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

S E A L

Exhibit A

Conditions of Approval

1) **G-104 Form:** 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) **Water Quality Sample Method:** 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.

4) **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) **Water Quality Background:** 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) **Correlative Rights:** 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.

7) **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.

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) **Mechanical Integrity Testing Initial Reporting:** 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.

10) **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.

11) OCD Discharge Permit (GTHT-001): The operator shall ensure that any OCD 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.

13) 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.

14) 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.

Disclaimer: *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*

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