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## Lahontan Regional Water Quality Control Board

March 27, 2020

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File Environmental Review  
Mono County

Governor's Office of Planning & Research

**MAR 27 2020**

**STATE CLEARINGHOUSE**

### **Comments on the Notice of Preparation of a Supplemental Environmental Impact Report for the Casa Diablo IV Project, Mono County, State Clearinghouse No. 2011041008**

Lahontan Regional Water Quality Control Board (Water Board) staff received the Notice of Preparation (NOP) of a Supplemental Environmental Impact Report (SEIR) for the above-referenced project (Project) on February 26, 2020. The NOP was prepared by Great Basin Unified Air Pollution Control District (GBUAPCD) and submitted in compliance with provisions of the California Environmental Quality Act (CEQA) in response to the State of California Third Appellate Court District's decision in Covington v. Great Basin Unified Air Pollution Control District (2019). The NOP limits the SEIR to the mitigation measure feasibility regarding fugitive reactive organic gas (ROG) emissions for n-pentane, the proposed working fluid for Casa Diablo IV Project. Water Board staff, acting as a responsible agency, has reviewed the NOP and associated documents and is providing these comments to specify the scope and content of the environmental information germane to our statutory responsibilities pursuant to CEQA Guidelines, California Code of Regulations, title 14, section 15096. Based on our review of the NOP, we have concern regarding potential impacts to surface and groundwater by n-pentane and would like clarification of the working fluid(s) proposed for the Casa Diablo IV Project.

#### **COMMENTS TO BE CONSIDERED IN ENVIRONMENTAL REVIEW**

1. Evans et al. (2004)<sup>1</sup> reported isobutane emissions from fumaroles and hot springs throughout the area of the Mammoth Geothermal Complex. The presence of isobutane was attributed to leaks within the heat exchanger(s) of the existing Mammoth Geothermal Complex, which allowed for the working fluid to

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<sup>1</sup> Evans, W.C., Lorenson, T.D., Sorey, M.L., and Bergeld, D., "Transport of injected isobutane by thermal groundwater in Long Valley Caldera, California, USA." Water-Rock Interaction-11. 1 Edition. Saratoga Springs, New York: Taylor & Francis (2004), Volume 1, p.125-129.

mix with the geothermal fluid prior to being injected into the geothermal aquifer. Isobutane detections were reported up to 10-kilometers (6.25 miles) east and approximately 1.4-kilometers (0.8 mile) west of the Mammoth Geothermal Complex (Evans et al., 2004)<sup>2</sup>. The occurrence of isobutane to the east was considered consistent with the geothermal hydrology; the occurrence of isobutane to the west of the Mammoth Geothermal Complex was unexpected and attributed to altered local hydrology as a result of the “high rate of injection” into the geothermal aquifer. **This information must be considered in the environmental analysis, particularly the fate and transport of working fluids in the subsurface.**

2. In the event of n-pentane being leaked from the proposed Casa Diablo IV Project, Water Board staff anticipate distribution of n-pentane within the Mammoth Geothermal Complex to occur similarly to the distribution of isobutane leaks noted by Evans et al. (2004)<sup>2</sup>. Of particular concern is the number of injection wells for the proposed Casa Diablo IV Project as shown on Figure 1-3 of the Environmental Impact Study/Environmental Impact Report (EIS/EIR) and the anticipated “high rate of injection” from this proposed well field. Water Board staff are concerned for the potential to introduce minute quantities of n-pentane from the geothermal systems into the shallow groundwater along the northern margins of the shallow water aquifer as identified by Howe et al. (2019).<sup>3</sup> Any discharge of n-pentane to waters of the state, either surface water or groundwater, as a discharge of waste and subject to regulation under waste discharge requirements issued by the Water Board. **The SEIR must identify and list the specific mitigation measures that will be implemented to prevent leaks of the working fluid to the environment. The mitigation measures should include the following: (1) procedures to identify and quantify n-pentane losses from the process, including both vapor and aqueous phase; (2) a monitoring program to monitor the geothermal resource for n-pentane pre- and post-injection; and (3) a monitoring program that includes an adequate number of groundwater monitoring wells to ensure the earliest detections of n-pentane in the shallow water aquifer.**
3. The EIS/EIR indicates n-pentane will be the working fluid for the Casa Diablo IV Project and includes a reference to a Material Safety Data Sheet for Pentane and Isomers, dated August 31, 2005 and prepared by Air Liquide.<sup>4</sup> The Notice of Preparation, dated April 1, 2011 and prepared by the GBUAPCD, included as the second document of Appendix 2 identifies isopentane as the working fluid to be

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<sup>2</sup> Evans, W.C., Lorenson, T.D., Sorey, M.L., and Bergeld, D., “Transport of injected isobutane by thermal groundwater in Long Valley Caldera, California, USA.” Water-Rock Interaction-11. 1 Edition. Saratoga Springs, New York: Taylor & Francis (2004), Volume 1, p.125-129.

<sup>3</sup> Howle, J.F., Evans, W.C., Galloway, D.L., Hsieh, P.A.Q., Hurwitz, S., Smith, G.A., and Nawikas, J., “Hydraulic, Geochemical, and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, Mono County, California, 2015–17, USGS, Open-File Report 2019-1063.

<sup>4</sup> Airgas, an Air Liquide company, Safety Data Sheet, Isopentane, April 17, 2018.

used for the Casa Diablo IV Project. The current Safety Data Sheet from Airgas (an Air Liquide company), dated April 17, 2018 identifies isopentane as a "Category 2 Long Term Aquatic Hazard."<sup>3</sup> Water Board staff are concerned that, should isopentane be leaked to the environment, impacts to groundwater and surface water could occur at locations where geothermal gases vent through fumaroles, hot springs, springs, along faults, and geologic contacts into surface waters which would rapidly cool fugitive gas to below the boiling point for isopentane or as the result of catastrophic failure of the storage tank(s). **The SEIR must identify all potential working fluids that may be used for the Casa Diablo IV Project and include an analysis of the potential impacts and hazards that these working fluids pose to all environment resources. Mitigation measures must be included in the SEIR to reduce all potential impacts to a less than significant level.**

4. The EIR/EIS, Section 2. Proposed Action and Alternatives, Mitigation Measure PHS-1 states the following.

"ORNI 50, LLC shall prepare emergency contingency plans, including a Spill or Discharge Contingency Plan, a Hazardous Gas Contingency Plan, and an Injury Contingency Plan, and submit these plans for technical review to the USFS, the BLM, the LVFPD, and the MLFPD prior to construction. The Spill or Discharge Contingency Plan shall be designed to apply to spills or other releases at all proposed facilities where potential water quality pollutants would be utilized or stored, including proposed geothermal fluid pipelines, the power plant, the substation, and other proposed facilities where fuels, oils, and other chemicals may be stored or utilized."

**Water Board staff request the opportunity to review and approve any contingency plans that address the containment and cleanup of any spills and/or discharges to the ground, surface water, and/or groundwater, as these spills and/or discharges have the potential to impact water quality.**

If you have any questions regarding this letter, please contact Jeff Fitzsimmons at (760) 241-4942 ([jeffrey.fitzsimmons@waterboards.ca.gov](mailto:jeffrey.fitzsimmons@waterboards.ca.gov)), Tom Browne (760) 241-7391 ([thomas.browne@waterboards.ca.gov](mailto:thomas.browne@waterboards.ca.gov)), or Jan Zimmerman, Senior Engineering Geologist at (760) 241-7376 ([jan.zimmerman@waterboards.ca.gov](mailto:jan.zimmerman@waterboards.ca.gov)).



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