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LVETAG Comments on Preliminary Staff Assessments for proposed Elmore North, Morton Bay, and Black Rock Geothermal Projects

Please see attached.

Additional submitted attachment is included below.

September 2, 2024

Re: Comments on Preliminary Staff Assessments for proposed Elmore North, Morton Bay, and Black Rock Geothermal Projects.

Dear CEC Commissioners and Staff:

Please find below comments on the Preliminary Staff Assessments for the proposed Elmore North, Morton Bay, and Black Rock geothermal projects, submitted by experts from Comite Civico del Valle's Lithium Valley Equity Technical Advisory Group.

The Lithium Valley Equity Technical Advisory Group collaborates with Comite Civico del Valle and the Lithium Valley Community Coalition on:

- Reviewing of the scientific and legal literature to guide the development of a research agenda for the expansion of a circular lithium economy based in the Imperial Valley, with requirements for environmentally responsible raw material sourcing, refinement, and product design that supports material recovery, reuse, and recycling;
- Surveying Lithium Valley stakeholders to identify priorities that can contribute to government and academic research goals, while emphasizing participatory research models for community engagement and action;
- Connecting technical support to strengthen environmental and health mitigation measures in the preparation of Imperial County's Lithium Valley Programmatic Environmental Impact Report for local stakeholders; and
- Executing research/analysis that can support community benefit projects and agreements, in addition to educational pathways for a skilled and trained workforce, including internships, apprenticeships, certificate, and degree programs for Imperial Valley residents.

We have been conducting community-engaged research on environmental justice issues relating to the development of Lithium Valley and hold expertise in a variety of related fields. We hope that our comments will be helpful in ensuring that any of the relevant proposed projects, including this one, are built in a just and sustainable way. In what follows we offer suggestions for further consideration and mitigation of impacts.

No Alternatives Fully Analyzed

- We appreciate that alternatives were considered for power plant cooling technologies to reduce water use, as well as buffers for Tribal cultural resources. However, these and other possible alternatives were not fully analyzed (California Energy Commission, 2024, section 8-1, p. 860; hereafter, page numbers of in-text citations refer to the pdf of the docket file for the Elmore North PSA unless otherwise specified).[1] If alternatives had been analyzed in more adequate

[1] California Energy Commission. (2024, June). *Elmore North Geothermal Project Preliminary Staff Assessment*. California Energy Commission. https://efiling.energy.ca.gov/GetDocument.aspx?tn=256843&DocumentContentId=92656

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detail, then it may have been possible to find more feasible approaches that would have attained the key project objectives. For instance, only one analogous buffer was considered and dismissed. The PSA should be revised to analyze other setback and site design alternatives, for instance if directional drilling may be used to avoid project siting so close to the Southeast Lake Cahuilla Active Volcanic Cultural District (SELCAVCD). Analyzing this alternative may provide opportunities to avoid and mitigate significant impacts to Tribal cultural resources.

Cumulative Impacts

- The list of projects for cumulative impacts is too narrow if it is intended to identify past, present, and probable future projects that are closely related either in time or location to the project. In particular, the list does not include the much grander scope of Lithium Valley Vision that has already been presented to the CEC, and which has been outlined in the Initial Study for the Lithium Valley Specific Plan and Programmatic Environmental Impact Report.
- The cumulative impacts list is missing broader Lithium Valley Vision plans, including more planned geothermal projects (BHE has publicly stated plans to double the current number of geothermal plants at the Salton Sea). It also omits inter alia:
    - BHE's pilot direct lithium extraction (DLE) plant with Oxy that has already been launched and approved by Imperial County
    - The geothermal plant operated by Cyrq at Hudson Ranch (the PSA documents mainly consider EnergySource Minerals, even though the PSA for Morton Bay mentions Cyrq's concerns about potential interference)
    - The other planned 6 out of 7 stages of CTR Hell's Kitchen
    - A proposed project by Phoenix Lithium
    - A proposed project by Falcon Ridge Lithium
    - A proposed project by Hypower Lithium
    - Battery manufacturing
    - Logistics industry, such as warehouses that are already factored into zoning changes
    - The proposed CalEthos data center
    - Additional solar projects, including some that have already been in the process of approval (e.g. Vega 6 and Perkins Renewable Project)
    - Proposed green hydrogen projects
    - Proposed biofuels projects, including Sugar Valley Energy, LLC's 49 MW biomass power plant combined with ethanol and biomethane/renewable natural gas production.
    - Imperial Irrigation District (IID) Temporary Colorado River System Water Conservation Project
    - Playa restoration projects aligned with the CNRA SSMP
    - Other geothermal and industrial development projects proposed or in operation throughout Imperial County, including those operated by other geothermal operators, such as Ormat
- The PSA must be revised to fully analyze the cumulative impacts of the project together with all the reasonably foreseeable projects listed above. Cumulative impacts to Tribal cultural resources, farmland of statewide significance, IID water, groundwater, subsidence, traffic, and air quality, among other issues described below, all should be more carefully considered and evaluated.

Environmental Justice

- The incomprehensive list of cumulative impacts is concerning given that the area already has disproportionate environmental burdens within and beyond the 6-mile radius.

- If this census tract is "among the worst of all tracts statewide in terms of threats related to hazardous waste generation and facilities" then how is this high percentile for hazardous waste exposure factored into analysis of cumulative impacts? What evidence is there to support the assertion that the project would not contribute significantly to hazardous waste generation (California Energy Commission, 2024, p. 842)?
- Similarly, if the "asthma percentile for this census tract is 99.25, meaning the asthma rate is higher than 99.25 percent of the census tracts in California" (California Energy Commission, 2024, p. 846), then how are cumulative impacts accounted for to mitigate this considerable environmental health affliction?
- The same could be said about the census tract scoring 99 percent in the Impaired Water Bodies category (see Table 6-4) (California Energy Commission, 2024, p. 852). If the threat to impaired water bodies in this census tract is already very high, how will significant cumulative impacts to the community and local wildlife be mitigated? The PSAs assert that the "project would not be expected to further impair local water bodies" (California Energy Commission, 2024, p. 852). This claim does not consider how water use required for the proposed project may reduce inflows to Salton Sea, making it further impaired. The PSAs must be revised to analyze impacts to the Salton Sea.
- Finally, it is promising for public benefit that school impact fees are included: "School Impact Fees Total Estimated Fees: $47,000 (Calipatria Unified School District)" (California Energy Commission, 2024, p. 857). This is a modest start for community benefits, and other provisions to consider may include broader impact fees tied more explicitly to project impacts, annual reviews through development agreements and community advisory committees, and community benefit agreements to ensure promises of sustainability and public benefits are enforceable.

Air Quality

- The determination of a less than significant localized cumulative air pollution impact with mitigations was based on only three stationary sources of pollution (see for example, Elmore North Geothermal Project Staff Assessment, section 5.1-33). More thorough modeling is needed to understand cumulative impacts and effectiveness of mitigations, including smaller stationary sources and mobile sources.
- The incomprehensive list of cumulative impacts also underestimates how these projects will affect the airshed in Imperial Valley and the broader Salton Sea region, which is already severely degraded. The Applicant has claimed that because geothermal power plants are not a source of inflow, their operation will not prevent IID from restoration efforts at the Salton Sea. However, this is precisely one of the most problematic aspects of these proposed projects for environmental justice communities: they would require water that may currently provide a source of inflow from other uses, such as agriculture. Thus, the proposed geothermal projects will indirectly impact air quality by exposing more lakebed and releasing more toxic dust into the air. This has become a public health crisis for community members near the Salton Sea where respiratory illnesses have spiked, due not only to air pollution from industrial agriculture and borderland transportation, but also non-combustion sources of ambient dust particulate matter.[2] The current

[2] R. Abman, E. C. Edwards, and D. Hernandez-Cortes, "Water, dust, and environmental justice: The case of agricultural water diversions," American Journal of Agricultural Economics, pp. 1–18, 2024, https://doi.org/10.1111/ajae.12472;
Biddle, T., Chakraborty, R., Li, Q., Maltz, M., Gerrard, J., & Lo, D. (2022). The drying Salton Sea and asthma: A perspective on a "natural" disaster. California Agriculture, 76, 27–36. https://doi.org/10.3733/ca.2022a0003;
Johnston, J. E., Razafy, M., Lugo, H., Olmedo, L., & Farzan, S. F. (2019). The disappearing Salton Sea: A critical reflection on the emerging environmental threat of disappearing saline lakes and potential impacts on children's health. Science of The Total Environment, 663, 804–817. https://doi.org/10.1016/j.scitotenv.2019.01.365;

analysis still fails to consider the broader impact on air quality caused by the buildout of this project as well as other geothermal plants and renewable energy infrastructure developments throughout Imperial County on the already receding Salton Sea.

- Moreover, Colorado River water cuts need to be considered among cumulative impacts for the proposed development of geothermal lithium on air quality. It is crucially important to include in cumulative impact analysis the IID's planned water conservation programs to mitigate prolonged drought of the Colorado River accelerated by climate change that have now been approved, as well as the high likelihood of future water cuts. These programs will divert several hundred thousands of acre-feet per year (AFY) of runoff that would usually reach the Salton Sea from the IID's drainage system.[3] Geothermal lithium development and water cuts will bring compounding problems that together will reduce inflows to the Salton Sea and result in even more dust pollution without strong mitigation measures in place.[4]
- Difficulty of breathing for shoreline communities is compounded by the high levels of fertilizer in the Salton Sea that have caused algal blooms, eutrophication, and lake emissions of hydrogen sulfide (H2S) that have released a "big stink" of rotten-egg odor exacerbated by mass die-offs of fish and birds.[5] Exposure to hydrogen sulfide emissions from geothermal plants is associated with an increase in hospitalization due to respiratory diseases, as well as nervous system disorders and cardiovascular diseases. The need for a robust hydrogen sulfide reduction system in geothermal energy development is well known. Even though the Applicant has designed abatement measures for H2S, models still show emissions exceeding thresholds, and this is a serious concern given the cumulative impacts of lake emissions of the gas that should be analyzed in a comprehensive manner.
- In addition to H2S, CEC staff analysis should also include impacts from hydrochloric acid, as well as emissions of other potentially hazardous Non-Condensable Gases (NCGs), such as radon and arsenic, which the Applicant estimated in data response disclosures. According to the Applicant, "arsenic is the predominant contributor to the project's cancer risks" at 67% per-pollutant or 12.6 per million at the PMI.[6] The Applicant has dismissed this chronic cancer risk based on maximum levels of exposure, but again this does not take into consideration cumulative impacts of the full buildout of Lithium Valley.
- The PSAs acknowledge that PM10 exceeds the U.S. EPA threshold of 5 µg/m3 for 24-hour impacts but claims that the distance for this project is adequate from fenceline communities. Nonetheless, the project must adhere to the Clean Air Act, which prohibits permitting projects that would cause or contribute to nonattainment of national ambient air quality standards (NAAQS). This needs to be considered in the context of other past, present, and projected projects, as well as non-combustion related sources like ambient particulate matter from dust

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Farzan, S. F., Razafy, M., Eckel, S. P., Olmedo, L., Bejarano, E., & Johnston, J. E. (2019). Assessment of Respiratory Health Symptoms and Asthma in Children near a Drying Saline Lake. International Journal of Environmental Research and Public Health, 16(20), Article 20. https://doi.org/10.3390/ijerph16203828

[3] Bureau of Reclamation. (2024, August 12). *FONSI and Final EA for IID*. https://www.iid.com/home/showpublisheddocument/22431

[4] Abman, R., Edwards, E. C., & Hernandez-Cortes, D. (2024). Water, dust, and environmental justice: The case of agricultural water diversions. *American Journal of Agricultural Economics*, 1–18. https://doi.org/10.1111/ajae.12472
Busse, M. M., McKibben, M., Stringfellow, W., Dobson, P., & Stokes-Draut, J. R. (2024). Impact of geothermal expansion and lithium extraction in the Salton Sea known geothermal resource area (SS-KGRA) on local water resources. Environmental Research Letters. https://doi.org/10.1088/1748-9326/ad6a73

[5] Cantor, A. (2021). Hydrosocial hinterlands: An urban political ecology of Southern California's hydrosocial territory. *Environment and Planning E: Nature and Space*, *4*(2), 451–474. https://doi.org/10.1177/2514848620909384

[6] Trujillo, J. (2024, May 24). *Elmore North Geothermal LLC Responses to The LV Equity Technical Advisory Group Comments on the ICAPCD PDOC*. https://efiling.energy.ca.gov/GetDocument.aspx?tn=256579&DocumentContentId=92388

pollution. More information is needed on how exactly cumulative impacts are accounted for here, including the full buildout of Lithium Valley that will bring other sources of particulate matter and air pollution more generally, including increased diesel truck emissions that will exacerbate respiratory illnesses due to oxidative stress from nitric oxide (NO).

- It is noteworthy that unlike the Applicant, the CEC staff do not dismiss the possibility of Valley Fever risks, stating: "Valley Fever Construction could disturb a certain percentage of approximately 3 acres of top soil that could harbor the Coccidioides spores, possibly exposing humans to the risk of Valley Fever." (California Energy Commission, 2024, p. 668). Imperial County's declaration of compliance that currently downplays Valley Fever risks should be consistent with CEC staff's assessment. Research in *Geophysical Research Letters* shows that dust storms in the southwest United States is increasing alongside the spread of incidences of Valley Fever.[7] The Applicant should monitor for Valley Fever causing spores during construction or other times with high levels of dust generation.

Climate Change and Greenhouse Gas Emissions / Efficiency and Energy Resources

- Analysis of greenhouse gas (GHG) emissions should take into account all aspects of the project, particularly high drilling demand, which Schenker et al. showed could increase climate change impacts of geothermal development projects by 30-41 percent.[8] Impacts due to drilling would be especially important to monitor if lithium extraction is added to these projects because more drilling may be required to maintain high concentrations of lithium amid the possible dilution of lithium concentrations in the deposit due in part to reinjection of spent brine.
- Comprehensive assessment of GHG emissions also needs to consider the nuances of power purchase agreements and possible brown energy consumption. The PSA for Elmore North states: "Combined Effects of Operation and Construction: 66,227 Emissions Avoided by Producing Electricity via geothermal resource-457,000; Total Net Emissions- 390,773" (California Energy Commission, 2024, p. 393). This assumes that energy provision will derive from geothermal power, but other projects in the Lithium Valley area have disclosed plans to use power from the grid as well, which may include natural gas or other fossil fuels in the energy mix. This would lead to higher net GHG emissions and public health impacts due to air pollution, so it is critical to include assessment of plans for energy provision early in the approval process in relation to cumulative impacts.
- There is no information about whether the Applicant plans to sell renewable energy credits from the proposed project, or buy the credits and retire them, or sell the electricity for renewable energy portfolio standard compliance. The Applicant should only be able to claim GHG emissions reductions if they can provide assurances that there is no unbundling of the environmental attributes from the energy and sale of these attributes into renewable certificate or offset schemes. The Applicant should provide assurances that they are not double counting GHG emissions reductions.

Hazards, Hazardous Materials/Waste, and Wildfire / Solid Waste Management

- Throughout the report, there are vague, unenforceable claims about recycling hazardous and non-hazardous solid waste. In some instances, the PSA suggests that this solid waste recycling will include filter cake or scaling material in addition to other waste, such as used oil. This would

[7] Tong, D. Q., Wang, J. X., Gill, T. E., Lei, H., & Wang, B. (2017). Intensified dust storm activity and Valley fever infection in the southwestern United States. Geophysical research letters, 44(9), 4304-4312. https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017GL073524

[8] Schenker, V., Bayer, P., Oberschelp, C., & Pfister, S. (2024). Is lithium from geothermal brines the sustainable solution for Li-ion batteries? *Renewable and Sustainable Energy Reviews*, *199*, 114456. https://doi.org/10.1016/j.rser.2024.114456

present a refreshing, circular approach to solid waste management, but no method for doing so is described in any detail. More evidence is needed to support this assertion (California Energy Commission, 2024, p. 12; 41).

- The applicant claims to recover some mineral byproducts, such as silica, iron, and manganese, but does not mention lithium. BHE's pilot DLE project with Occidental Petroleum has been publicly launched and approved; it should be considered in this analysis as well (California Energy Commission, 2024, p. 42) The PSA should be revised to include an analysis of how co-locating DLE with the proposed geothermal plant would lead to additional environmental impacts, and how these would be mitigated.
- In the event of contamination, a procedure is described to remove contaminated soils and/or groundwater, but this may introduce further impacts that would need to be mitigated. On-site remediation methods should be considered in the analysis as well to reduce impacts of hauling soil off-site (California Energy Commission, 2024, p. 580).
- The section on hazards, hazardous materials/waste, etc. does not adequately use the full list of projects for cumulative impact analysis (California Energy Commission, 2024, p. 584).

<u>Separate but related section on "Solid Waste Management" i.e. filter cake (California Energy Commission, 2024, p. 708)</u>

- This section indicates that solid waste would be recycled, but it seems to refer mainly to other waste besides the vast majority comprising filter cake (estimated 24,000 out of 24,121 tons) (California Energy Commission, 2024, p. 711). This needs clarification: "Solid waste generated during the project's construction and operational phases would be recycled to the greatest extent possible" (California Energy Commission, 2024, p. 708). The PSA must be revised to include clear estimates of how much waste can and will be recycled.
- Again, the PSA suggests that there will be recycling of solid waste but does not include details on the process for synthesis of filter cake or scale material, as well as secondary use applications (California Energy Commission, 2024, p. 712)
- If that vast majority (more than 99 percent) of solid waste is filter cake or scale material without any details provided about plans for recycling, then how is it possible for this project to meet the state's mandated goal of "50 percent of solid waste be diverted from landfills by the year 2000" (California Energy Commission, 2024, p. 714)?

Land Use, Agriculture, and Forestry

- A key unresolved issue is the Loss of Farmland of Statewide Significance. Converting this farmland would reduce the inflow to the Salton Sea, speeding up the recession of the sea and exposure of playa, leading to an indirect impact on air quality due to dust pollution.
- Any reduction of inflow to the Salton Sea must be considered a significant impact that is mitigated to the fullest extent, including means/incentives to reduce project-specific water demand, such as public benefit fees tied to a project's water usage to fund water conservation projects.
- There are also potential undetermined conformance with military use, IID water use, as well as existing and future geothermal facilities (California Energy Commission, 2024, p. 11; 609; 614; 619).
- To consider the cumulative impact on land use from this project, staff should include pipelines and gen-tie line infrastructure, as well as the project site itself and wells (California Energy Commission, 2024, p. 913).

Socioeconomics

- The proposed payment of school impact fees is a good first step, and other impact fees tied to impacts should be considered.
- The number of construction jobs does not seem to be consistent, ranging from a "maximum between 580 and 610 workers" (California Energy Commission, 2024, p. 44) and "an average of 293 workers and a peak of 636 workers in month 19" (California Energy Commission, 2024, p. 696).
- Temporary housing and facilities resembling construction camps (or man-camps) may bring more socioeconomic burdens rather than long-term benefits, and this should be mitigated in detail to avoid boom and bust problems common to extractive industries (California Energy Commission, 2024, p. 46).
- The PSA claims that approximately 80 percent of the construction workforce would be local, but there is no mechanism for ensuring this first source hiring, such as a legally binding project labor agreement or community benefit agreement (California Energy Commission, 2024, p. 696).
- If so much of the labor is temporary for construction, then more enforcement is needed to ensure that there are union agreements in place for the estimated 61 longer term jobs in operation and maintenance (California Energy Commission, 2024, p. 697).

Transportation

- Clarification is needed on what kind of roadway improvements are planned, and if the Applicant plans to use permeable material to mitigate impacts (California Energy Commission, 2024, p. 12)
- Now that other companies have pledged to use fleets of electric trucks in Lithium Valley, an explanation is needed as to why this mitigation is not included in this proposed project to reduce tailpipe emissions from the 26 delivery/haul truck trips per day for construction, as well as truck trips during operation (California Energy Commission, 2024, p. 737).

Water Resources

- The PSAs state that CEC staff have been given reassurance from IID on ability to supply water needed for the projects, but it was concerning to hear them say in the most recent workshop that they had been "left in the dark" and excluded from conversations between IID and the Applicant. Note that the water supply assessment falsely claims that the County of Imperial is the lead agency with responsibility to determine if water supply conditions are sufficient to approve (Jacobs, 2024, section 6-2, p. 35).[9] We urge CEC to closely examine the water supply assessments before approval as the actual lead agency.
- It remains unclear how the AFY do not surpass the 25,000 AFY apportioned for non-agricultural uses if other approved users are included, such as those projects that are listed among cumulative impacts that already surpass 6,380 AFY reportedly committed to other users (California Energy Commission, 2024, p. 12; 808). Through a personal communication, IID staff clarified that this figure includes two water supply agreements for Hudson Ranch Power I LLC and EnergySource Minerals, LLC, as well as one "will-serve" letter for Sugar Valley Energy, a stand-alone ethanol distillery, renewable cogeneration and biomethane and inorganic fertilizer feedstock plant. However, this does not include several of the projects that should be analyzed for cumulative impacts, including 6,500 AFY of freshwater estimated for Controlled Thermal Resources' Hell's

[9] Jacobs, L. (2024, June 14). *Elmore North Geothermal Project—SB 610—Water Supply Assessment (Revised Draft)*. California Energy Commission. https://efiling.energy.ca.gov/GetDocument.aspx?tn=256894&DocumentContentId=92708

Kitchen stage 1 project (200 for HKP1 operations and 6,300 for HKL1 operations).[10] This is even more problematic when we consider the Lithium Valley Specific Plan's projected use of water that should be considered in analysis of cumulative impacts as well. The CEC has already begun hosting workshops on the Lithium Valley Vision, and Imperial County has already estimated 100,000 AFY in its Initial Study for the Specific Plan, so it is no longer acceptable to treat these projects as "speculative" (California Energy Commission, 2024, p. 816).[11] These projects should all be thoroughly analyzed for cumulative impacts.

- Water supply questions are especially concerning in the context of the prolonged drought of the Colorado River accelerated by climate change. As the water supply assessment acknowledges, "Given the Colorado River conditions, the likelihood that IID will not receive its annual 3.1 MAF apportionment less QSA/Transfer Agreement obligations of Colorado River water is no longer low despite the high priority of the IID entitlement relative to other Colorado River contractors" (Jacobs, 2024, p. 35, section 6-2). The Colorado River drought conditions have already caused the IID to propose fallowing and other water conservation programs that are expected to conserve a maximum cumulative volume of 900,000 AF from 2024-2026.[12] Yet, water is urgently needed for ecological restoration projects to mitigate dust pollution at the rapidly receding Salton Sea. It is not acceptable for the water supply assessments to assert that the IID's water conservation programs will not affect the project because the projects plan to be in operation after 2026, or to assume no further regulatory cutbacks will be enforced. These Colorado River water cuts are increasingly likely, and they will have long-term cumulative impacts that need to be considered. These compounding constraints on water supply, which go beyond the immediate vicinity of the project, need to be mitigated.
- In some instances, the PSA claims that 50 percent of water will be recycled from steam condensate (California Energy Commission, 2024, p. 39-40). This seems highly questionable and may not be feasible given the need for a "heat sink" to absorb the great deal of thermal energy for each liter of water that needs to be condensed. The water supply assessment suggests that condensate generated would be used prior to using canal water with the notable exception of dilution water, yet volumetric flow rate of recycled water is not specified. Given the uncertain efficiency of the proposed condensation process, it is crucial to reference a pilot study that demonstrates its feasibility. Without such factual evidence, such claims are unlikely to be accepted by the technical community. While some alternatives like capping the service water pond or alternative power plant cooling technologies are mentioned, this assertion about recycling water is not described in any detail in the specific chapter devoted to water resources or the water supply assessments. Overall, a more detailed explanation is needed to support this claim.
- Elsewhere, the PSA suggests that water for the plant will primarily come from IID agricultural distribution canals, and this has serious implications for cumulative impacts given the IID's stated plans to conserve such water to mitigate the prolonged drought of the Colorado (California Energy Commission, 2024, p. 55). WATER-8 proposes to track water consumption, but simply tracking or reporting use may not help with mitigating this vexing problem that requires stronger limits (California Energy Commission, 2024, p. 814)

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[10] Chambers Group, Inc. (2023). *Final Environmental Impact Report for the Hell's KitchenPowerCo1 and LithiumCo 1 Project*.

[11] Dudek. (2023). *Initial Study: Imperial County Lithium Valley Specific Plan* (22–0001), p. 47.

[12] Imperial Irrigation District, & Environmental Science Associates. (2024). *IID 2024-2026 Temporary Colorado River System Water Conservation Project Draft Environmental Assessment* (LC-24–07). Bureau of Reclamation, U.S. Department of the Interior. https://usbr.gov/lc/region/g2000/envdocs/IID/00_FinalDraftEAIID_508ADAFinal.pdf

- Details are provided on brine pond management compliance with CRBRWQCB, but unlike the freshwater surface containment, it is not required to be covered, and further impact avoidance measures are necessary. In the August 1st, 2024 workshop held by CEC staff, BHE's consultants requested removing the condition of surface containment altogether, including freshwater. We urge CEC staff to closely consider how containment of both freshwater and brine may help mitigate environmental impacts before deciding on this request. It is worth noting that CalEnergy / BHE Renewables already agreed to pay a $910,000 penalty and conduct soil remediation as part of a 2007 consent agreement related to brine spills. The PSA also acknowledges release of approximately 410-gallons of brine from the JJ Elmore Power Plant as recent as September 6, 2022, so this significant environmental risk merits robust mitigation (California Energy Commission, 2024, p. 562). Mitigation is required to account for substantial risks from further spills of arsenic and lead-containing materials from blowouts, corrosion, abrasion, accidents and scaling. Covering the brine pond might help mitigate possible impacts to wildlife that could bypass the fence from risk of contamination from arsenic, lead and other metals in brine fluid (California Energy Commission, 2024, p. 300; 301).
- Again, claims of recycling seem to be exaggerated, not only regarding water from steam condensate, but also filter cake and solid waste generated from the brine pond. It remains unclear how exactly this potentially hazardous material will be recycled for beneficial use (California Energy Commission, 2024, p. 996). It may be possible to pursue more circular waste management strategies to divert this geothermal waste from landfills through technological innovations. For example, geothermal solid waste may be synthesized into mesoporous silica, which is a material that may be used in a variety of industries—including energy and mineral resources—as catalysts, adsorbents, ion exchangers, optic materials, and solar panels.[13] There are also a few preliminary examples demonstrating feasibility of the chemistry for synthesizing zeolites, which may serve as soil amendments for pollution remediation and water retention, from geothermal waste.[14] However, these methods have not been widely industrially applied or explored with differing waste streams, which may have regional differences that affect the final products. If measures are described more clearly and taken to prevent contamination, circular approaches to hazardous waste management might offer beneficial uses, including mitigation for soil contamination due to spills.

Geology / Seismic Activity

- The PSA's claims about the seismic potential and subsidence are ambiguous, in some instances described as presenting credible threats, and in others dismissed as low risk. Assertions that it is low need further evidence, especially if the project site is on expansive soil (California Energy Commission, 2024, p. 50; 80; 536)
- The claim that the project will not result in the loss of availability of a known mineral resource that would be of value to the region flies in the face of BHE's development of lithium extraction with Oxy (California Energy Commission, 2024, p. 540).

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[13] Watanabe, Y., Amitani, N., Yokoyama, T., Ueda, A., Kusakabe, M., Unami, S., & Odashima, Y. (2021). Synthesis of mesoporous silica from geothermal water. *Scientific Reports*, *11*(1), Article 1. https://doi.org/10.1038/s41598-021-03133-x

[14] Widayat, Hadiyanto, Satriadi, H., Cahyono, B., Astuti, W. I. S. T., & Febrianti, P. (2019). Synthesis of Zeolite X Molecular Sieve from Geothermal Solid Waste. Materials Today: Proceedings, 13, 137–142. https://doi.org/10.1016/j.matpr.2019.03.203

Sulardjaka, S., Nugroho, S., Iskandar, N., Adi, A., & Fitriyana, D. (2021). Zeolite A Synthesized from Geothermal Waste Using Conventional and Microwave Heating for the Hydrothermal Treatment. Fluid Dynamics & Materials Processing, 17(2), 385–395. https://doi.org/10.32604/fdmp.2021.011784

- The PSAs for these projects need to consider the potential impacts of adding lithium extraction facilities to these projects, especially now that the Applicant has publicly stated to the California Alternative Energy and Advanced Transportation Financing Authority that the Morton Bay project will include lithium extraction components.

Biological Resources

- There are several special status species of birds, fish and other wildlife in the project site area, and plans for geothermal construction and operation must be compatible with rather than delay or conflict with the urgent need for biological resource protection and wetland restoration at the Salton Sea.
- The PSAs acknowledge that rare bird species, such as Yuma Ridgway's rail, Western gull-billed tern, and black skimmer have nesting habitat in the project location (California Energy Commission, 2024, p. 205). It is critical to analyze impacts to aquatic bird species from the charging source of water used for habitat, and monitor water quality in the project area, as well as on mitigation sites.
- Please consider alternatives for deterrents to the use of brine ponds by avian species as part of the development and administration of a wildlife protection plan for special status species as a condition of approval. Operators should adhere to best practices to avoid power line avian electrocutions and collisions; include technical details and drawings for perch deterrents and other design features built into the project equipment and buildings. Cumulative impacts including related projects listed above need to be examined at an appropriate scale.
- The PSAs must disclose permitting requirements for de-watering already completed and planned and analyze impacts of drain interference on wetland ecosystems and special status species. It is remarkable that the proposed Morton Bay project is located in an area that was once a freshwater pond. Dewatering and loss of wetlands is a particular concern for protection of desert pupfish whose presence is presumed. As the PSAs note: "If dewatering of desert pupfish aquatic habitat is needed due to a high rainfall year, it would be considered a significant impact. Impacts to Red Hill Bay Drains could result in direct impacts to desert pupfish if the drains become inundated in the future. Production wells are proposed within the playa near the Salton Sea. Direct impacts could occur if fish were exposed to pipeline and well infrastructure during a flood event that results in entrapment and mortality" (California Energy Commission, 2024, p. 275). Clear threshold levels should be established that would prompt immediate actions in terms of monitoring data for drains associated with the desert pupfish and other sensitive species like Yuma Ridgway's rail. The Burrowing Owl Mitigation Plan should also consider impacts of changing uses of drains and canals, in addition to direct removal of vegetation, increased noise, dust pollution and human presence more generally.

Cultural and Tribal Cultural Resources

- The PSA must be revised to consider alternatives that avoid and mitigate significant impacts to Tribal cultural resources, particularly the Southeast Lake Cahuilla Active Volcanic Cultural District (SELCAVCD). It is unacceptable to simply call impacts to the viewscape "unmitigable" or "unavoidable" without full analysis of environmentally preferred alternatives, such as reduced project footprint, alternative location and site design, and adequate buffer zones.
- We appreciate that CEC staff has engaged members of the Kwaaymii, Agua Caliente, and Quechan tribes through email exchanges, Zoom meetings, and in-person field visits. The PSAs also show rigor in collection and description of archaeological and ethnohistorical data about relevant Tribal cultural resources. We commend CEC staff for calling for detailed documentation of the SELCAVCD, as a significant Tribal cultural resource for the purposes of CEQA, and

nominating it to the California Register of Historical Resources and National Register of Historic Places. The PSAs describe a process for the project owner to nominate and fund the work of a cultural anthropologist to carry out this work in coordination with the Kwaaymii Laguna Band of Mission Indians (care of Courtney Coyle), the Agua Caliente Band of Cahuilla Indians, and the Fort Yuma Quechan Tribe. However, it is important to avoid possible conflicts of interest that are not uncommon in cultural resource management on behalf of developers, and while funding and resources should be available for such work, priorities for mitigation need to be Tribally driven. This documentation, as well as preparation and implementation of a monitoring plan, might possibly help to increase protection from future impacts by limiting or altering future geothermal development in proximity to the cultural district, but it falls short of preventing or mitigating cultural and visual degradation of the impacts that are currently under consideration to a less-than-significant level.

- This documentation process for the cultural district may take several months or years, but more feasible mitigation measures can be incorporated now without rushing to approve projects as significant and unmitigable. Installation of exterior lighting that meets "Dark Sky Approval" may dim or redirect visual impacts, but it is not convincing that such "add-on" mitigation measures would reduce impacts to a level that would not influence cultural uses.
- It is significant that the construction lay down area for these projects is adjacent to Obsidian Butte (California Energy Commission, 2024, p. 33), which the PSAs acknowledge has served as "the major source of volcanic glass for the Colorado Desert and coastal southern California" (California Energy Commission, 2024, p. 404). According to the PSAs, "One outcropping is 0.07 mile from the closest construction laydown and parking area common to all three proposed geothermal projects" (California Energy Commission, 2024, p. 451). If part of the rationale behind not considering alternative locations is that the development needs to occur where the resources are located, this does not seem relevant to siting of staging grounds for construction. An alternative lay down area should be considered that offers more protection for Obsidian Butte and the rest of the Salton Buttes and volcanic features of SELCAVCD. Construction activities may contribute to the prospects of vandalism, theft, and damage to these cultural resources and the applicant does not appear to have a plan to manage the influx of people that will be accompanying the construction phase.
- Connectivity needs to be thoroughly analyzed and preserved along Tribal trails between and among features of the SELCAVCD, including the mud pots, mud volcanoes and the Salton Buttes. The PSA states that parts of the Salton Buttes, such as '"Paint Island" (now known as Red Island or Red Hill) and the now dried-up springs on it…once were mud volcanoes" (California Energy Commission, 2024, p. 425). They also note that the landscape is dynamic and constantly changing. Given the sacred and living state of sites in constant flux within this cultural landscape, alternatives should be fully considered to account not only for protection of particular features, such as mud pots or mud volcanoes, from future geothermal development but also to better understand and plan for "migrating of mud pots and mud volcanoes along their liniment, the sudden appearance or disappearance of a group of mudpots, and the constant building, collapse, and rebuilding of mud volcanoes" (California Energy Commission, 2024, p. 450). Local residents of fenceline communities are well aware of challenges of retrofitting infrastructure around these volcanic features, having observed how the nearby Niland Geyser has altered the course of the Union Pacific Railroad, California State Route 111, and other infrastructure. Failing to fully consider an environmentally preferred alternative risks: (1) breaking the connection between people and this sacred site; (2) limiting the transmission of cultural knowledge, heritage and patrimony; (3) causing further problems for the natural integrity of healthy ecosystems in and beyond the Sonny Bono Salton Sea National Wildlife Refuge; (4)

as well as the structural integrity of current and future possible infrastructure in the broader Lithium Valley area.

- Again, we appreciate that the PSAs include considerations of the viewshed, and we urge the CEC and the Applicant to seriously consider alternative site designs and buffer setbacks that might make the layout of the cooling towers less obtrusive to minimize visual impact from different perspectives. The PSAs dismiss a potential buffer but do not consider different Tribally determined distances for setbacks or alternate site designs that might mitigate impacts on the viewshed and remain feasible for the project. The example mentioned of a culturally appropriate setback of 11 miles from Zuni Salt Lake for a proposed coal mine may offer a relevant precedent, but it may not be the only possible distance that could be analyzed for feasible mitigation that might better protect a sacred place. Geothermal operators are already accustomed to directional drilling to access resources where they may not already be present, so it may be feasible to locate the project in a different location that might offer more protection while still sustaining the operation.

Finally, we are concerned that the Applicant requested removing conditions requiring a decommissioning plan in the recent CEC workshop. To achieve climate action goals and uphold environmental justice principles, it is critical not just to plan for a future transition to renewable energy, but also to mitigate hazardous impacts of abandoned infrastructures that may extend beyond the productive life of these projects.[15] Decommissioning of uncapped wells has already presented a significant unresolved challenge for sustainably phasing out fossil fuels, and abandoned geothermal wells could be future sources of air pollution and carbon dioxide leakage. California has an opportunity to lead the way toward addressing such problems in advance by holding extractive industries responsible from the start.

Sincerely,

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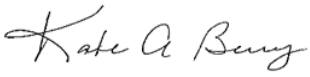

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