01, LLC		•		to state and	LDG 63A-7
136 S. Main Street	T. LETTER	G LOCA	7EO 1403 PE	25 South age 19	ast Lea	ghrning Dock I	CGRA
						Hidalgo	
	- 50, 57,	20A ES	d & States Prog. Sta	14. Proposed Depth 1,500 feet		ium/Tertiary volcanic	Mud Rotary
4208 GR		1	PROPOSED CASHIC	AND CEMENT PROOF	AM	9/1/2015	•
SIZE OF HOLE	9/20 0	F CASING	WEIGHT PER PC	OT BETTING DEP	TH SACKS	OF CRIMENT	EST. TOP
12.25"		9.625"	36#	90'		6	GR
8.5"		7"	23#	150°		20	GR
6.125"		5"	11.5#	-1.500		None	1400'

Drill a geothermal injection well on Federal lease NM-34790.

Please see attached location plat Form G-102.

Please see attached drilling handbook prepared by Capuano Engineering Company.

in ABOVE SPACE DESCRIBE PROPOSED PROBABLE IS a used, then between growth proposed, if any, I hereby certify that the information above is true and equal		ductives June 2000 Everyoned Day productive
Develle Janney Po	Agent for Lightning Dock Geothermal HI-01, LLC	6/29/2015
(West State for Built Stary		
COMBITTONS OF AFFROVAL, IF ANY	WAY	.6496

GEOTHERMAL RESOURCES WELL LOCATION AND ACREAGE DEDICATION PLAT

		All distances m	nucl be from the	euler boundare	s of the Section,		
perator Linkship Des	de Coothornel III	OL I'LC	Losse	End	Coothormal NM	24700	Well No.
	k Geothermal HI		l ₋₁₀₀	rea.	Geothermal NM- County	34790	LDG 63A-7
nit Letter , G	Section 7	Township 25.5	outh	19 West	Hid	algo	
cinal Fuolage Loca	1		Cutil L	17 (7 CSt		uigo	
1403	feet from the	East	See and	1934	feet from the No.	rth s	int
round Level Elev.	Producing Fu	rmatica.	Pool				ed Acrest:
4208			4	NA			Acres
2. If more and roys 3. If more commun. The Yes If answer is necessary.). No allowab	than one lease is alty). than one lease of altization, unitization. No If a "no," list the or one one will be assisted.	f different owners lon, force-pooling, inswer is "yes," ty	well, outline sip is dedicate , etc? pe of consolid escriptions wh	each and iden d to the well, stion ich have actua	have the interest	ip thereof (both is of all owner lated. (Use review d (by commu	as to working interest t been consolidated by true side of this form in
anis daminis (1911) eess e				32°08'49 108°49'5	.34664" 7.52920" Re A	Geo-Science So May 29, 201	ey, PG ock Geothermal HI-01, LLC lutions, LLC
					R.		ut .

OIL CONSERVATION DIVISION

P. O. BOX 2088

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

SANTA FE, NEW MEXICO 87501

Form G-104 Adopted 10-1-74 Revised 10-1-78

CERTIFICATE OF COMPLIANCE AND AUTHORIZATION TO PRODUCE GEOTHERMAL RESOURCES

Approved		Position		Date
Signed Daniel Janney	, PC	Agent f Position Geothe	or Lightning Dock rmal HI-01, LLC	
I hereby certify that all rules and regul- promulgated by the Oil Conservation is subject well, and that the information give	Division of New Mexico,	have been com	plied with, with	respect to the
CERTIFICATE OF COMPLIANCE	·.	ual manuscratic of	la in the State of	Now Manimum
Be Used For Residential and commercia	•			
Purchaser 414 Silver Ave. Suite 4 Album Product Will	querque, NM 87102	•		
Address of	4			
Name of Purchaser Public Service Company of N				
DESIGNATION OF PURCHASER OF PR	RODUCT			
Steam	Water Water		ermal Water	
TYPE OF PRODUCT Dry S	Steam and	Lov	v Temp.	
County Hildago				
Section Township _	25S	Range	19W	
	feet from the		East	line of
Letter G ;	feet from the	······································	North	line and
LOCATION Unit			•	
(Fee, Fed. or State) Federal	Number NM-	34790		
Name Kind of Lease	No. LDG-63A-7	Reservoir		
DESCRIPTION OF WELL Lease Not Applicable	Well	Name of	Lightning Dock	
Other (Please Explain)				
REASON FOR FILING New Well Recompletion Change in Ownership Designation	n of Purchaser			
Geothermal Producer	Low-Temperature The	ermal	Injectio	on/Disposal 🗸
TYPE OF WELL				
Address 136 S. Main Street, Ste. 600, S	alt Lake City, U1 84101			
Name Lightning Dock Geothermal HI-01				
OWNER OR OPERATOR				

OIL CONSERVATION DIVISION

Form G-112 Adopted 10-1-74 Revised 10-1-78

P. O. BOX 2088 SANTA FE, NEW MEXICO 87501

APPLICATION TO PLACE WELL ON INJECTION-GEOTHERMAL RESOURCES AREA

Operator Lightning Dock Geot	hermal HI-0	ı, LLC		Address 136 S.	Main S	Street,	Suite 600 S	alt La	ke City, UT	84101
Lease Name Federal NM-34790		Well N	6. G 63A-7	Field	htning				County Hid	
Location	Weti Is Loc	1934	Feet Fro	m The N	orth	_ Line A	nd 1403	_ Foet	From The <u>Ea</u>	st
Line, Section 7	Township_	25S	_ Range _	19W		NMPM.				
		CASI	NG AND T	UBING D	ATA				· · · · · · · · · · · · · · · · · · ·	
NAME OF STRING	SIZE	SETTING DEP	TH SA	ACKS CEM	ENT	TOF	OF CEMENT		TOP DETER	MINED BY
Conductor Pipe	9.625"	90'		6 су		G	R		flow to su	ırface
Surface Casing	7"	150'		20	•	G	R		flow to s	urface
Long String	5" Íiner	1.500'	. ,	None		N	one		NA	
Tubing				e, Model a	nd Depth	of Tubi	ng Packer			
Name of Proposed Injection Form	nation			Top of F	ormation)		Bottom	of Formation	
Quaternary alluvium/Ter	tiary volcanio			150'				1,500)'	
Is Injection Through Tubing, Casi	ne, or Annulus?	Perforat	tions or Ope	en Hote?		1,500'	i(s) of injection	on		
5" liner Is This a New Well Drilled For	If Answer i	slotte is No, For What	ed liner Purpose wa	s Well Or		rilled?	las Well Ever	Been Pe	rforated in Ansed Injection Z	y Zone
tnjection ? YES							Ather Lugu Co	- Plopo:	and Injection 5	NA
Not Applicable Depth of Bottom of Deepest Fres		is This Injection	on for Purp	ose of Pre	ssure Mai	intenance		•		
in This Area Unkown		or Water Dispi	osal? (See R	Rules 501	and 502)			f spent	geothermal w	ater
Anticipated Daily Minimum Injection 4400'+ 720.00		mum Ope Syst	n or Closed	Туре	is in	ection to ure? Gr	be by Gravit avity	y or	Approx. Press	ure (psi)
Answer Yes or No Whether the Fo to such a Degree as to be Unfit to or Other Contain No.	linwing Waters ar	e Mineralized .Y		Injected	Natu Zone	1 Zone]	Are Water Analyses Attached? Summary on file with OCD	
Name and Address of Surface Own	er (or Lessee, if	State or Federal								
Rosette, Inc. P.O. Box 1618 Ro List Names and Addresses of all Or			of This In	jection We	nit	······································		~ ~		
Americulture 25 Tilapia Trail	Animas, NM 88	3020								
Rosette Inc. PO Box 1618 Ros	swell, NM 88202	2-1618				_				
				•			*			
Have Copies of this Application Be Sent to Each Operator Within One Half Mile of this Well?			not app	licable			<u>.</u>	·		
Are the Following Items Attached this Application (see Rule 503)			See G-102	Electrica	_	No X)	Diagrar Yes	fummer.	of Well See drillin Manbook
1 hereby	certify that the		ve is true at	····						
Daniel Jane	y, PG	Agent fo	r-Lightnin	g Dock G	eotherm	al HI-0	بلند بالم	ine 29.	2015 (Date)	

ROY A. CUNNIFF AND ASSOCIATES 224 W. GREENING LAS CRUCES, NM 88005

July 18, 1996

Damon L. Seawright Americulture, Inc. HC 65 BOX 260C Animas, NM 88020

Dear Damon:

Enclosed please find the forms and records you need to submit to Roy Johnson at the NM OCD. The forms are self-explanatory, and I have provided notes on little stickees of the remaining information you must supply. Because I am uncertain of some of the key dates, you might have to redo some of the forms. To this end also enclosed are blank forms.

I will be in Colorado visiting our children and other family members from July 19 through July 30. I will give you a telephone call when I return. Hope everything is going well at Animas.

Sincerely,

Roy A. Cunniff

noyl lung

8 Incls:

P.S. As I told you during our telephone discussion earlier this week, there is no charge for the above service.

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

Oil Conservation Div 2040 Pacheco St. Santa Fe, NM 87505

NO OF COPIES RECEIVE	ED		Junea 10,	MI 0750.	,			
DISTRIBUTION							5. Indicate	Type of Lease
File			APPLICATION FOR PE	RMIT TO DRILL	DEEPEN	J.	STATE 🔀	FEE [
N.M.B.M.			R PLUG BACKGEOTE				5.a State Lea	
U.S.G.S.	$\longrightarrow \longrightarrow$						GTR -	304-1
Operator								
Land Office		,					7//////	
la. Type of Work	orill 🕱	3	Deepen	Plug Ba	ck 🗆	107 - 4	7. Unit Agre	ement Name
1				Temp Observati		•	8. Farm or L	ease Name
L	.ow-Tem	p Thermal	X	Injection/Disposi	al L		Amen	UCULTURE
2. Name of Operator	Ame	FRICULTU	ee, Inc.				9. Well No.	A - 568
3. Address of Operator	· ****** · · · · · · · · · · · · · · ·		ANIMAS N	N BRAZZ	١			Pool, or Wildcat
							LIGHTN	MG POCK
4. Location of Well	IIT LETT	ER A	OCATED <u>579</u> FEE	T FROM THE	>KTH	LINE		
AND 971 FEET	EBOMI	THE 645 T	E OF SEC. 7	255	19W			
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	1111	<i>HHHH</i>		19. Proposed De	pth 1	9A. Formatio		20. Rotary or C.T.
	7]]]]			490'		RHYDLITE	.	ROTHRY
21. Elevations (Show whe	ther DF,	RT, etc.) 21/	A. Kind & Status Plug. Bon			***************************************	22. Approx	. Date Work will start
4256'RT		<u> </u>		JIM M	·8EE		85	ucy 1996
			PROPOSED CASING	AND CEMENT PR	GRAM			
SIZE OF HOLE		SIZE OF CASI	NG WEIGHT PER FO	OT SETTING	DEPTH	SACKS OF	CEMENT	EST. TOP
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Œ	277890	MITTEN						
	_				21	b. Dril	ling Cont	hock
3a R	ve4	PATRA						
					S	16N 4	DATE A	7 BOTTON
.51/4	BMIT	5 car	123					4
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		10 000	- route					
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IN ABOVE SPACE DESCR	IBE PRO	POSED PROGR	AM: If proposar is to useo	en or plug back, give	e data on ir	resent produc	tilla tona sam	
	- p. c. y, c.	****, ** ** *** y *,					THE TORE OF	biobosed use bioductis
I hereny certify that he inf	iormation	ahove is true an	d complete to the best of	my knowledge and t	elief.			
Signed	1		(1 1.	., ,				
		- Jan	Tine Vice - p	rusident		D	ate 7-3	1-96
(This spa	ce for Sta	ate Use)			- Washer Cambridge			
CONDITIONS			TITLE		material and a second district and a second district and a second district and a second district and a second	D	ATE	THE OWNER WAS A STATE OF THE PROPERTY OF THE P
CONDITIONS OF APPROV	AL, IF A	ANY:						

2040 Pacheco St.

Form G-102 Adopted 10-1-74 Revised 10-1-78

Santa Fe, NM 87505 GEOTHERMAL RESOURCES WELL LOCATION AND ACREAGE DEDICATION PLAT

Operator A		All distances mi	Lea				Well No.
it Letter	Section Section	T		State Lea		304-1	A-568
* A	Section 7	Township 25 S		Range 19W	County	AL60	
Actual Footage Loc		·				MAGO .	
57		NORTH	line and	971	feet from th	· EAST	line
Ground Level Elev. 4250'	Producing F		Poo	LIGHTAVNO	a Dock		Dedicated Acreage:
1. Outline		cated to the subject	well by co				/10103
	than one lease i					-	of (both as to working interest
commur	nitization, unitiza	of different owners: tion, force-pooling, answer is "yes," typ	etc?		ll, have the in	terests of all	owners been consolidated by
	"no," list the c				ually been cor	nsolidated. (U	se reverse side of this form if
No allowat	ole will be assi	gned to the well or until a non-stan	until all dard unit,	interests have eliminating such	been consol n interests, has	idated (by been approv	communitization, unitization, ed by the Division.
	1			your	¥		CERTIFICATION
				5/1/17	£	contained	certify that the information therein is true and complete to of my knowledge and belief.
				1		Name	Seff
	+						n Seawright
	1					Vice - Pro Company	n Seawright esident, operations ulture, Inc
						Date 7-3/-	•
						shown or	certify that the well location this plat was plotted from field actual surveys made by me or
				- +		is true a	supervision, and that the same and correct to the best of my e and belief.
	 			1		7-/9- Date Surveye	
	! !					and/or Land	Surveyor
						Certificate N	
rs 330 A60	90 1320 1650 1	980 2319 2640	3000	1500 1000	500 0	-	

Damon E. Seawright AmeriCulture, Inc. HC 65 Box 260C Animas, NM 88020 Phone: (505)548-2328 Fax: (505)548-2631

AUG 1 2 1996

August 9, 1996

Roy Johnson New Mexico Oil Conservation Division 2040 S. Pacheco Santa Fe, NM 87505

Dear Roy:

Enclosed herewith are the required number of copies of forms G-103, G-104, G-105, G-106, and G-107 for the new geothermal well location on State Lease No. GTR-304-1. Per our conversation on August 8 1996, G-108 filing is not immediately required. If you have any questions, please call me.

Sincerely.

Damon E. Seawright

cc: Gary L. Seawright
Garrett P. Seawright

STATE OF NEW MEXICO

Oil Conservation Div 2040 Pacheco St.

NO. OF COPIES RECEIVED		Santa Fe,	NM 87505				
DISTRIBUTION					5. Indicate Type of Lease		
	APPL	APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACKGEOTHERMAL RESOURCES WELL				FEE 🗌	
N.M.B.M.						se No.	
U.S.G.S.		SIN ESO DAGE SESTIMAL RESOURCES WELL			GTR - 3	304-1	
Operator			5	777777	THITTINITY IN THE		
Land Office							
la. Type of Work Drill	×	Deepen 🗆	Plug Back 🔲		7. Unit Agree	ment Name	
b. Type of Well Geothe	ermal Producer	Te	mp Observation		8. Farm or Le	ease Name	
Low-To	emp Thermal 💢	Inj	ection/Disposal 🗆		And	ICHLTURE	
2. Name of Operator					9. Well No.	TEGETURE	
An	IERICULTURE,	INC.				A - 568	
3. Address of Operator HC 65	box 260C , 1	ANIMAS NM	88020			Pool, or Wildcat W& DOCK	
4. Location of Well UNIT LC	TTER A LOCA	TED 579 FEET FE	OM THE NORTH	LINE			
		SEC. 7 TWP. 25.		NMPM			
				1111111	12. County		
	/////////////////////////////////////		9. Proposed Depth	19A. Formation		20. Rotary or C.T.	
			490'	RHYDLITE	1	ROTALY	
21. Elevations (Show whether E 4256 RT	21A. Kin	d & Status Plug. Bond 2	11B. Drilling Contractor TIM MCBEE		22. Approx.	Date Work will start	
		PROPOSED CASING AND	CEMENT PROGRAM				
SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF	CEMENT		
17"	109/4"	41.55	290'±	135		CIRC.	
		<u> </u>	<u> </u>	123		U/4C.	
						and the second of the second o	

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present proposed in the proposed proposed preventer program, if any.	oductive zone and proposed new productive
I hereny certify that the information above is true and complete to the best of my knowledge and belief.	
igned town serverght Title Vice - president	Date 7 - 31 - 96
APPROVED BY Hy Character TITLE DISTRICT SUPERVISOR	DATE 8-8-96
CONDITIONS OF APPROVAL, IF ANY:	

2040 Pacheco St.

Form G-102 Adopted 10-1-74 Revised 10-1-78

Santa Fe, NM 87505 GEOTHERMAL RESOURCES WELL LOCATION AND ACREAGE DEDICATION PLAT

AMERICULTURE State Lease GTR-304-/ III Letter Section Township Range County 7 25 S 19N 1410AL60 Actual Footage Location of Well:	A-568
A 7 253 19W 1410AL60 Actual Footage Location of Well:	
Actual Footage Location of Well:	
579 feet from the NORTH line and 971 feet from the EAST	line
Ground Level Elev. Producing Formation Pool LIGHTWAG DOCK Dedi	icated Acreage:
1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat belo	10.0 Acres
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (board royalty).	oth as to working interest
3. If more than one lease of different ownersip is dedicated to the well, have the interests of all own communitization, unitization, force-pooling, etc? Yes No If answer is "yes," type of consolidation If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use renecessary.) No allowable will be assigned to the well until all interests have been consolidated (by commorced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by	everse side of this form if
CE I hereby cer contained here	ERTIFICATION rtify that the information lein is true and complete to by knowledge and belief.
Name Damen Position Vice - Preside Company Ameri Calfe Date 7-31-96	Seawright dent, operations were, Inc
shown on this notes of actual under my supe	rify that the well location plat was plotted from field al surveys made by me or ervision, and that the same correct to the best of my dibelief.
7-/9-95 Date Surveyed Frank L. Registered Profess and/or Land Surve	Quarra 11
Certificate No. 0310 1050 1050 1050 1050 1000 1000 0	



RAY POWELL, M.S., D.V.M. COMMISSIONER

State of New Mexico Commissioner of Public Lands

310 OLD SANTA FE TRAIL P.O. BOX 1148

(505) 827-5760

FAX (505) 827-5766

SANTA FE, NEW MEXICO 87504-1148

January 26, 1996

Americulture, Inc. 536 Paul Place Los Alamos, New Mexico 87544

Attn:

Mr. Gary Seawright

Re:

Assignment of State of New Mexico Geothermal Lease No. GTR-304-1

Dear Mr. Seawright:

Enclosed is an approved copy of the above referenced assignment and collateral assignment for your records.

If we can be of additional assistance to you, please contact Karen S. Kreutzer at (505) 827-5750.

Sincerely,

LARRY KEHOE, Director
Oil, Gas and Minerals Division

LK/KSK/ksk

Encl.

xc:

Thomas W. McCants Star Route, Box 265

Animas, New Mexico 88020

NEW MEXICO STATE LAND OFFICE ASSIGNMENT OF MINERAL LEASE

KNOWN ALL MEN BY THESE PRESENTS:

FOR OFFICE USE ONLY

Lease No. GTR-304

From No. O To No.

	Omas W. McC Assignor, include w		, hereinafte	r called " Assignor	*, for and in consideration 506	of the sum of One Dollar,	and other
good and v	aluable consideration	on paid by Amer	culture, In	nc., whose I	ost Office address is Los	Alamos, N.M Zi	, <u>8754</u>
nereinafter	called the " Assign	ee ", has sold, transf	(Assignee) erred. set over and	assigned and by the	nese presents does sell, tran		
, .	occessors, and assis	giis, all of the Assign	Of's right, title, inte	rest and claim in ar	nd to that certain Mineral L	ster, set over and assign to case No. GTR-304	made by
50000 01	THEW MICKIED ID	Thomas W. Ners the following desc	uccants		under date of Septem		1986
.,		as are tonowing desc	ribed land to wit:				
	Institution	Section	Township	Range	Subdivision	Acres	
TRACT	Ref. Sch.	7	25S	19W	NMTHEFAET	10.00	
		GO COYUNTY	See At	tached Sur	vey		
ogether w	ith the personal pro	perty thereon, if any	, appurtenant thereto	o, or used or obtain	ed in connection herewith.		
are provi	orone or said icase	were fully set out ner	ein and Assignor is	relieved of such ob	ibed subdivisions, to the sar ligations and duties. the Lessee by the terms of		
igned this	1874	da	y <u>Dee</u> , 19	96.	1	.3	
				_2	les to Rec	en	
Si	ECRETARY (Corpo	oration Only)		ASS	IGNOR (If Corporation Pr	int or Type Name of Corp	oration
				and and	Executing Officer) Th	omas W. McCant	s
				WIF	E (If Applicable) Ma	The Contribution of the J. McCant	<u></u>
			(PERSONAL A	CKNOWLEDGME		in the conference of the confe	5
TATE OF	New Mexi	ω			,		
OUNTY (OF Hidaiqu) 85.			{		
7	The foregoing instru	ittent was acknowled	ged before me this	18HL	day of	ember .1995	i
y <u>May</u>	rtha J	Mc Cant	and -	Inomas V	V McCants	, , ,	;
fy Commi	ssion Expires :	June 12,	1999	-	Barbara Notary Pr	Aujello	
		(A	CKNOWLEDGME	NT BY ATTORNE	Y-IN-FACT)	,	
TATE OF					 ,		
)F) ss.					
		-	and hafe and the				
					day of		
						as attorney-in-fact in be	chaif
-							
v Commis	ssion Expires :						
,							

	(ACKNOWLEDGMENT BY	CORPORATION)	
STATE OF	_)		
COUNTY OF) ss. _)		
The foregoing instrument was ack	nowledged before me this	day of	. 19
by	•		
(Name)	(Title)	, of(Corpora	ation)
1	corporation	on behalf of said corporation.	
My Commission Expires :			
		Notary Publi	ic
	APPROVAL OF THE COMM	ISSIONER	
	APPROVAL OF THE COMMI	SSIONER	
Santa Fe, New Mexico 87504-1148		17-95.	
Office of Commissioner of Public Lands Santa Fe, New Mexico 87504-1148 I hereby certify that the within Assignment wasproved by me and to be effective as to the	as filed in my office on $8-1$	17-95	
Santa Fe, New Mexico 87504-1148 I hereby certify that the within Assignment w	as filed in my office on $8-1$	17-95. 11-96 Ray Pris	e O
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Santa Fe, New Mexico 87504-1148 I hereby certify that the within Assignment w	as filed in my office on $8-1$	17-95. 11-96 Ray Pris	eC ter of Public Lands by L.K.
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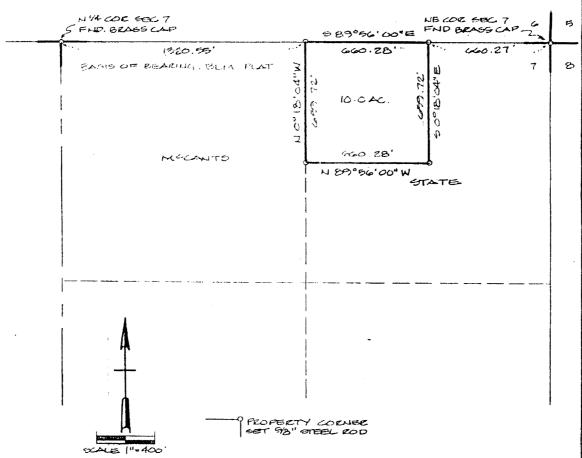
INSTRUCTIONS AND INFORMATION

- 1. All Assignments must be filed in triplicate, and should be filed in the State Land Office within 100 days from date of signing by Assignor and accompanied by Cashier's Check, Bank Draft, Postal Money Order, Express or Bank Money Order.
- 2. Recording and approval fee is \$30.00 for each Assignment. (Additional investigation and records research fee of \$75.00 if Assignment is submitted more than 100 days after date of signing of Assignment).
- When Assignments are accompanied by personal check, the Commissioner of Public Land reserves the right to withhold approval of Assignment until checks are paid.
- 4. Assignment will not be approved when assigned to more than one person or corporation. (Assignment must cover one or more complete subdivisions and must not convey an undivided or fractional interest in the lease, however, unapproved Assignments will be filed as miscellaneous instruments, see 7-9-29, N.M.S.A., 1953 Comp., and General Mining Rules 31 thru 38).
- 5. Assignments must show complete Post Office address and Zip Code of Assignee.
- 6. Assignments must be executed before an officer authorized to take acknowledgements of deeds. Use appropriate form.
- 7. Assignments must show whether Assignors are married or single; if married, both husband and wife must sign the Assignment, and Certificate of Acknowledgment must show marital status of Assignors. (This may be waived if records show lease is separate property of Assignee). Corporation must show state of incorporation.
- 8. All official business, letters and communications, must be addressed to and sent direct to the Commissioner of Public Lands.
- Make all payments for annual rental and recording approval fees to: Commissioner of Public Lands, P.O. Box 1148, Santa Fe, New Mexico 87504-1148.
- 10. Performance Bond (Rule 42 Change No. 2 8/7/72) In addition, before a lease shall issue, the lessee shall file with the Commissioner of Public Lands a bond in the amount to be set by the Commissioner which he deems necessary to guarantee payment of royalties to become due the State of New Mexico. Unless and until the Commissioner sets a higher amount upon good cause shown, the minimum and usual amount of such bond shall be \$1,000.00 for a single lease bond and \$2,000.00 for a multiple lease bond.

Property Boundary Survey

Tom McCants To Gary Seawright A survey to set the property corners for a certain tract of land in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ Section 7,T25S,R19W of the N.M.P.M. in Hidalgo County, New Mexico.

STATE



Description

A tract of land situate in the Northeast Quarter of the Northeast Quarter ($NE_4^1NE_4^1$) Section 7,T255,R19W of the N.M.P.M. in Hidalgo County, New Mexico and being described as follows: Beginning at the NW Corner of the tract herein described, which point bears S89°56'E along the north line of said Section 7 a distance of 1320.55 feet from the N¼ of said Section 7; Thence continuing S89°56'00"E a distance of 660.28 feet to the NE Corner of this tract; Thence S0°18'04"E a distance of 659.72 feet to the SE Corner of this tract; Thence N89°56'00"W a distance of 660.28 feet to the SW Corner of this tract; Thence N0°18'04"W a distance of 659.72 feet to the point of beginning. This tract contains 10.00 acres more or less and is subject to easements and restriction of record.

Certification



Deming, Luna County, New Mexico, July 24, 1995.

I, Frank L. Quarrell, hereby certify that I am the Registered Land Surveyor who prepared this plat from field notes of an actual survey conducted by me or under my direction on July 19, 1995, and that the same are true and correct to the best of my knowledge and belief. This plat meets the minimum requirements of the Standards for Land Surveys in New Mexico

Professional Land Surveyor No. 9829



NEW MEXICO STATE LAND OFFICE COLLATERAL ASSIGNMENT

The undersigned Americulty	re, Inc., a New Mexico corporation
· [re or acace or lucorbotation
of 536 Paul Place, Los Alamos, NM 87	544 , the holder of/State ment of Geothermal Lease
which and are as the N/A Aug of	(Specify type of lease or contract)
	N/A 19 does hereby assign, trans-
	s and Martha Jacquette McCants, his wife
Address HC 65, Box 265, Animas, NM	
the aforesaid (Parchase Kontract) (Lease) cover	ering the following described lands of the State of New Mexico,
to wit: Partial Assignment	
10 acres more fully des	scribed on copy of survey attached
	1996
	10 myary 23
	SUED ON - LABIBLIC LANDS
	APPROVEDIONER OF POD
	APPROVED ON January 23 1996 COMMISSIONER OF PUBLIC LANDS
This analogous is a sale of the sale of th	
I THIS RESTRIMENT IS MADE US COTTSTELST SE	curity for the payment of indebtedness owing by the undersioned to
	curity for the payment of indebtedness owing by the undersigned to
the assignee herein amounting to $$100,000.0$, and the payment of further advances that may
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(PERSONAL ACKNOWLEDGMENT)
STATE OF
)
COUNTY OF
The foregoing instrument was acknowledged before me this
19, by
My Commission expires:
NOTARY PUBLIC
(ACKNOWLEDGMENT BY ATTORNEY-IN-FACT)
STATE OF
) 88
The foregoing town
The foregoing instrument was acknowledged before me this day of
as attorney-in-fact in behalf of
My Commission expires:
NOTARY PUBLIC
(ACKNOWLEDGMENT BY CORPORATION) STATE OF NEW MENT OF
STATE OFNEW MEXICO)
COUNTY OF HIDALGO
The forecoing instrument and additional link
The foregoing instrument was acknowledged before me this 11th day of August
1995 , by (Name) Gary L. Seawright (Title) President
of (Corporation) AMERICULTURE, INC.
a New Maying
corporation, on benalf of said corporation.
My Commission expires: 6-7-94 Oristine Right NOTARY PUBLIC
NOTARY PUBLIC
APPROVAL OF THE COMMISSIONER
Office of the Commissioner of Public Lands Santa Fe, New Mexico
I hereby certify that the within Assignment was filed in my office on October 24, 1995
on January 23, 1996.
Ray Powell
STATE OF NEW MEXICO
O STATE OF NEW MEALOU BAY COME



RAY POWELL, M.S., D.V.M. COMMISSIONER

State of New Mexico Commissioner of Public Lands

310 OLD SANTA FE TRAIL P.O. BOX 1148

SANTA FE, NEW MEXICO 87504-1148

(505) 827-5760 FAX (505) 827-5760

NEW MEXICO STATE LAND OFFICE

NOTICE OF PUBLIC HEARING

Pursuant to NMSA 1978 § 19-13-9 and § 19-13-27 (1994 Repl. Pamp.), Ray Powell, New Mexico Commissioner of Public Lands, will hold a public hearing to receive oral and written comments at the State Land Office in Morgan Hall, 310 Old Santa Fe Trail, Santa Fe, New Mexico on September 27, 1995 at 2:00 p.m.

The public hearing will be for the purpose of receiving comments on a request by the holder of Geothermal Lease No. GTR-304 for a waiver of the operating requirement found in State Land Office Rule 7.023 and Paragraph 9 of Lease No. GTR-304 that would prohibit the Commissioner's recognition and approval of an assignment of less than a legal subdivision of the leased premises for the development of geothermal resources.

Written comments may also be submitted prior to the date of the public hearing to:

Karen S. Kreutzer
Oil, Gas and Minerals Division
New Mexico State Land Office
P.O. Box 1148, Santa Fe, New Mexico 87504-1148

Disabled individuals who wish to participate in the hearing and who require special equipment or assistance should contact the New Mexico State Land Office at the above address or call (505) 827-5750 no later than September 20, 1995 to request that such equipment or assistance be provided. Upon request, this document may be made available in alternative formats.

Commissioner Ray Powell

- Forme D ba C Gas 2

NEW MEXICO STATE LAND OFFICE

ORDER APPROVING THE PARTIAL ASSIGNMENT OF GEOTHERMAL LEASE NO. GTR-304

Thomas W. McCants, holder of New Mexico State Land Office Geothermal Lease No. GTR-304, requested on August 17, 1995, that the Commissioner of Public Lands approve the assignment of less than a legal subdivision (10 acres) of the leased premises to Americulture, Inc., for the development of the geothermal resources.

The New Mexico State Land Office held a public hearing pursuant to NMSA 1978 §§ 19-13-9 and 19-13-27 (Repl. Pamp. 1994) on September 27, 1995, in Morgan Hall in the New Mexico State Land Office, 310 Old Santa Fe Trail, Santa Fe, New Mexico, to receive public comments.

The Hearing Officer was Karen S. Kreutzer and those present representing the State Land Office were Larry Kehoe, Jami Bailey, and Jeff Albers. Those individuals who commented at the hearing were Dale Burgett, Betty Beagles, Thomas McCants, and Jim Alley.

Upon consideration of the request and the public comments made, I find that the partial assignment of 10 acres is beneficial to promote the development of the geothermal resources and I therefore approve the assignment.

Ray (Powell, M.S., D.V.M.

Commissioner

Dated

New Mexico State Land Office Oil, Gas and Minerals Division P.O. Box 1148 Santa Fe, NM 87504

RE: GTR-304; Request for Assignment Waiver

Dear Sirs:

With this writing, I am asking for your consideration of a waiver/variance of Assignment Rule #28, Rules and Regulations Governing Geothermal Reasource Leases.

I am requesting a waiver of a legal subdivision (40 acres) assignment in favor of a ten (10) acre assignment, as per the attached application and legal survey.

Americulture, Inc., a New Mexico Corp., at 536 Paul Place, Los Alamos, NM, Gary L. Seawright, Pres., is interested in developing the geothermal resources of a 10 acre tract, for utilization in their aquacultural operations.

I believe that Americulture's development will prove to be of benefit to the geothermal development interests of the State of New Mexico.

Thank you for your time and consideration.

Respectfully,

Thomas V. McCants Leasee GTR-304 PLAN OF OPERATIONS

AMERICULTURE, INC.

HIDALGO COUNTY, NEW MEXICO

AUGUST 21, 1995

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1.0 INTRODUCTION

Pursuant to the requirements of Federal Regulations Title 43, Part 3260, presented herein is the Plan of Operations (P.O.O.) for the AmeriCulture, Inc. operations in Hidalgo County, New Mexico.

AmeriCulture, Inc. is planning the establishment of a fish farm on 15 acres of private land purchased from the McCants' ranch in Section 7, Township 25 South, Range 19 West. This fish farm would grow tilapia for commercial markets. The fish farm would use geothermal heat produced from an existing geothermal well on the property.

1.1 Name and Address of Operator

Americulture, Inc. 536 Paul Place Los Alamos, New Mexico 87544 ATTN: Mr. Gary L. Seawright, President Telephone: (505) 672-3739

AmeriCulture, Inc. HC P.O. Box 265 B Animas, New Mexico 88020 ATTN: Mr. Damon E. Seawright, Vice-President Telephone: (505) 548-2328

2.0 PROJECT LOCATION

Figure 1 displays the general location in Southwest New Mexico for the the AmeriCulture business operations. Figure 2 is a sketch map which depicts the location of existing facilities in context of the AmeriCulture facilities.

The proposed operations would include essential operations to be conducted on private land owned by AmeriCulture, Inc. Initially, geothermal operations on this tract of land would consist only of operating the existing geothermal well located on that land. As the operation expands in size, AmeriCulture would drill new wells on their own land, or would drill new wells on the 10-acre tract of New Mexico Trust Land for which AmeriCulture owns the geothermal lease right. In the future, it is possible that the scope of operations might expand to encompass New Mexico Trust Land leased from the State of New Mexico.

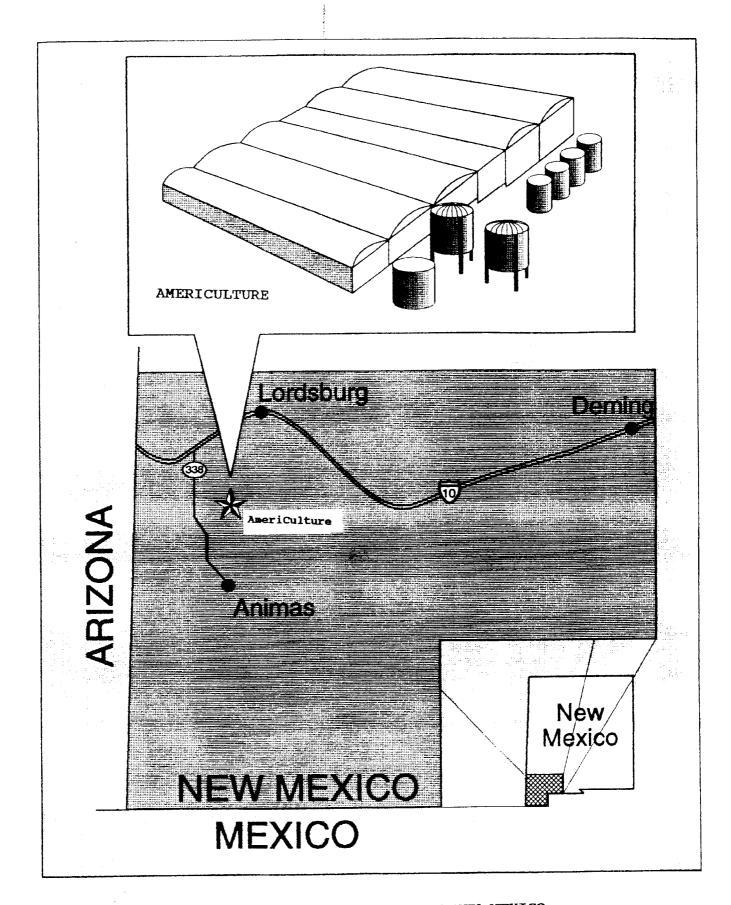


FIGURE 1. LOCATION MAP IN NEW MEXICO

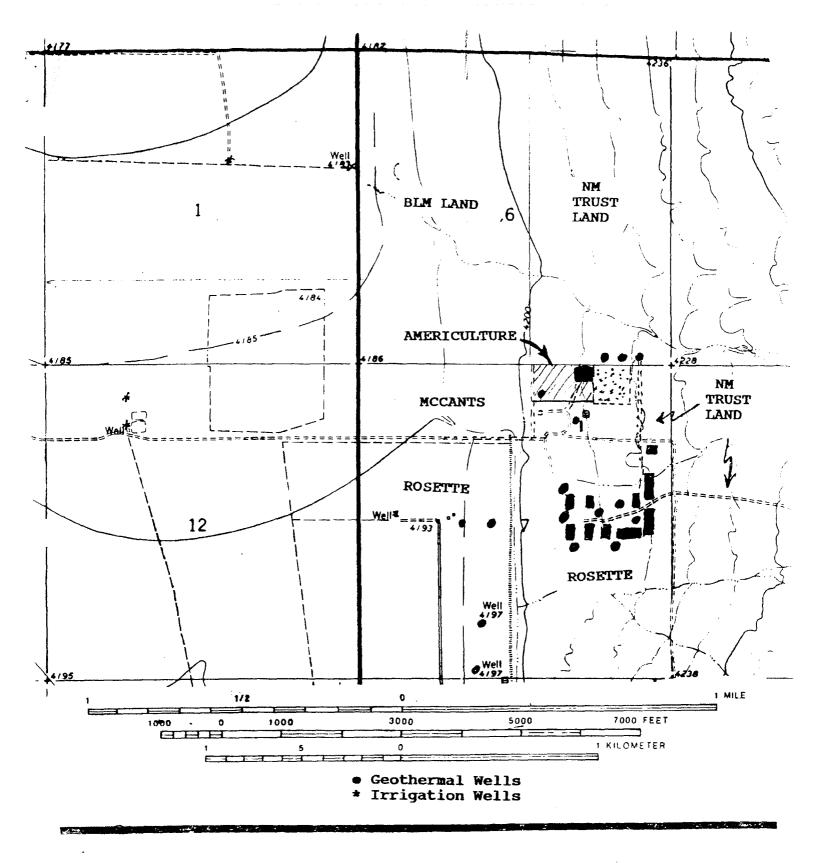


FIGURE 2. LOCATION MAP, ANIMAS VALLEY

3.0 DESCRIPTION OF OPERATIONS, CONDUCT, AND PERIOD OF PROPOSED ACTIVITY

3.1. Prior Conditions and Current Conditions

3.1.1 Previous Conditions

The property purchased by AmeriCulture originally was leased by McCants's to the Beall Corporation, who drilled the existing geothermal well and irrigation well in 1984. These wells were used to provide geothermal heating and irrigation for a greenhouse containing approximately 22,000 square feet. The geothermal well produced at a temperature of 195 degrees F., with a steady flow rate of about 75 gpm.

After heat was extracted from the geothermal fluid, the water was discharged to a shallow trench and allowed to flow along the ground to the northwest.

The Beall Company filed for bankruptcy in 1982, and the greenhouse and geothermal system were operated for a period of time by Mr. Thomas McCants, the land owner. Since 1984, the geothermal system has been the subject of a Shut-Down Order issued by the Las Cruces District Office of the Bureau of Land Management.

3.1.2 Current Conditions

Americulture, Inc. has purchased a 15-acre tract including the geothermal well and distributions piping system, the irrigation well and distribution system, and the existing green house complex. Also purchased were the geothermal lease rights to a 10-acre tract of New Mexico Trust Land.

AmeriCulture, Inc. has negotiated and signed a Joint Facility Operating Agreement with the lessee on Federal geothermal lease NM 34790. Under this Agreement, and as limited to only the 15 acres of private land, AmeriCulture has the right to produce geothermal heat for heating the fish farm and ancilliary facilities. The lessee retains all geothermal lease rights to produce electricity.

3.2 Description of Operations

Americulture has taken action to erect two small greenhouse structures which will be used for the brood stock of fish. As an initial action, the tanks in these two structures will be heated with geothermal water using a heat exchanger system.

Figure 3 depicts AmeriCulture land status as well as the general location of the Phase I fish farm complex.

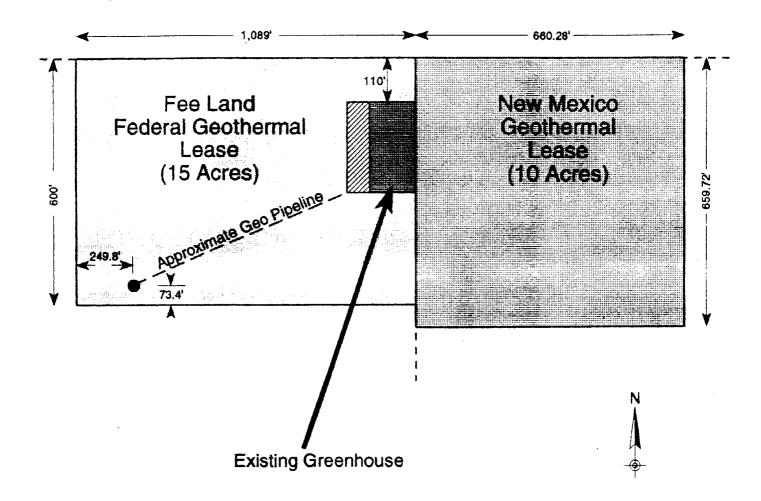


FIGURE 3. PHASE I - AMERICULTURE, INC.

Concurrently, action has been initiated to refurbish and enlarge the existing greenhouse structure. As part of this refurbishment, a system of tanks will be installed in the structure to hold fish in varying degrees of maturity. The existing structure will be enlarged to allow room for additional equipment needed for successful fish farming. As part of this expansion, the total size of the greenhouse will be enlarged to dimensions of approximately 220 feet by 155 feet (34,000 square feet).

Construction also will include two smaller greenhouse structures measuring about 95 feet by 30 feet (2,850 square feet for each structure) which will be used for the fish hatchery.

Initially, the geothermal water load to heat the entire fish farm complex will be roughly 150 gpm at peak load, and about 50 gpm average flow rate during the heating system. The geothermal water will flow through a heat exchanger system to warm the circulating fish growth medium and to warm the structure. The optimal temperature for the growth medium is 85 degrees F. After the geothermal water has been cooled through the heat exchangers, the cooled effluent would be discharged to a shallow trench and would be available as a water source for range cattle on the McCants' ranch.

A complex system of instrumentation and controls will be used to monitor and control system operations. This control system will include metering equipment to measure and record geothermal heat utilization as well as other key parameters needed for accurate and timely control of fish farm operations.

A key element in the fish farm cycle is the removal of fish wastes from the circulating water system. A system of screens and filters will be used to remove solid wastes high in nitrate concentrations. A back-wash system will be used to remove the waste solids from the filters. This back-wash cycle would be roughly 15 gpm. The nitrate-enriched waste stream would be discharged to evaporation ponds for solar drying.

Fish and fish products will be farmed and transported to markets. It is expected that initial sales will consist of live fish; however, fish fillets and fish by-products also might be sold to commercial outlets.

3.3 Future Operations

The preceding descriptions of operations has been categorized as Phase I. It is possible that the business will expand sequentially to a conceptual Phase V. Expansion would consist of adding increments to the Phase I as complete units, with a potential sales volume in Phase III which would allow the construction of a fish processing plant on the site.

Initial site studies indicate that the fish farm operation can be expanded to construct up to five additional modules the same size as Phase I, and also provide room for a fish processing plant on site.

As the operation expands, it will be necessary to add to the geothermal fluid production volume by increasing the size of the well pump, by drilling additional wells on the Federal geothermal lease, and by expanding geothermal production to the New Mexico geothermal lease.

3.4 Conduct of Operations

3.4.1 Surface Activities

During construction of Phase I facilities, earth moving equipment will be used to excavate and shape the earth for the installation of specialized equipment.

During operations, large vehicle movement will consist of trucks to transport the live fish to market using tanker trucks. Other large vehicles will be used to transport fish feed to the facility.

3.4.2 Geothermal Well Pump and Drilling Activities

As part of initial construction actions, the existing geothermal well pump will be installed and tested. During the course of this testing activity, small volumes of geothermal water will be disposed into small pits at the well site. Testing should take about 48 hours of pump operation.

In completing actions to establish Phase I of the fish farm operations, a second geothermal well likely would be drilled and completed. This well could be drilled on the private land, with all required permits obtained from the New Mexico State Engineer and the Bureau of Land Management. Conversely, the new well could be drilled and completed on the New Mexico geothermal lease purchased by AmeriCulture. In this latter case, all necessary permits would be acquired.

3.5 Period of Proposed Activity

The construction and operation of Phase I operations is expected to take approximately 12 months, and would be completed in the latter half of 1996.

Expansion of the fish farm operations to a Phase II or more extensive modifications will be based on a management review of market success and cost factors. A decision to expand the fish farm likely would not be forthcoming until late CY 1996.

such as the Animas Valley. The Bureau of Land Management controls all activities involving the Federal geothermal resource under Lease NM 34790. All geothermal operations on New Mexico or private land are regulated by the New Mexico Oil Conservation Division.

5.2 Geothermal Disposal Permit

As indicated in Section 4.3 above, AmeriCulture has submitted the necessary application for a Disposal Permit. As necessary and appropriate, the Disposal Permit will be modified for future operations in accordance with the procedures of the oil Conservation Division.

6.0 CONSULTATION, COORDINATION, AND LIST OF PREPARERS

6.1 Consultation and Coordination

Mr. Charles O'Donnell, Las Cruces District Office Bureau of Land Management

Mr. Roy Johnson, New Mexico Oil Conservation Div. Geothermal Bureau

Mr. Mark Ashley, New Mexico Oil Conservation Div. Environment Bureau

6.1 List of Preparers

This document was prepared by: Roy A. Cunniff, RAC Associates Las Cruces, NM