

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

2015 SEP -3 P 3:08

APPLICATION OF LIGHTNING DOCK  
GEOTHERMAL HI-01, LLC FOR APPROVAL  
TO INJECT INTO A GEOTHERMAL AQUIFER  
THROUGH THREE PROPOSED GEOTHERMAL  
INJECTION WELLS AT THE SITE OF THE  
PROPOSED LIGHTNING DOCK GEOTHERMAL  
POWER PROJECT, HIDALGO COUNTY, NEW  
MEXICO

CASE NO. 15357

APPLICATION OF LIGHTNING DOCK  
GEOTHERMAL HI-01, LLC TO PLACE WELL  
NO. 63A-7 ON INJECTION-GEOTHERMAL  
RESOURCES AREA, HIDALGO COUNTY, NEW  
MEXICO

CASE NO. 15365  
Order No. R-14021-B

AMERICULTURE, INC.'S NOTICE OF APPEARANCE AND  
PRE-HEARING STATEMENT

1. AmeriCulture, Inc. hereby enters its appearance as a Protestant in this case.
2. Parties and Attorneys:

Applicant Lightning Dock Geothermal HI-01, LLC

Applicant's Attorney Michelle Henrie, Esq.  
P.O. Box 7035  
Albuquerque, NM 87194  
Santa Fe, NM 87501  
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Protestant AmeriCulture, Inc.

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Intervenor Hidalgo Soil and Water Conservation District

Intervenor's Attorney Pete V. Domenici, Jr., Esq.  
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OCD New Mexico Oil Conservation Division

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3. Concise Statement of the Case:

Lightning Dock Geothermal HI-01, LLC (Applicant) filed administrative applications (Forms G-112) pursuant to 19.14.93.8 NMAC to drill four new shallow injection wells (Wells Nos. 15-8, 76-7, 13-7 and 63A-7) to receive spent geothermal fluid from Applicant's geothermal power plant. Wells 15-8, 76-7, and 63A-7 have proposed injection volumes between 720,000 and 1,000,000 gallons per day for each well (500 to 694 gallons per minute per well) with a proposed injection zone between from 150' depth to 1,500' depth. Well 13-7 has a proposed injection volume of between 720,000 and 1,000,000 gallons per day with a proposed injection zone spanning from 500' depth to 1,500' depth. These applications have been protested by Damon E. Seawright on behalf of AmeriCulture, Inc (Protestant).

This hearing is being conducted pursuant to the Geothermal Resources Conservation Act, NMSA 1978 Sections 71-5-1 through 71-5-24, as amended, and Rules set forth in 19.14 NMAC, especially 19.14.93.8 NMAC, concerning permitting of geothermal injection and disposal wells. The hearing will be conducted by a Commission-appointed hearing officer. The issues to be addressed, as raised by the Intervenor, concern whether the proposed injection will contaminate any underground source of drinking water or otherwise cause waters of the State of New Mexico to exceed applicable water quality standards; reservoir capacity; and whether such injection will

cause waste of geothermal resources or impair correlative rights of geothermal users, as defined in 19.14.1.7.C NMAC. Other issues to be raised relate to the impairment of Protestant's water right, continued escalation of contamination of its domestic/commercial well, and the endangerment of Protestant's aquaculture business.

### Legal Standard

The issues to be addressed by the Commission, as set forth in the public notice, include whether the proposed injection will "contaminate any underground source of drinking water or otherwise cause waters of the State of New Mexico to exceed applicable water quality standards, and whether such injection will cause waste of geothermal resources or impair correlative rights of geothermal users, as defined in NMAC 19.14.1.7(C)."

The burden of proof required for Applicant to meet is that the proposed injection will not: 1) contaminate any underground source of drinking water; 2) cause waters of the State of New Mexico to exceed applicable water quality standards; 3) cause waste of geothermal resources; or, 4) impair correlative rights of geothermal users. This burden lies with Applicant – not with the Protestant AmeriCulture or with the Oil Conservation Division. "The courts have uniformly imposed on administrative agencies the customary common-law rule that the moving party has the burden of proof." *Lone Mt. Cattle Co. v New Mexico Pub. Serv. Comm'n*, 83 N.M. 465, 493 P.2d 950 (1972); see also *International Minerals & Chem. Corp. v. New Mexico Pub. Serv. Comm'n*, 280, 283, 466 P.2d 557, 560 (1970) (applying common-law rule that movant bears burden of proof to administrative proceedings); *Duke City Lumber Co. v. New Mexico Envtl. Improv. Bd.*, 95 N.M. 401, 402-03, 622 P.2d 709, 710-11 (Ct. App. 1980) (moving party has burden of proof); *Baca v. Bueno Foods*, 108 N.M. 98, 102, 766 P.2d 1332, 1336 (Ct. App. 1988) (parties seeking benefit of statute have burden of proving they are within its terms); *Dick v. City of Portales*, 116 N.M. 472, 863 P.2d 1093 (Ct. App. 1993) (Proceedings in administrative agencies are subject to the customary common-law rule that the moving party has the burden of proof.).

Under NMSA 1978, § 71-5-8, the Oil Conservation Division has the authority to enter an order to: (¶ B) prevent geothermal resources, water or other fluids from escaping from the strata in which they are found into other strata; (¶ F) require wells to be drilled, operated and produced in such a manner as to prevent injury to neighboring leases or properties and to afford reasonable protection to human life and health and to the environment; and (¶ M) to regulate the disposition

of geothermal resources or the residue thereof, and to direct the surface or subsurface disposal of such in a manner that will afford reasonable protection against contamination of all fresh waters and waters of present or probable future value for domestic, commercial, agricultural or stock purposes, and will afford reasonable protection to human life and health and to the environment. Under the OCD's Primacy Agreement with the EPA, the proposed wells are considered as Class V Injection wells. Therefore, EPA's UIC Class V regulations (40 CFR 144 through 147) apply.

Under 40 CFR § 144.12(a) ( Prohibition of movement of fluid into underground sources of drinking water), "No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons. The applicant for a permit shall have the burden of showing that the requirements of this paragraph are met."

### **The Proposed Injection will Contaminate Underground Water**

19.14.26.8.B NMAC states, "All waters of present or probable future value for domestic, commercial, agricultural or stock purposes shall be...adequately protected by methods approved by the division." Further, the May 29, 2009 Order of the Division, states (22) "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."

Despite the forgoing, and the presentation of evidence by Protestant at hearing in March, 2013 that there existed a hydraulic connection between proposed injection well LDG 55-7 and Protestant's State Well #1, the OCC concluded in its May 9, 2013 Order of the Commission that (12), "15. Los Lobos presented evidence that...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 waters)," and (15) "Los Lobos presented evidence that the fluid production zone in Well 53-7 and Well LDG 55-7 is the same and that the geothermal flow intervals occur in the same geological formations and are not

connected to the alluvial aquifer at 400 feet below ground surface in AmeriCulture, Inc.'s State Well No. 1." At that same hearing, Protestant presented testimony regarding protectable groundwater tapped by its "Federal Well" (OSE designations A-444/A-45-A-S-3) which lies within its 15 acres of deeded acreage, yet has considerably lower levels of fluoride (a known contaminant as per 20.6.2.3103) than waters within the outflow plume of the geothermal resource, an attribute that is important for its production of tilapia fish, which are physiologically affected by excessive fluoride concentrations.

Consistent with Protestant's testimony and contrary to Applicant's testimony, regional shallow ground water levels began rising sharply after injection commenced into well LDG 55-7, which can only be due to the hydraulic connection between the injection zone of LDG 55-7 and the shallow alluvial aquifer. Applicant reported to OCD the existence of, and progression of, the injection mound in shallow groundwater monitoring wells in its 2014 October Alluvial Geothermal Background BTV Report (Figures 12 through 17). Despite the prohibition against the migration of waters from between strata contained in 19.14.26.8.A NMAC, "...all fresh water strata...overlying the geothermal resources strata shall be sealed or separated to prevent the migration of fluids from one stratum to the other," OCD has not only failed to suspend injection of geothermal waters into well LDG 55-7, but appears to be receptive to the exacerbation of the situation by considering the injection of spent geothermal water directly into shallow groundwater through the newly proposed shallow injection wells: "Due to the observed upwelling of groundwater in the area along with the potential interest expressed by Cyrq in the relatively shallow injection of some percentage of spent geothermal waters from the power plant for an indeterminate period of time, the OCD is requiring the regular monitoring of groundwater quality and water levels. This letter is intended to provide Cyrq with direction in that regard." (Monitoring Letter, OCD to Applicant, dated May 14, 2015).

On January 21, 2014, shortly after the commissioning of the Applicant's power plant and corresponding injection into well LDG 55-7, Protestant collected water samples from the Federal Well in order to establish natural background water quality for that well. The water samples revealed concentrations for fluoride much less than typical of the geothermal outflow plume as well as a Total Dissolved Solids (TDS) level of 977 mg/l which that conformed with standards set for Domestic Water Supply as set forth in 20.6.2.3103.B NMAC. Beginning January 29,

2014; the Office of the State Engineer conducted regional water table measurements in several wells including the Federal Well. From its initial measurement, to the most recent water table measurement on May 12, 2015; the Federal Well has shown a 3.52 foot rise in water level resulting from the migration of water injected into well LDG 55-7 into the shallow alluvial aquifer. On July 20, 2015, Protestant collected water samples from the Federal Well to determine if the observed inundation of the well with water migrating from well LDG 55-7 had resulted, in part, in an unlawful rise above background for fluoride and an unlawful rise above Domestic Water Supply standards for other constituents, among them TDS. Protestant learned on August 22, 2015 that the analysis showed an 11.6% rise in TDS to a level of 1,090 mg/l, and a rise in fluoride above background, thus confirming that the Applicant's injection into well LDG 55-7 has indeed led to an unlawful violation of 20.6.2.3103 NMAC, "...will not result in concentrations at any place of withdrawal for present or reasonably foreseeable future use in excess of the standards of this section." The unlawful exceedance of background concentrations for known contaminant fluoride, and Domestic Water Supply standards for TDS, as well as a degradation in overall water quality in the Federal Well was caused by the flooding of the Federal Well water producing zone with geothermal effluent through the improperly cased injection well LDG 55-7. Since the Federal Well is currently being produced for both drinking water and aquaculture production purposes, the OCD should immediately suspend injection of geothermal waters into well LDG 55-7.

Regionally, the shallow geothermal outflow plume is heated naturally by an upflow of high fluoride geothermal source fluid having a modest flow rate into the Lightning Dock Geothermal system. The outflow plume projects north and characterized by elevated temperature, fluoride, silicate and chloride that originated in the upflowing geothermal fluid. The Applicants proposal involves direct pumping of the high fluoride source water and injection of the same water at a rate many times greater than the natural rate of upflow. As a result, a much greater weight of fluoride will be added to the outflow plume than exists today. Coupled with the inevitable increase in northerly water movement resulting from mounding of injected water, the horizontal extent of the outflow plume together with its chemical constituents, will increase resulting in exceedances above background for certain chemical constituents including fluoride.

## **The Proposed Injection Will Impair Correlative Rights**

According to the OCD's Geothermal Rules and Regulations, "CORRELATIVE RIGHTS shall mean the opportunity afforded, insofar as is practicable to do so, the owner of each property in a geothermal reservoir to produce his just and equitable share of the geothermal resources within such reservoir, being an amount, so far as can be practicably determined, and so far as can be practicably obtained without waste, substantially in the proportion that the quantity of recoverable geothermal resources under such property bears to the total recoverable geothermal resources in the reservoir, and for such purpose to use his just and equitable share of the natural heat or energy in the reservoir."

In prior documents, as well as in hearing testimony, Applicant has relied upon an overly-simplistic tabulation of overall lease acreage in an inadequate attempt to meet the burden of proof that their proposed activities will not impair correlative rights. Presently, Applicant holds two Federal Geothermal leases, NM-108801 and NM-34790, consisting of 640 acres and 2500.96 acres, respectively. Correlative rights pertain only to geothermal resources that can be both "practically determined" and "practically obtained without waste." There exists no evidence of practically obtainable geothermal underneath lease NM-108801. Furthermore, practically obtainable geothermal exists beneath only a minority portion of lease NM-34790, rendering an acreage-based correlative rights assessment untenable.

Except under the limited statutory exception contained within NM Stat § 71-5-2.1 (2013) for waters having temperature in excess of 250°F which are diverted for geothermal power production and returned to the same source without net depletion to the source, those diverting geothermal water in New Mexico for any purpose, including power production, must hold both a valid geothermal right and a water right approved by the New Mexico Office of the State Engineer (OSE) that is approved for the specified purpose. Applicant's only water right is approved for the limited use of "greenhouse irrigation, irrigation and related purposes" and thus Applicant holds no valid water right to produce geothermal fluid having a temperature of less than 250°F for geothermal purposes. Only two wells, well LDG 45-7 and well LDG 55-7, among the 3,454.55 acres of Federal and State geothermal leases, have demonstrated production temperature in excess of 250°F. Applicant well LDG 45-7 is used as a production well and well

LDG 55-7 as an injection well, thus only a single well exists among 3,454.55 acres of geothermal leases from which Applicant can practically obtain geothermal water.

As described more thoroughly below, Protestant holds a water right for Non-Consumptive Geothermal Power Production to Support Aquaculture and Agriculture, allowing for the diversion of up to 1,775.52 acre-feet of geothermal per annum from one or both of its State Geothermal wells, as well as a permit issued pursuant to 19.14.93.8 NMAC by the OCD for said power production. The associated geothermal water is practically attainable and is thus included in Protestant's correlative right. The proposed injection by Applicant would reduce Protestant's geothermal production temperature and thus impair Protestant's correlative right.

### **The Proposed Application Will Result in Waste**

The Commission and Division are charged with the prevention of waste under NMSA 1978, §71-5-7. 19.14.1.9 NMAC prohibits waste: "(A) The production or handling of geothermal resources of any type or in any form, or the handling of products thereof, in such a manner or under such conditions or in such an amount as to constitute or result in waste is hereby prohibited; and (B) All owners, operators, contractors, drillers, transporters, service companies, pipe pulling and salvage contractors and other persons shall at all times conduct their operations in the drilling, equipping, operating, producing, and plugging and abandoning of geothermal resource wells in a manner that will prevent waste of geothermal resources, and shall not wastefully utilize geothermal resources or allow leakage of such resources from a geothermal reservoir, or from wells, tanks, containers, or pipe, or other storage, conduit or operating equipment."

According to 19.14.1.7 NMAC, "Waste" shall mean any physical waste including, but not limited to, underground waste resulting from the inefficient, excessive or improper use or dissipation of reservoir heat or energy or resulting from the location, spacing, drilling, equipping, operation or production of a geothermal resources well in such a manner as to reduce or tend to reduce the ultimate economic recovery of the geothermal resources within a reservoir and surface waste resulting from the inefficient production, gathering, transportation, storage or utilization of geothermal resources and the handling of geothermal resources in such a manner

that causes or tends to cause the unnecessary or excessive loss or destruction of geothermal resources obtained or released from a geothermal reservoir.

In the April, 2013 hearing, Protestant's expert witness James Witcher testified that, based on regional heat flow, the Lightning Dock Geothermal resource is the result of an upflow of high temperature ( $\geq 300^{\circ}\text{F}$ ) geothermal fluid having limited flow rate into the Lightning Dock Geothermal system. The current application involves the production and reinjection of up to between 2,000 and 2,778 gpm of thermally-depleted water, which will result in the excessive loss of geothermal resources. During the 2013 hearing, OCD commented through its counsel David Brooks, that a decreased reservoir temperature would constitute waste, and this position was embodied in the Conditions of Approval for Order of the Commission R-13675 (4) "Geothermal Waste" includes...(...re injection of cold reservoir fluids back into the geothermal reservoir resulting in inefficient and/or decreased geothermal reservoir temperature(s))." This is exactly what will happen if the present injection well applications are approved.

### **The Proposed Application Will Impair Existing Senior Water Rights**

As stated herinabove, the Applicant's proposed injection will prematurely cool the geothermal resource. Protestant's geothermal production is located within the outflow plume of the geothermal resource its water temperature under production volumes is anticipated to be approximately  $232^{\circ}\text{F}$  based on the results of a previous flow test. AmeriCulture has a valid, licensed water right for Non-Consumptive Geothermal Power Production to Support Aquaculture and Agriculture that permits AmeriCulture to non-consumptively produce a continuous flow of 1,100 gpm from either/both its State Well #1 and State Well #2, through a small geothermal power plant, to a yet-future injection well (A-45-A-S-6) that has been approved by the division. The permit was issued in, and therefore has a priority date of, October 24, 2002. This permit is of substantial commercial value to AmeriCulture. Because of the dramatic impact of resource temperature on power generation using Binary, geothermal power generation equipment, particularly at lower geothermal temperatures, AmeriCulture would be harmed financially by even modest diminishment of resource temperature and such an impact would amount to impairment. The OCD is not authorized to endorse water impairment.

## **Ongoing Permit Violations and Enforcement Deficiencies**

Under the Conditions of Approval for Order of the Commission R-13675 (the Order) (4) “The operator shall assess the potential for the effluent...into Injection Well 55-7 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 55-7. OCD may require the operator to implement corrective action(s) if water quality exceeds...background at any place of withdrawal of ground water for the present or reasonably foreseeable future use. Protestant’s Federal Well is within one-half mile of Injection Well LDG 55-7. Applicant’s injection into well LDG 55-7 has caused (a) fluoride levels in the Federal Well, already above WQCC ground water standards as specified at 20:62.3103, to rise further; and (b) TDS levels, below Domestic Water Supply standards prior to the commencement of injection, to now exceed those standards.

The Order further states in (13) The operator shall comply with the...OCD’s Geothermal Regulations (Title 19, Chapter 14 NMAC). 19.14.26.8.A NMAC states, “...all fresh water strata...overlying the geothermal resources strata shall be sealed or separated to prevent the migration of fluids from one stratum to the other. Waters injected into well LDG 55-7 began immediately migrating into shallow groundwater; a fact known to Applicant well before the filing of their Geothermal Background BTV Report, in which they state, “The water table generally rose after commercial power production began.” Applicant then describes how, when injection was interrupted, they observed the water table in various wells drop. Applicant demonstrated that the injection of water into a well cased to 1,050 feet has rapid impact on shallow water levels demonstrating that waters are migrating from one stratum to another, thus violating 19.14.26.8.A NMAC.

The Order states in (14) that “The operator shall comply with the above Conditions or Approval or OCD may...terminate the operator’s injection permit.

## **Conclusion**

Applicant was issued Discharge Permit GTHT-001 on the premise of a closed-loop system in which thermally-depleted water would be returned to the same strata from which it

was originally produced to allow the re-heating and reuse of the water. For a period of five years, Applicant has endeavored to identify and develop injection wells bearing that description so as to allow for the closed-loop system they once envisioned. After having failed on three attempts to develop adequate injection wells (wells 47-7, 53-7 and 63-7), they applied for, and received a permit to, use a thirty-year old well LDG 55-7 as an injection well. Immediately upon the commencement of injection into well LDG 55-7, injected water began migrating into shallow ground water resulting in regional mounding and the contamination of Protestant's production well with fluoride above background and TDS above Drinking Water Standards. Now, after having failed yet another attempt to develop a suitable injection well (well 17-7), Applicant is asking the OCC to endorse a plan that will contaminate ground water regionally, waste geothermal resources, impair water rights, impair correlative rights, and reduce the ultimate economic recovery of the resource. The State of New Mexico has no obligation to compensate a private company that has failed to achieve its operational objectives through the issuance of improvident permits to the detriment of natural resources, long-standing businesses, and the interests of the citizens of New Mexico.

4. Witnesses:

Applicant may call the following witnesses to testify or rebut:

1. Damon Seawright, Ph.D.  
President  
AmeriCulture, Inc.  
25 Tilapia Trail  
Animas, NM 88020

Dr. Seawright may testify as both a fact and expert witness regarding aquaculture technology and business, the affairs of the AmeriCulture, Inc. business and/or any of the issues stated hereinabove. Dr. Seawright's testimony will require approximately 45 minutes and approximately 20 minutes will be required for rebuttal.

2. James Witcher  
Witcher and Associates  
2250 Missouri Ave.  
Las Cruces, NM 88001

Mr. Witcher may testify as both a fact and expert witness regarding geothermal, geology, and hydrology issues, and/or any of the issues stated hereinabove. Mr. Witcher's testimony will require approximately 45 minutes and approximately 20 minutes will be required for rebuttal.

3. Dan Hand  
Sustainable Engineering  
13801 120<sup>th</sup> St. E.  
Puyallup, WA 98374

Mr. Hand may testify as both a fact and expert witness regarding geothermal binary power generation. Mr. Hand's testimony will require approximately 30 minutes and approximately 10 minutes will be required for rebuttal.

4. Charles Jackson  
Deming, NM

Mr. Jackson may testify as both a fact and expert witness regarding water rights, the Animas Underground Water Basin, water law and water right impairment. Mr. Jackson's testimony will require approximately 20 minutes and approximately 20 minutes will be required for rebuttal.

5. Time to Present Case:

AmeriCulture estimates the time to present its case at three hours.

6. Procedural Matters to be Resolved Prior to the Hearing:

AmeriCulture, Inc. has none at this time of filing. However, based upon a review of the privileged document log produced in response to AmeriCulture's IPRA request to the OCD, AmeriCulture may request the hearing be vacated and reset in order to conduct discovery for production of certain documents, in particular those pertaining well construction and cement logs and water quality sampling

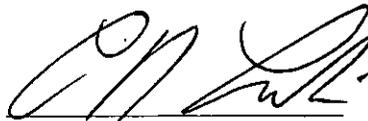
7. Protestant AmeriCulture's Position:

The Protestant opposes the Application because its belief that the proposed injection plan may endanger underground water, impair correlative water rights, waste geothermal resources, result in depletion of underground water resources and/or otherwise endanger its aquaculture business.

### CERTIFICATE OF SERVICE

I certify that on September 3<sup>rd</sup>, 2015, I served a copy of the forgoing document to all counsel of record.

Respectfully Submitted,  
LAKINS LAW FIRM, P.C.



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