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August 31, 2023

Jerry Salamy
Jacobs
2485 Natomas Park Drive, Suite 600
Sacramento, California 95833

Data Requests Set 1 for Morton Bay Geothermal Project (23-AFC-01)

Dear Jerry Salamy:

Pursuant to Title 20, California Code of Regulations, section 1716, California Energy Commission (CEC) staff is asking for the information specified in the enclosed Data Requests Set 1, which is necessary for a complete staff analysis of the Morton Bay Geothermal Project (MBGP) under the Warren-Alquist Act and California Environmental Quality Act (CEQA).

Responses to the data requests are due to staff within 30 days. If you are unable to provide the information requested, need additional time, or object to providing the requested information, please send written notice to me and the Committee within 20 days of receipt of this letter. Such written notification must contain the reasons for not providing the information, the need for additional time, or the grounds for any objections (see Title 20, California Code of Regulations, section 1716 (f)).

If you have any questions, please email me at eric.veerkamp@energy.ca.gov.

/S/

Eric Veerkamp
Project Manager

Enclosure: Data Requests Set 1

**MBGP
DATA REQUESTS SET 1**

AIR QUALITY

Authors: Tao Jiang, Ph.D., P.E., Wenjun Qian, Ph.D., P.E., and Andres Perez

BACKGROUND: AIR DISTRICT REVIEW

The proposed project will require permits from the Imperial County Air Pollution Control District (ICAPCD). For purposes of inter-agency consistency, CEC staff needs copies of all correspondence between the applicant and the ICAPCD in a timely manner to stay up to date on any issues that arise prior to completion of the Preliminary and Final Staff Assessments (PSA and FSA).

DATA REQUESTS

1. Please provide copies of all substantive correspondence between the applicant and the ICAPCD regarding the project, including any application(s), supplemental information, including attachments or information referenced in correspondence, and e-mails. Please provide all existing records in accordance with the requirements of title 20, California Code of Regulations, section 1716. This is a continuing request, requiring ongoing submission of relevant correspondence. Please provide correspondence no more than one week from the date it is created or received. This request is in effect until staff publishes the PSA and FSA.
2. Please provide a copy of the permit application that was submitted to the ICAPCD.

BACKGROUND: EMISSION CALCULATION SPREADSHEETS

Appendices 5.1A, 5.1B, and 5.1D of the Application for Certification (AFC) (TN 249726) contain tables with estimates of the project's operational and construction emissions (Appendices 5.1A and 5.1D) as well as tables showing the model inputs used in the project's air quality impact analysis (Appendix 5.1D). CEC staff requires spreadsheet versions of the tables contained in the appendices, with live, embedded calculations, to complete the analysis.

DATA REQUESTS

3. Please provide spreadsheet versions of the tables listed in Appendix 5.1A and Appendix 5.1B, with live, embedded calculations
4. Please provide spreadsheet versions of the tables listed in Appendix 5.1D, with live, embedded calculations. Please also provide a construction schedule showing the estimated start and end dates of each construction phase, the type of equipment used during each phase, the operating time of each equipment type during each phase, and the number of each equipment type used.

BACKGROUND: EMERGENCY DIESEL ENGINES

The proposed project would install six emergency standby diesel fueled engines, including one fire water pump and five emergency generators. The diesel fire pump engine would be a Tier 2-certified unit, and the five emergency generators would be

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compliant with Tier-4 emission standard through the use of a selective catalytic reduction (SCR) control device, diesel particulate filter, and diesel oxidation catalyst. Staff needs vendor documentation to verify the diesel engines' emission factors. In addition, staff needs the justification for the use of Tier-2 fire pump engine.

DATA REQUESTS

5. Please provide the vendor documentation to verify the emission factors for the diesel fire pump engine and the five emergency generators.
6. Please indicate if a Tier-4 fire pump is available for the project. If available, please justify the use of the proposed Tier-2 engine over a Tier-4 engine.

BACKGROUND: MOBILE TESTING UNIT MODELING

Page 5.1-40 of the AFC (TN 249723) states that the mobile testing unit (MTU) was not included in the modeling analysis due to its use at various (i.e., temporary) well locations throughout the project site for only a limited number of hours. The AFC also states that the emissions from MTU operation would be minimal and less than emissions from the production testing units (PTUs) and rock muffler (RM). However, pages 3 and 4 of 176 of Appendix 5.1A (TN 249726) show that the hourly and first year annual emissions of the MTU would be higher than those of the PTUs. In addition, page 3 of Appendix 5.1A shows that the MTU would operate 2,160 hours and 2,640 hours per year for production well testing and injection well testing respectively, which would be 10 times more than the PTU operation. CEC staff needs an impact analysis of the MTU with other emission sources modeled previously to complete the analysis.

DATA REQUEST

7. Please provide a revised impact analysis to include the MTU with other emission sources modeled previously. The analysis to be revised would include but not be limited to the hydrogen sulfide (H₂S) impact analysis and the nitrogen deposition modeling analysis.

BACKGROUND: HYDROGEN SULFIDE MODELING RESULTS

Table 5.1-30 of the AFC (TN 249723) shows the maximum modeled H₂S concentration to be 39.6 µg/m³. However, the modeling files provided by the applicant show that the maximum modeled H₂S concentration would be 369.5 µg/m³. CEC staff also performed an independent H₂S modeling at the sensitive receptors used in the health risk assessment (HRA). The maximum H₂S concentration from staff's independent modeling is 51.5 µg/m³ at sensitive receptor number 5,897 (shown on page 10 of 40 in TN 249733). Staff needs clarification regarding the difference in the modeled H₂S results shown above and the location of the modeled result of 39.6 µg/m³ shown in Table 5.1-30.

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DATA REQUEST

8. Please clarify the difference in the modeled H₂S results shown above and provide the location of the modeled result of 39.6 µg/m³ shown in Table 5.1-30.

BACKGROUND: COOLING TOWER MODELING

Page 50 of 176 of Appendix 5.1A (TN 249726) and the applicant's modeling files indicate that the applicant modeled the H₂S emissions of 5.57 pounds per hour (lbs/hr) for the cooling tower during routine operations. However, Table 5.1-11 on page 5.1-20 of the AFC (TN 249723) and page 3 of 176 of Appendix 5.1A (TN 249726) show that H₂S emissions would be much higher during sparger bypass (84.2 lbs/hr) and biological oxidation box bypass (57.2 lbs/hr).

CEC staff believes that a worst-case impact analysis should consider the higher emission scenarios.

DATA REQUEST

9. Please update the H₂S impact analysis with the worst-case emission rates for the cooling tower.

BACKGROUND: NITROGEN DEPOSITION MODELING

Page 50 of 176 of Appendix 5.1A (TN 249726) and the applicant's modeling files indicate that the applicant modeled the HNO₃ emissions of 228 grams/second for each of the 14 point sources defined for the cooling tower. That would result in a total HNO₃ emissions of 25,333 (=228×3,600/453.6×14) lbs/hr or 110,960 (=25,333×8,760/2,000) tons per year (tpy). If this were derived from the NH₃ emissions, the equivalent NH₃ emissions would be 6,836 (=25,333×17/63) lbs/hr or 29,942 (=6,836×8,760/2,000) tpy. CEC staff is not able to find such high emission rates in the application. Staff needs to understand how the HNO₃ emissions were derived.

DATA REQUESTS

10. Please provide spreadsheet versions of the tables showing how the modeled emission rates for nitrogen deposition were derived, with live, embedded calculations.
11. Please update the nitrogen deposition modeling if necessary.

BACKGROUND: CUMULATIVE MODELING

Page 5.1-45 of the AFC (TN 249723) states that both 24-hour and annual PM_{2.5} predicted concentrations during project operation exceed their respective Significant Impact Level (SIL) and will, therefore, require a cumulative modeling analysis. Page 5.1-50 of the AFC states that 1-hour and annual NO₂, 24-hour and annual PM₁₀, and annual PM_{2.5} predicted concentrations during construction exceed their respective SIL and will, therefore, require a cumulative modeling analysis. In addition, page 5.1-43 of the AFC also mentioned a cumulative impacts analysis to include the project with new

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or modified sources (individual emission units) that would cause a net increase of 5 tpy or more per modeled criteria pollutant within a 6-mile radius that have received construction permits but are not yet operational or are in the permitting process.

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12. Please provide an update on the cumulative impacts analyses mentioned in the AFC.
13. Please provide the modeling files if they are available for review.

BACKGROUND: OFFSET PROPOSAL

The applicant proposed Best Available Control Technologies (BACT) to mitigate the particulate matter emissions from the cooling tower and the H₂S emissions from the geothermal stream, as shown in Table 5.1-21. Staff generally recommends that emissions from the nonattainment pollutants and their precursors be offset in addition to BACT. While CEC staff believes that the ozone nonattainment situation in Imperial County is directly attributable to pollutant transport and so staff is not currently recommending offsets for ozone precursors, staff believes that PM₁₀ attainment problems in the ICAPCD are more attributable to the man-made emissions occurring within Imperial County, so offsets from within the County would provide substantive mitigation. Staff needs additional information from the applicant for available PM₁₀ offset/mitigation proposal.

Additionally, the hydrogen sulfide offsets were considered necessary due to the potential direct emission impacts and the potential for the project to create new exceedances of the California Ambient Air Quality Standard for hydrogen sulfide. CEC staff needs more detailed information from the applicant on how the proposed project will reduce emissions to eliminate the potential for project or cumulative hydrogen sulfide impacts.

DATA REQUESTS

14. Given staff's recommendation to offset all nonattainment pollutant and their precursors by a minimum 1:1 ratio, please provide a PM₁₀ offset proposal or clear rationale why the PM₁₀ offset is considered unnecessary.
15. Please identify how the proposed project will eliminate the potential for project or cumulative hydrogen sulfide impacts.

ALTERNATIVES

Authors: Jeanine Hinde, Jacquelyn Record, Wenjun Qian, James Ackerman, and Kenneth Salyphone

BACKGROUND: ALTERNATIVE PROJECT SITES

Section 6.3 of the application, "Power Plant Site Alternatives," generally discusses the reasons why the MBGP is proposed for siting in the Salton Sea Known Geothermal Resource Area (KGRA).

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DATA REQUEST

16. Please describe other potential sites that were considered for the MBGP, either in the Salton Sea KGRA or any of the other KGRAs in Imperial County. Please describe the locations of any sites initially considered and specific reasons why those sites were rejected.

BACKGROUND: POWER PLANT COOLING ALTERNATIVE

In section 6.5.2 of the application, it states that the project would “require the use of a cooling tower to condense steam from the steam turbine.” Section 5.15 states that process water for the proposed project would require approximately 5,560 acre-feet per year (AFY) from the Imperial Irrigation District (IID) canal. (Water taken from the IID canal for the Morton Bay, Elmore North, and Black Rock geothermal projects would total approximately 13,000 AFY.)

IID’s Interim Water Supply Policy for Non-Agricultural Projects (IID 2009) states that IID may conserve and set aside up to 25,000 AFY for non-agricultural use within its service area. A proposed water user has options for funding and implementing a different means of securing water, subject to approval by IID. Options include water conservation or water storage projects or using an alternative source such as recycled water. As of July 2023, a total of 5,380 AFY has been committed to some users, leaving up to 19,620 AFY that may be made available to new non-agricultural projects by implementing conservation and efficiency measures (CEC 2023). The combined annual operational water demand of the three proposed geothermal projects constitutes two-thirds of the available non-agricultural water that may be set aside. In a May 22, 2023, letter to the U.S. Bureau of Reclamation (Reclamation), the lower Colorado River basin states (California, Arizona, and Nevada) proposed a plan (Lower Basin Plan) to conserve at least 3 million AFY of water deliveries between 2023 and 2026, with 1.5 million AF in 2024 (Lower Division States 2023). According to a Holtville Tribune article (Holtville Tribune 2023), IID announced increasing water conservation to 250,000 AFY as part of the Lower Basin Plan, voluntarily reducing its water use to 2.85 million AFY. It is not certain how the Lower Basin Plan will affect future IID non-agricultural water deliveries.

Regardless of Lower Basin Plan conservation efforts, water demand can be expected to grow due to future development and continue to exceed the Colorado River basin’s ability to supply water. In 2022, releases from Hoover Dam totaled 8,742,390 AF (Reclamation 2023), which would be a deficit of 257,610 AF when compared to total lower basin water user allotments (9.0 million AFY) based on treaties and agreements known as the “Law of the River” (Reclamation 2023). Given that IID’s water allocations of 3.1 million AFY amount to 70 percent of California’s total Colorado River water allotment (greater than any other state or Mexico), combined with the fact that future conflicts over Colorado River water rights are highly anticipated, it seems doubtful that IID’s water set aside will be reliable for the life of all three projects.

The applicant proposes the use of a crossflow cooling tower with seven sections. An alternative cooling technology using an air-cooled condenser (ACC) is discussed in

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section 6.5.2 of the application. However, other alternative cooling systems are available, such as an augmented adiabatic cooling system used in large-scale data centers (up to 99 MW capacity) in the Silicon Valley area. An augmented adiabatic cooling system is known as an evaporative pre-cooling system which pre-cools the incoming ambient air into an ACC with either a water fogging system or an evaporative pad. Pre-cooling the ambient air would reduce the ambient air temperature prior to reaching the condenser, during hot days, providing better heat exchange and increasing cooling capacity efficiency. Furthermore, it would use less water than the traditional cooling tower and less electricity to operate than a traditional ACC during hot days. However, this system can lead to particulate matter emissions.

DATA REQUESTS

17. Please describe and analyze an augmented adiabatic cooling system project alternative. Include its water use requirements, assess its potential feasibility, and describe its ability to attain the project objectives.
18. Staff requests data on particulate emissions to determine whether the alternative cooling system would have less impacts on air quality compared to the proposed cooling tower. For the alternative cooling system, please estimate the associated particulate matter (PM10) emissions.

REFERENCES

- CEC 2023 – California Energy Commission (TN 252077). Report of Conversation re: Remaining Non-Agricultural Project Set-Aside for 2023, dated August 31, 2023. Available online at:
<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-AFC-01>
- Holtville Tribune 2023 – IID Comments on Lower Basin Plan for Colorado River & Lake Mead Water Conservation. May 22, 2023. Available online at:
<https://holtvilletribune.com/2023/05/22/iid-gm-comments-lower-basin-plan-for-colorado-river-lake-mead-water-conservation/>
- IID 2009 – Imperial Irrigation District. IID Interim Water Supply Policy for Non-Agricultural Projects. Adopted September 9, 2009. Available online at:
<https://www.iid.com/home/showpublisheddocument/9599/638108689553970000>
- Lower Division States 2023 – Colorado River Basin States Representatives of Arizona, California, and Nevada. Letter to the U.S. Bureau of Reclamation proposing the Lower Basin Plan. May 22, 2023. Available online at:
<https://doi.gov/sites/doi.gov/files/lower-basin-plan-letter-5-22-2023.pdf>
- Reclamation 2023 – U.S. Bureau of Reclamation. Calendar Year 2022, Colorado River Accounting and Water Use Report: Arizona, California, and Nevada, Interior Region 8: Lower Colorado Basin. May 15, 2023. Available online at:
<https://www.usbr.gov/lc/region/g4000/4200Rpts/DecreeRpt/2022/2022.pdf>

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BIOLOGICAL RESOURCES

Author: Andrea Stroud

BACKGROUND: CLASS II SURFACE IMPOUNDMENT (BRINE POND)

The AFC (TN249723) discusses a Class II surface impoundment also called a brine pond. According to the AFC, the brine pond would receive “aerated process fluid, geothermal fluid from unplanned overflow events, and geothermal fluid from the partial draining of clarifiers during maintenance events”. In addition, the brine pond “stores solids that have either precipitated or settled out of the geothermal fluids” and “hold fluids generated during emergency situations, maintenance operations, and water from hydro blasting, safety showers, and eye wash stations, vehicle wash station effluent, water from the plant conveyance system, and reject water from reverse osmosis. The brine pond collects geothermal fluid from wells during flow-testing, after drilling maintenance, and from startup.” The brine pond would be of earth construction with a concrete surface and have two feet of freeboard.

There is no discussion of the water quality of this brine pond, although based on the fluids that would be contained within it, it is expected to be toxic. In addition, there is no discussion as to the impacts this would have on special status wildlife and birds. The information provided includes no mention of any enclosure, cover, or netting over this brine pond to protect special status wildlife, particularly birds, from gaining access. Although similar facilities have perimeter fencing, mammals such as desert kit fox and coyotes, have found ways into facilities. There is no discussion of the pond containing escape ramps to allow birds or other species of wildlife to escape. Desert kit fox and other species have been known to be trapped and drown in surface water impoundments.

DATA REQUESTS

19. Please confirm the toxicity of the expected water quality of the brine pond.
20. If the brine pond liquid contains chemicals that can harm and kill special status wildlife, please explain how the wildlife would be prevented from gaining access to this pond and what physical features such as escape ramps are proposed.
21. Please provide a description of the impacts this brine pond would have on special status wildlife and any mitigation measures that would be necessary to minimize significant impacts.

BACKGROUND: ATMOSPHERIC FLASH SYSTEM

The AFC (TN 249723) mentions an atmospheric flash system which “lowers the fluid pressure from the LP crystallizer to atmospheric pressure conditions. Fluid from the LP crystallizer discharges into the Atmospheric Flash Tank (AFT). Fluid from the AFT flows by gravity to the primary clarifier. The steam from the AFT is discharged to the dilution water heaters and excess steam is vented to atmosphere.” It is this steam from the AFT vented to the atmosphere that is of concern.

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Steam vented to the atmosphere is not discussed in the AFC. In CEC staff's Data Adequacy Recommendation (TN 250066), dated May 8, 2023, staff requested more information on steam venting such as how high and how often the venting occurs; however, the applicant's response only contained a description of the steam flashing and that it would not impact wildlife species.

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22. Please provide information on the expected temperature of the steam vented to the atmosphere.
23. Please provide information on the approximate height of the steam that vents into the air, how often this event occurs, and how long the venting occurs.
24. Please provide a description of the impacts this vented steam would have on avian species that may encounter this steam and any mitigation that would be necessary to minimize significant impacts.

BACKGROUND: VEGETATION MAPPING

The Biological Resources Section of the AFC (TN 249723) discusses vegetation communities in the biological survey area and classified the vegetation communities using *Landcover Descriptions for the Southwest Regional Gap Analysis Project* (NatureServe 2004). This document is from the Southwest Regional Gap Analysis Project that covers Arizona, Colorado, Nevada, New Mexico, and Utah but not California. Since California was not included, this vegetation community mapping reference is not applicable for the project survey area. In addition, the California Department of Fish and Wildlife (CDFW) has specific guidelines for the mapping of natural communities.

The CDFW guidance is found here, <https://wildlife.ca.gov/data/vegcamp/natural-communities> along with protocols for surveying and evaluating impacts to special status native plant populations and natural communities. The goal is to identify all natural communities using the best means possible. These should be identified and described in accord with *A Manual of California Vegetation*, Second Edition (Sawyer et al. 2009) or in classification or mapping reports from the region, if applicable. Available on the VegCAMP's Reports and Maps page here (<https://wildlife.ca.gov/Data/VegCAMP/Reports-and-Maps>). This page breaks down the reports by regions. The proposed project would fall under California Deserts. While there are regional maps from the Desert Renewable Energy Conservation Plan (DRECP) that cover the project area for the desert region, these maps are not detailed enough. Therefore, the applicant should only use the DRECP maps for preliminary high-level identification and then use *A Manual of California Vegetation*, Second Edition to develop more specific natural community mapping for the biological survey area.

It is important to use the proper natural community mapping guidance and protocol to ensure sensitive natural communities and the special-status species that may occur within are not overlooked or missed.

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25. Please provide vegetation community mapping using *A Manual of California Vegetation*, Second Edition (Sawyer et al. 2009) for the biological survey area. Pursuant to these mapping refinements, applicant should be prepared to answer subsequent data requests relative to avoidance and mitigation techniques and measures, if necessary for state waters or species/habitat not previously identified.
26. Please include descriptions of the communities and the dominant and subdominant plant species as well as any associated plant species for each vegetation community found in the biological survey area.

REFERENCES

- NatureServe 2004. Landcover Descriptions for the Southwest Regional Gap Analysis Project. September 10
- Sawyer et al., 2009. A manual of California vegetation. John O. Sawyer, Todd Keeler-Wolf, Julie M. Evan. 2nd ed. p 1300

CULTURAL AND TRIBAL CULTURAL RESOURCES

Author: Cameron Travis

BACKGROUND: INCORRECT SOURCE CITATION AND REFERENCE

The Cultural Resources section of the AFC contains numerous source citations in the text and the bibliographic entries to match. Although the completeness of this information is high, staff identified an incorrect source citation and reference. Resolving this gap in the AFC will enable CEC staff and other interested parties to better understand the factual basis for the applicant's analysis.

In its discussion of railroad development in Imperial and San Diego counties, the AFC cites "Crawford, n.d." (Jacobs 2023a, page 5.3-11). The accompanying cultural resources report cites "Crawford, 2010" in the same discussion (Jacobs 2023d, page 28). The References in the AFC section and cultural resources report both contain a bibliographic entry for "Crawford, Richard" dating to 2010 (Jacobs 2023a, page 5.3-43; Jacobs 2023d, page 69). Staff followed the URL given in the references cited and the article contains no mention of railroad development, instead finding a treatment of the San Diego Aqueduct.

DATA REQUEST

27. Please provide a source applicable to the San Diego and Arizona Eastern Railroad's history.

BACKGROUND: LOCATION OF MAKEUP WELLS

The AFC identifies 20 wells as part of the proposed MBGP; Data Adequacy Response Set 1 also identifies the location of a backup well pad as the future location for two makeup

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wells that could be drilled during the MBGP's operational life to maintain full capacity (Jacobs 2023a, page 2-9 and Jacobs 2023u. AFC Figure 2-7b, however, depicts two wells that do not appear on other figures in the document.

DATA REQUESTS

28. Please describe the wells labeled 19-1 and 19-2 in the AFC (Jacobs 2023a, Figure 2-7b)
29. Depending on the description of the two wells mentioned in the previous data request, what route would the associated hot brine line (see Jacobs 2023a, Figure 2-7b) take to the MBGP?
30. Have qualified cultural resource specialists surveyed the associated hot brine line for the presence of cultural resources, as described in Appendix B to the CEC's Siting Regulations?

BACKGROUND: ARCHAEOLOGICAL SURVEY COVERAGE

Qualified archaeologists were able to survey most of the archaeological study area for the presence of archaeological resources. A sizable portion of the applicant's archaeological study area was inaccessible because it was fenced off or underwater. This means that no archaeological survey was conducted in these areas; however, a significant portion of the inaccessible area is part of the proposed primary MBGP facility. This area would be subject to significant ground disturbance.

The applicant estimates that the excavation depth at the main power plant site and well pads would reach 5 feet below the current ground surface (Jacobs 2023a, Figure 2-7a). Altogether, inaccessible portions of the archaeological study area encompass about 110 acres out of the 2,068-acre archaeological study area (5.3 percent); however, the majority of this acreage is located within the footprint of the proposed power plant site. Additionally, four portions of the applicant's archaeological study area had effectively no ground surface visibility. Agricultural crops covered the ground surface in these areas to such an extent that only 10 percent or less of the surface was visible to archaeologists (Jacobs 2023d, Figure 6-5).

The lack of accessibility in these areas of the proposed project calls into question the completeness of the archaeological survey and site control. The proposed project site is near three recorded cultural resources.

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31. Please indicate when qualified archaeologists will have access to currently inaccessible portions of the archaeological study area
32. Please indicate when the crops will be harvested from the low-visibility portions of the archaeological study area
33. Please direct qualified archaeologists to survey the currently inaccessible portions of the archaeological study area after access has been gained

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- a. Space survey transects at 33–50-foot intervals
 - b. Report survey methods and results in an addendum to the cultural resources report and section of the AFC
 - c. The archaeologists shall record any cultural resources identified as a result of the survey on the appropriate Department of Parks and Recreation 523 forms
 - d. Submit any sensitive cultural resources information, such as the location of archaeological resources and tribal cultural resources, under request for confidential designation
34. Please direct qualified archaeologists to resurvey the low-visibility portions of the archaeological study area after crops have been harvested and ground surface visibility is improved
- a. Space survey transects at 33–50-foot intervals
 - b. Report survey methods and results in an addendum to the cultural resources report and section of the AFC
 - c. The archaeologists shall record any cultural resources identified as a result of the survey on the appropriate Department of Parks and Recreation 523 forms
 - d. Submit any sensitive cultural resources information, such as the location of archaeological resources and tribal cultural resources, under request for confidential designation

BACKGROUND: SOURCES CONSULTED DURING THE RECORDS SEARCH

The applicant conducted a records search at the South Coastal Information Center (SCIC) of the California Historical Resources Information System (CHRIS) on March 23, 2022. The records search covered the proposed MBGP and a 1.0-mile buffer around all proposed project elements except for transmission lines, to which a 0.5-mile buffer applied. The records search included examinations of the SCIC's base maps of previous cultural resource studies and known cultural resources. (Jacobs 2023a, page 5.3-16; Jacobs 2023d, page 36.) In addition to the SCIC's base maps, the CHRIS Data Request Form indicates that other sources of information are available to the researcher. Of particular interest to CEC staff are the following sources of information, which staff has not located in the AFC:

- The Office of Historic Preservation's (OHP's) Built Environment Resources Directory
- The OHP's Archaeological Resources Directory
- *California Inventory of Historic Resources*
- The California Department of Transportation's Bridge Survey. (CHRIS 2020, page 3.)

DATA REQUEST

35. Please provide copies of the results of examining the aforementioned sources for the records search area

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REFERENCES

- CHRIS 2020 – California Historical Resources Information System, CHRIS Data Request Form. Available online at:
<https://ohp.parks.ca.gov/pages/1068/files/CHRIS%20Data%20Request%20Form.pdf>
- Crawford n.d. – No bibliographic information supplied
- Crawford 2010 – Richard Crawford. The San Diego Aqueduct. San Diego Union-Tribune, August 7. Accessed on September 22, 2022, at
<http://www.sandiegoyesterday.com/wpcontent/uploads/2010/08/San-Diego-Aqueduct.pdf>
- Jacobs 2023a – Jacobs (TN 249723). Morton Bay Geothermal Project Application for Certification, Volume 1, dated April 18, 2023. Available online at:
<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-AFC-01>
- Jacobs 2023d – Jacobs (TN 249724). Morton Bay Geothermal Project AFC, Volume 2, Appendix 5-3 Cultural Resources, dated April 18, 2023. Available online at:
<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-AFC-01>
- Jacobs 2023u – Jacobs (TN 250396). Morton Bay Geothermal Project Data Adequacy Response Set 1, dated May 30, 2023. Available online at:
<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-AFC-01>

GEOLOGY AND SOILS

Author: Michael Turner, PG, CEG

BACKGROUND: MULLET FAULT ZONE

Section 2.3.2.2, Project Site Selection, of the AFC states, “Production wells access the hotter parts of the reservoir to produce geothermal fluid that will be used to convert thermal and pressure energy to electricity are north of the fault.” The Preliminary Geotechnical Investigation prepared by Landmark Geo-Engineers and Geologists, dated October 20, 2022, Section 3.7 Seismic and Other Hazards, indicates the plant site is in the general alignment of the Mullet Fault Zone as evidenced by CO₂ mud pots and mud volcanos in the area. This fault is neither shown nor identified on either the Landmark or Jacobs geology maps (Landmark Figures 1 and 2, Landmark Plate A-5, or Jacobs Figure 5.4-1 and 5.4-2); however, the Brawley Seismic Zone is shown west of the site in Landmark Figures 1 and 2 and four hidden faults (two east and two west of the site) are mapped in the vicinity of the site as shown on Landmark Plate A-5.

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36. Please explain what fault you are referencing in the AFC.
37. Please identify the location of the Mullet Fault Zone in a figure or plate.
38. Please provide the referenced Landmark report that discusses the Mullet Fault Zone.

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39. Please provide a discussion on the seismic activity level of the Mullet Fault Zone.

BACKGROUND: GEOLOGIC RESOURCES OF RECREATIONAL, COMMERCIAL, OR SCIENTIFIC VALUE

Section 5.4.2.3, Geologic Resources, of the AFC states, "The Project lies within a known geothermal resource area, the Salton Sea Known Geothermal Resource Area, where geothermal fluids contain unusually high concentrations of metals such as zinc, lead, copper, silver, iron, manganese, sodium, calcium, potassium, and lithium." However, lithium is not mentioned in AFC Section 5.4.1.6, Geologic Resources of Recreational, Commercial, or Scientific Value.

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- 40. Please explain your reasoning why lithium is not discussed in Section 5.4.1.6, Geologic Resources of Recreational, Commercial, or Scientific Value, to be of known commercial or scientific value.
- 41. Please provide a discussion of whether MBGP is considering incorporating lithium extraction and production in a current or future phase, and if so, how that incorporation will impact the environment or the project area.
- 42. Whether or not lithium extraction and production is planned, please provide a discussion regarding how MBGP could impact the ability of other entities to do lithium extraction and production.

BACKGROUND: SALTON SEA KNOWN GEOTHERMAL RESOURCE AREA

Section 2.1, Introduction, of the AFC states, "The Salton Sea KGRA is known to have significant geothermal reserves. A "known geothermal resource area" is an area in which the geology, nearby discoveries, competitive interests, or other indicia would, in the opinion of the Secretary of the Interior, engender a belief in those who are experienced in the subject matter that the prospects for extraction of geothermal steam or associated geothermal resources are good enough to warrant expenditures of money for that purpose."

DATA REQUESTS

- 43. Please provide a discussion of the potential for the depletion of the Salton Sea KGRA and the associated short- and long-term impacts of a depletion.
- 44. Please explain if the possibility of a depletion in the resource was considered in your Cumulative Effects, as presented in AFC Section 5.4.3, and if not, why?

BACKGROUND: SECTIONS 2.6 AND 5.4.10, REFERENCES

Sections 2.6 and 5.4.10 of the AFC references the Preliminary Geotechnical Investigation, Proposed 81 MW Black Rock Geothermal Power Plant, Calipatria, California, dated October 20, 2022.

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DATA REQUEST

45. Please explain if this is the reference you intended to provide or if you intended to reference the Preliminary Geotechnical Investigation for Morton Bay.

BACKGROUND: GEOMORPHIC PROVINCES AND PHYSIOGRAPHIC PROVINCES

Section 5.4.1.1, Local Settling and Regional Geology, of the AFC references both geomorphic provinces and physiographic provinces. Physiographic provinces were first introduced by Nevin Fenneman in 1917 and geomorphic provinces are used by the California Geologic Survey as introduced in their 2002 Note 36. Using both systems can be confusing to the reader.

Also, the reference for Frost et al. 1997 was not included in your references in Section 5.4.10.

DATA REQUESTS

46. Please clarify how the two systems of provinces are related.

47. Please provide the document referenced, Frost et al. 1997.

BACKGROUND: DEPTH TO GROUNDWATER AND LIQUEFACTION

Section 5.4.1.2, Local Geology and Stratigraphy, of the AFC states, "The site is in an area of shallow local groundwater conditions. The surficial soils were observed to be saturated, and groundwater was encountered in all of the subsurface explorations at depths of approximately *six feet* below ground surface (bgs)." Emphasis added. Section 5.4.1.5.3, Liquefaction, of the AFC states, "Depth to water during the geotechnical investigation conducted at this property (Landmark 2022) was reported at *3.5 to 5 feet* bgs." Emphasis added. Section 5.15.1.6, Groundwater, of the AFC states, "Groundwater was encountered in the borings at about 13 feet at the time of the exploration but may rise with time to approximately 6 to 8 feet below the ground surface at the site."

Section 3.8, Liquefaction, of the Landmark Preliminary Geotechnical Investigation states, "The [liquefaction] analysis was performed using a PGAM value of 0.61g was used in the analysis with an 8-foot groundwater depth and a threshold factor of safety (FS) of 1.3."

Section 3.8, Liquefaction, of the Landmark Preliminary Geotechnical Investigation states, "Liquefaction can occur within several isolated silt and sand layers between depths of *8 to 50 feet*." Emphasis added. Section 4.5, Deep Foundations, of the Landmark Preliminary Geotechnical Investigation states, "Since the subsurface soils at the project site may experience liquefaction settlements at depths between *8.5 to 50 feet* below ground surface, a deep foundation system like drilled piers founded at a minimum depth of 30 feet below ground surface is estimated to reduce settlements to approximately ¼ inch or less." Emphasis added.

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- 48. Please provide information on the consensus on the depth to groundwater at the site.
- 49. Please explain why the shallowest determined historic depth to groundwater (high groundwater) was not used in the liquefaction analysis.
- 50. Please provide information about the range of depths of potential liquefaction based on high groundwater as determined by the geotechnical engineer.
- 51. If liquefaction was analyzed with the historic high groundwater, please explain if you considered the possibility that liquefaction settlement could occur at shallower depths.

BACKGROUND: LIQUEFACTION

Section 3.8, Liquefaction, of the Landmark Preliminary Geotechnical Investigation states, "Because of the depth of the liquefiable layer, the 17.5-foot-thick non-liquefiable clay layer will likely act as a bridge over the liquefiable layer resulting in a fairly uniform ground surface settlement; therefore, wide area subsidence of the soil overburden would be the expected effect of liquefaction rather than bearing capacity failure of the proposed structures."

DATA REQUEST

- 52. Please explain if there is a 17.5-foot-thick non-liquefiable clay layer across the site or if liquefaction settlement can occur as shallow as 8 feet as noted.

BACKGROUND: JACOBS FIGURE 2-6B

According to Jacobs Figure 2-6B, of the AFC, site grades would be raised as much as approximately 7.5 feet to promote drainage.

DATA REQUEST

- 53. Please provide a discussion regarding the possibility that settlement could occur due to fill placement and if it was accounted for in the preliminary design and borrow quantity needs.

BACKGROUND: MUD POTS

Mud pots are visible in aerial photographs adjacent to the site, approximately 0.13 miles toward the southeast and approximately 1.3 miles northwest of the site near Mullet Island. According to the Executive Summary in Landmark 2022, "The proposed plant is located adjacent to CO₂ mud pots and above a naturally occurring CO₂ gas reservoir. The reservoir is generally located at depths of greater than 50 feet. The measured gas pressure obtained from previous investigation adjacent to the geothermal plant site was approximately 15 to 25 pounds per square inch." Section 3.1, Site Conditions, of the Landmark Preliminary Geotechnical Investigation states, "Several carbon dioxide (CO₂) mud volcanoes are sited at the vacant parcel southeast of the project site." Section 3.7, Seismic and Other Hazards, of the Landmark Preliminary Geotechnical Investigation

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states, "...this plant is located in the general alignment of the Mullet Fault Zone as evident by CO₂ mud volcanoes."

DATA REQUESTS

54. Please explain if the presence of mud pots on either side of the proposed plant are significant or not to site development. If they are not significant, please provide an explanation as to why they are not significant.

55. Please explain if the presence of the Mullet Fault Zone or nearby CO₂ gas releases would affect the construction, operation, or occupation of the MBGP.

BACKGROUND: SECTION 2.3.2.2, PROJECT SITE SELECTION

Section 2.3.2.2, Project Site Selection of the AFC, states that the top of the geothermal reservoir is 300 to 1,400 feet bfg but is also hydrologically disconnected from the Salton Sea. According to the Executive Summary in Landmark 2022, "The proposed plant is located adjacent to CO₂ mud pots and above a naturally occurring CO₂ gas reservoir. The reservoir is generally located at depths of greater than 50 feet."

DATA REQUEST

56. Please explain the origin of the CO₂ gas reservoir and its connection or lack thereof to the geothermal reservoir and Salton Sea.

BACKGROUND: 2009 GEOTECHNICAL INVESTIGATION

Section 5.4.1.5.3, Liquefaction, of the AFC states, "...a previous geotechnical investigation conducted at the site in 2009."

DATA REQUEST

57. Please provide the referenced document.

BACKGROUND: EXPANSIVE SOILS

Section 5.4.1.5.6, Expansive Soils, of the AFC states, "The MBGP area is not noted to be in a known area of expansive soil. However, the materials encountered during the 2022 geotechnical investigation borings did note the presence of clay-rich soils from 5 feet to 100 feet bgs during field activities. These native soils likely exhibit high swell potential (Landmark 2022) and will be further evaluated during design-level geotechnical investigations." Landmark logged the site soils as Fat and Lean Clay (CH and CL) starting at the ground surface and as documented with Atterberg Limits testing. Section 3.3 Subsurface Soil of the Landmark Preliminary Geotechnical Investigation states, "The subsurface soils encountered during the field exploration conducted on September 28 and 29, 2022 consist of approximately 18 feet of near-surface fat clays."

DATA REQUESTS

58. Please accurately describe if the MBGP area is in a known area of expansive soil.

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BACKGROUND: BORROW SITES USCS CLASSIFICATIONS

Section 4.1, Site Preparation and Backfill, of the Landmark Preliminary Geotechnical Investigation states, "Imported fill soil shall be non-expansive and should meet the USCS classifications of ML (non-plastic), SM, SP-SM, or SW-SM with a maximum rock size of 3 inches and no less than 5% passing the No. 200 sieve." Section 3.3, Subsurface Soil, of the Landmark Preliminary Geotechnical Investigation states, "The subsurface soils encountered during the field exploration conducted on September 28 and 29, 2022 consist of approximately 18 feet of near-surface fat clays." The boring logs included in Appendix B of the Landmark Preliminary Geotechnical Investigation report show Lean and Fat Clay (CL and CH) were logged starting at the ground surface in all the borings.

DATA REQUEST

59. Please provide subsurface data from the proposed borrow sites showing soil types ML (non-plastic), SM, SP-SM, or SW-SM are present.

BACKGROUND: SEICHES

Section 3.7, Seismic and Other Hazards, of the Landmark Preliminary Geotechnical Investigation states, the site lies adjacent to the Salton Sea, so the threat of seiches or other seismically-induced flooding *is considered possible*." Emphasis added. But Section 5.4.1.5.7, Tsunamis and Seiches, of the AFC states, "While the MBGP site is located adjacent to wetlands hydraulically connected to the Salton Sea the actual Salton Sea is located approximately two miles away from the Project. With a current elevation of approximately -240 feet, the potential for a seiche event that would affect the site is *not considered likely*." Emphasis added.

DATA REQUEST

60. Please resolve the inconsistency between these two statements regarding seiches and accurately state the likelihood/possibility of seiches.

BACKGROUND: EXTRUSIVE RHYOLITE DOMES

Section 5.4.1.2, Local Geology and Stratigraphy, of AFC states, "Obsidian Butte lies west of the site and is the westernmost of five small extrusive rhyolite domes arranged along a northeast trend. These domes erupted approximately 5,000 to 10,000 years before present and are collectively known as the Salton Buttes, which were extruded onto Quaternary alluvium." Section 5.8.1.1 Physiographic and Geologic Setting, of the AFC states, "The fourth major rock group includes modern volcanic deposits collectively known as the Salton Buttes lava domes. The Salton Buttes lava domes consist of four small volcanoes that include, from southwest to northeast, Obsidian Butte, Rock Hill, Red Hill, and Mullet Island (Robinson et al. 1976). These volcanoes last erupted approximately *16,000 years ago*." Emphasis added. Section 3.7 Seismic and Other Hazards, Volcanic Hazards, of the Landmark Preliminary Geotechnical Investigation states, "Obsidian Butte and Red Hill, located at the south end of the Salton Sea

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approximately 1 mile west of the project site, are small remnants of volcanic domes. The domes erupted about *1,800 to 2,500 years ago* (Wright et al, 2015).” Emphasis added.

DATA REQUEST

61. Please resolve the inconsistency of the age(s) of the last eruption of the domes.

LAND USE

Author: Andrea Koch

BACKGROUND: CONSISTENCY WITH DEVELOPMENT STANDARDS FOR SUPPORTIVE/ANCILLARY SITES

On pages 5.6-12 to 5.6-13, the MBGP application shows various zoning designations for the locations of the proposed project’s supportive/ancillary elements, which include the production and injection well sites, aboveground production and injection pipelines, freshwater connections, generation interconnection transmission (gen-tie) line, laydown yards, parking areas, construction camps, and borrow pits. However, the application only analyzes the project’s consistency with the development standards for the zoning designation of the main project site, not the zoning designations for the supportive/ancillary sites.

DATA REQUEST

62. Please show how the development of each supportive/ancillary site is consistent with the development standards for the site’s zoning designation.

BACKGROUND: CONSISTENCY WITH DEVELOPMENT STANDARDS FOR HEIGHT

The application states on page 5.6-13 that the project conflicts with Imperial County zoning regulations for maximum height. The proposed atmosphere flash tanks, at 95 feet in height, exceed the maximum building height of 35 feet in the Open Space/Recreational zoning district with a Geothermal Overlay (S-1-G). This requires an approved variance from Imperial County, according to Imperial County zoning regulations. The application states that Imperial County staff have indicated during discussions with the applicant that variance findings for the project could be made. However, CEC staff needs to confirm this, either through submittals from the applicant or communications with Imperial County. Although the CEC has exclusive authority over the proposed project, the CEC must ensure compliance with Imperial County laws, ordinances, regulations, and standards (LORS).

DATA REQUESTS

63. Please submit materials supporting the statement that Imperial County could make variance findings for the height of the atmosphere flash tanks. This includes copies of any communications with the County regarding the variance. If the applicant’s

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communications with the County were not in writing, please include a summary of discussions with the County and the name/s of the Imperial County staff contacted.

64. Please submit, in accordance with the application form for variances used by Imperial County, the reason why the variance is needed, and a description of the properties immediately to the north, south, west, and east of the project property.
65. Please include a discussion of how the proposed project could meet the required variance findings in Section 90202.08.

BACKGROUND: CONSISTENCY WITH CONDITIONAL USE PERMIT FINDINGS

The application notes on pages 5.6-12 to 5.6-13 that the generating facility and many of the supportive/ancillary elements would require a conditional use permit (CUP) from Imperial County under the applicable zoning designations. Although the CEC has exclusive authority over the proposed project, the CEC must ensure compliance with Imperial County LORS.

DATA REQUEST

66. Please state how each project element, including development on the primary site and supportive/ancillary sites, meet the findings required for a CUP from Imperial County. The findings for approval of a CUP are in Section 90203.09 of the Imperial County Code.

PROJECT DESCRIPTION

Authors: Eric Veerkamp and Andrea Koch

BACKGROUND: CONSTRUCTION CAMP DETAILS

The application does not provide many details about the construction camps in the Project Description. However, some general details of construction-related activities proposed for the supportive/ancillary sites, including the construction camps, are spread throughout the application. Section 5.10.1.7.3 (Socioeconomics) of the application states that wastewater would be generated by portable restrooms, showers, and kitchens at the crew construction camps and stored for removal and disposal at an appropriate wastewater facility. This section also states that sanitary waste from restroom, kitchen, and similar facilities would be directed to a septic tank constructed to Imperial County specifications, and that sludge from the septic system would either be sent to an onsite leach field or trucked offsite for disposal. Section 5.11.2.2.6 (Soils and Agricultural Resources) provides additional detail, stating that activities and construction at laydown yards and construction camps would include Best Management Practices (BMP) installation, clearing and leveling the sites, installation of temporary ground cover/gravel suitable for material and equipment staging areas, parking, power and security site lighting installation, perimeter fencing, portable construction trailers, camp facilities, and associated utility construction.

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It is difficult to differentiate between which improvements are generally planned for the project site and supportive/ancillary sites, and which improvements are planned specifically for the construction camps. In addition, staff needs more detail on the specific improvements planned for the construction camps to assess impacts. Please provide the following additional information needed for the Project Description.

DATA REQUESTS

67. Please confirm that the information on the handling of wastewater and sanitary waste provided in Section 5.10.1.7.3 of the application applies to the construction camps.
68. Please provide information on the type (mobile trailers, etc.) and number of housing units that would be used at the construction camps; also if the kitchen facilities referenced would be in each housing unit or if consolidated meal service is proposed.
69. Please provide a list and description of facilities that would be used at the construction camps, including restroom, kitchen, vehicle fueling, recreation, and commissary facilities, and any other facilities that would be provided.
70. Please provide details on the proposed temporary power and water supply for the construction camps.
71. Please provide more detailed information on current site conditions at the sites proposed for construction camps and plans for grading or any other alterations of the surface.
72. If possible, please provide to scale or dimensioned site plans for the proposed construction camp areas.

PUBLIC HEALTH

Authors: Huei-An (Ann) Chu, Ph.D. and Wenjun Qian, Ph.D., P.E.

BACKGROUND: CONSTRUCTION HEALTH RISK ASSESSMENT (HRA)

In the AFC for MBGP (TN 249723), the construction health risk assessment (HRA) estimated the rolling cancer risks for each 29-month period during a 30-year exposure duration (starting with exposure during the third trimester), aligned with the expected construction duration, at the point of maximum impact (PMI), the maximally exposed individual resident (MEIR), maximally exposed individual worker (MEIW), and maximally exposed sensitive receptor. The results of the analysis are contained in Table 5.9-9 and Appendix 5.9B.

The construction HRA indicates that the maximum cancer risk due to exposure to air toxics emitted by a Power Generation Facility (PGF) construction would be approximately 28.9 in one million at the PMI, which is above the SCAQMD's "significant health risk" threshold of 10 in one million. The applicant stated that 'although this risk level is greater than the SCAQMD's "significant health risk" threshold, the location of the

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PMI represents the maximum possible cancer risk outside of the facility boundary. Cancer risks are expected to be much less in locations where long-term exposure is more likely to occur, such as at the locations of the MEIR, MEIW, and maximally exposed sensitive receptor. Cancer risks at these locations are 1.03, 0.67, and 1.03, respectively, which are all less than the significance threshold. Non-cancer chronic and acute effects (i.e., HI values) from project construction are also well below the SCAQMD significance thresholds of 1.0 at all locations. Additionally, the project construction activities will be finite, and best available emission control techniques would be used throughout the 29-month construction period to control pollutant emissions. Therefore, the potential cumulative health risk impacts from construction are also expected to be less than significant.' (TN 249723, P. 5.9-19)

Staff needs to verify that the health impact during construction is less than significant.

DATA REQUESTS

73. Please provide spreadsheet versions of the tables listed in Appendix 5.9B, including live, embedded calculations.

74. For residential exposures, please provide a map containing health risk isopleths, including an isopleth showing the risk value of 10 in a million.

BACKGROUND: OPERATION HEALTH RISK ASSESSMENT (HRA)

In the AFC (TN 249723), the operation HRA estimated cancer risks by using the 30-year continuous exposure duration scenario for residence and by using the 25-year exposure duration (8 hours per day starting at age 16 years old) for worker, at the point of maximum impact (PMI), the maximally exposed individual resident (MEIR), maximally exposed individual worker (MEIW), and maximally exposed sensitive receptor. The results of the analysis are contained in Table 5.9-8 and Appendix 5.9A.

The operation HRA indicated that the maximum cancer risk due to exposure to air toxics emitted by a Power Generation Facility (PGF) operation would be 16.4 in one million at the PMI, which is above the SCAQMD's "significant health risk" threshold of 10 in one million.

The applicant stated that 'Although this risk level is greater than the SCAQMD's "significant health risk" threshold, its location represents the maximum possible cancer risk outside of the facility boundary. Cancer risks are expected to be much less in locations where long-term exposure is more likely to occur, such as at the locations of the MEIR, MEIW, and maximally exposed sensitive receptor. Cancer risks at these locations are 0.47, 0.73, and 0.47, respectively, which are all less than the significance threshold, as is the estimated cancer burden rate. Non-cancer chronic and acute effects (i.e., HI values) from project operations are also below the SCAQMD significance thresholds of one (1) at all receptor locations. Additionally, emission control technologies for key toxic air contaminants (TACs) will also be installed as part of the project, as described in Section 5.9.6, which will reduce TAC emissions to the extent

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technically feasible. Therefore, the potential cumulative health risk impacts from operation are expected to be less than significant.’ (TN 249723, P. 5.9-18)
Staff needs to verify that the health impact during operation is less than significant.

DATA REQUEST

75. For residential exposures, please provide a map containing health risk isopleths, including an isopleth showing the risk value of 10 in a million.

BACKGROUND: HYDROGEN SULFIDE (H₂S) HRA

Project operation would result in emissions of hydrogen sulfide (H₂S). H₂S causes a wide range of health effects, including odor nuisance, nausea, tearing of the eyes, headaches or loss of sleep, airway problems (bronchial constriction) in some asthma patients, possible fatigue, loss of appetite, headache, irritability, poor memory, dizziness, coughing, eye irritation, loss of smell, etc.¹ In the Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values², noncancer acute and chronic Reference Exposure Levels (RELs) are listed.

However, it is stated that “The acute risk threshold for H₂S in the Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values is equal to the 1-hour CAAQS of 42 micrograms per cubic meter (CARB 2022a), which was adopted for purposes of odor control. As a result of the acute threshold developed by OEHHA and the CAAQS being based upon the same concentration, the CAAQS analysis presented in Section 5.1 is considered sufficient for addressing short-term impacts and associated risks of H₂S. This HRA does not analyze H₂S in the presented HARP2 modeling and associated health risk results.” (TN 249723, P.5.9-16) Staff disagrees with this argument. Staff needs a complete HRA to sum hazard quotients for all the TACs, including H₂S, to determine whether the total hazard index would be less than 1.

DATA REQUEST

76. Please revise the operation HRA (i.e., noncancer chronic and noncancer acute) including H₂S.

BACKGROUND: MOBILE TESTING UNIT MODELING

Page 5.1-40 of the AFC (TN 249723) states that the mobile testing unit (MTU) was not included in the modeling analysis due to its use at various (i.e., temporary) well locations throughout the project site for only a limited number of hours. The AFC also states that the emissions from MTU operation would be minimal and less than emissions from the production testing units (PTUs) and rock muffler (RM). However, pages 3 and 4 of 176 of Appendix 5.1A (TN 249726) show that the hourly and first year annual emissions of the MTU would be higher than those of the PTUs. In addition, page 3 of Appendix 5.1A shows that the MTU would operate 2,160 hours and 2,640 hours

1 <https://www.osha.gov/hydrogen-sulfide/hazards>

2 <https://www2.arb.ca.gov/sites/default/files/classic/toxics/healthval/contable08042023.pdf>

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per year for production well testing and injection well testing respectively, which would be 10 times more than the PTU operation. CEC staff needs a revised HRA to include the MTU with other emission sources modeled previously to complete the analysis.

DATA REQUEST

77. Please revise the HRA to include the MTU with other emission sources modeled previously.

BACKGROUND: COOLING TOWER MODELING

The applicant's HRA modeling files show that the applicant used NH₃ emissions of 8.53 lbs/hr, 74,686.8 lbs/yr (for 8,760 hours of routine operation scenario), and 71,454.8 lbs/yr (for startup/shutdown scenario) for the cooling tower. However, page 3 of 176 of Appendix 5.1A (TN 249726) shows that the hourly NH₃ emission of the cooling tower with sparger during continuous operation or during biological oxidation box bypass would be 119 lbs/hr and 572 lbs/hr during sparger bypass. Page 5 of 176 of Appendix 5.1A (TN 249726) shows that the annual NH₃ emission of the cooling tower with sparger, sparger bypass, and biological oxidation box bypass would be 1,000,649 ($= [0.00718 + 2.48 + 0.0274 + 5.9 + 4.81 + 418 + 57.2 + 11.9] \times 2000$) lbs/yr for subsequent year without commissioning. Page 6 of 176 of Appendix 5.1A (TN 249726) shows that the annual NH₃ emission of the cooling tower with sparger would be 1,045,800 ($= [517 + 5.94] \times 2000$) lbs/yr for 8,760 hours of routine operation.

CEC staff needs clarification regarding how the modeled NH₃ emission rates were determined. Staff believes that a worst-case HRA should consider the worst-case emission scenarios.

DATA REQUESTS

78. Please clarify how the modeled NH₃ emission rates were determined.

79. Please update the HRA with the worst-case NH₃ emission rates for the cooling tower.

SOCIOECONOMICS

Author: Ellen LeFevre

BACKGROUND: CONSTRUCTION CAMPS

CEC staff needs additional information on the proposed construction camps to temporarily house construction workers on the proposed MBGP.

In section 2.3.4.4 page 2-44 of the AFC the applicant states "Affiliates of the Applicant anticipate constructing two additional geothermal power plants (Elmore North Geothermal Project and Black Rock Geothermal Project) concurrently with Morton Bay Geothermal Project, which will increase regional peak workforce and may require temporary housing and facilities for construction workers affiliated with MBGP and the

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two other projects. These potential construction camps would be used by personnel working on the construction of the Black Rock Geothermal Project, Elmore North Geothermal Project, and MBGP.”

DATA REQUESTS

- 80. What is the maximum number of construction workers that could be housed at the construction camps?
- 81. Would each geothermal project be allocated a specified area for their workers? If so, how many workers could be housed in the area set aside for MBGP workers?
- 82. Would the construction camps be available for workers the entire 29 months of construction and commissioning of MBGP? If not, how long would the construction camps be in use?

TRANSPORTATION

Authors: Spencer Reed and Shane Russell

BACKGROUND: FACILITIES, OPERATIONS AND MAINTENANCE

The MBGP AFC indicates in its Project Description section that “The MBGP is expected to be operated by a staff of approximately 61 full-time, onsite employees. The facility will be capable of operation seven days per week, 24 hours per day.” To provide clarification and aid staff analysis of any operational impacts, CEC staff requires description of anticipated shift hours and number of staff required per shift, as well as any anticipated heavy truck activity to occur to/from the site.

DATA REQUESTS

- 83. Please clarify whether the number of operating staff is 61 persons per shift, or 61 persons total. How many employees are anticipated per shift, and what are shift hours? What is the potential for staff to arrive/depart during AM/PM peak hours?
- 84. Please provide information on anticipated number of trucks accessing the project site each day, as well as any information regarding the timing of truck arrival/departures.

BACKGROUND: EXISTING TRAFFIC CONDITIONS AND LEVEL OF SERVICE (LOS) ANALYSIS

The MBGP AFC indicates a specific set of traffic count data used in the Existing Traffic Conditions and Level of Service Analysis. Section 5.12.1.2.1: Existing Roadway Conditions states that “Traffic volumes were obtained from traffic counts published by Caltrans in 2019 and field counts conducted in October 2022. Field traffic counts were collected for 2 days during the weekday.” Section 5.12.1.2.2: Existing Intersection Conditions states that “Traffic volumes at the intersections were collected in October 2022. Traffic counts were collected for two days during the weekday morning period of 5:00 a.m. - 8:00 a.m. and afternoon period of 4:00 p.m. to 8:00 p.m.” Table 5.12-4:

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Existing Intersection LOS Summary provides LOS results for study intersections operating under the Existing Conditions scenario.

No details regarding traffic volumes or LOS calculations are provided. CEC staff requires copies of the traffic data and LOS calculations that inform the analysis, for use in the independent CEC staff assessment.

DATA REQUESTS

85. Please provide any raw and adjusted traffic count data used or referenced in the LOS analysis, including heavy vehicle/truck data

86. Please provide LOS calculations and turning movement counts for the study intersections used in the analysis, for each scenario and peak period analyzed.

BACKGROUND: CONSTRUCTION TRAFFIC

The MBGP AFC section 5.12.2.2.1 contains operational analyses of the project under the "Construction Conditions" scenario. Table 5.12-6: Construction Trip Generation shows an assumption of two passengers (workers) per vehicle for trip generation purposes. The paragraph immediately below the table explains that "During construction, up to 560 workers would access the Project site each working day. Because it is assumed that construction employees would be recruited locally and would stay in hotels and RV campsites in nearby cities, workers would carpool (ride with others), resulting in 560 daily trips." Table 5.12-7: Construction Condition Roadway Segment LOS Analysis Summary provides LOS results for study roadway segments operating under the "Construction Conditions" scenario. It is stated in the paragraph immediately preceding the table that "The daily traffic volumes generated during the MBGP peak construction period were added to the existing traffic volumes on each roadway segment, and the V/C ratio was calculated." Table 5.1-8: Construction Condition Intersection LOS Summary provides LOS results for study intersections operating under the "Construction Condition" scenario. It is stated in the paragraph immediately preceding the table that "The AM and PM peak-hour traffic generated during the construction period was added to the existing turning movement counts at the study intersections."

Details regarding how trips were assigned to study roadways are not provided. No details regarding traffic volumes or LOS calculations are provided. CEC staff requires copies of the traffic data and LOS calculations that inform the analysis, for use in the independent CEC staff assessment. Additionally, CEC staff requests clarification on assumptions regarding trip generation.

DATA REQUESTS

87. Please provide any data or reasoning to support the assumption of 2 passengers per vehicle arriving to and leaving from the project site.

88. Please provide details (via figures, diagrams, spreadsheet, etc.) that demonstrate how project trips were distributed to the roadway network. Were different routes assumed for construction worker trips (passenger vehicles) vs. heavy vehicle trips?

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89. Please provide LOS calculations and turning movement counts for the study intersections used in the analysis, for each scenario and peak period analyzed.
90. Please provide details (via figures, diagrams, spreadsheet, etc.) that demonstrate how project trips were assigned to the study intersections. A summary of the project trips added to each turning movement at each study intersection for each scenario and peak period analyzed, would be ideal.

BACKGROUND: VMT THRESHOLDS AND ANALYSIS

The MBGP AFC contains an analysis of Vehicle Miles Travelled (VMT), and states assumptions regarding the geographic residency of employees required for operation and maintenance of the facility. These assumptions inform commute distances used in the VMT analysis, and as such, CEC staff request confirmation of any information regarding where employees may reside.

DATA REQUEST

91. Please provide any data that shows a breakdown/distribution of where maintenance and operation employees, as well as construction workers are anticipated to be housed, geographically.

BACKGROUND: CUMULATIVE OPERATIONS AND MAINTENANCE EFFECTS

The MBGP AFC section 5.12.4.2 contains operational analyses of the project under the "Cumulative Conditions" scenario. Table 5.12-12: Cumulative Condition Roadway Segment LOS Analysis Summary provides LOS results for study roadway segments operating under the "Cumulative Condition" scenario. It is stated in the paragraph immediately preceding the table that "Potential cumulative Project traffic increases were determined based on available information from published documents on the Imperial County planning website."

Details regarding the potential projects contributing to these increases, or their respective magnitudes, are not provided. CEC staff requests details regarding other projects assumed in the cumulative scenario that inform the analysis, for use in the independent CEC staff assessment.

DATA REQUEST

92. Please provide information regarding the projects assumed to contribute to an increase in traffic volumes in the cumulative conditions scenario, and how the addition of cumulative project traffic was calculated. Also, please provide a description of each cumulative project assumed under this scenario and an explanation of how trips were estimated for each. Please include data sources and calculations for trip generation estimates, as applicable.

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TRANSMISSION SYSTEM ENGINEERING

Authors: Laiping Ng and Mark Hesters

BACKGROUND

The California Environmental Quality Act (CEQA) requires the identification and description of the "Direct and indirect significant effects of the project on the environment." The AFC requires discussion of the "energy resource impacts which may result from the construction or operation of the power plant." For the identification of impacts on the transmission system resources and the indirect or downstream transmission impacts, staff relies on the Phase I and Phase II Interconnection Studies for ensuring the interconnecting grid meets the California Independent System Operator (California ISO) reliability standards. The studies analyze the effect of the proposed project on the ability of the transmission network to meet reliability standards. When the studies determine that the project will cause a violation of reliability standards, the potential mitigation or upgrades required to bring the system into compliance are identified. The mitigation measures often include the construction of downstream transmission facilities. CEQA requires the analysis of any downstream facilities for potential indirect impacts of the proposed project. Without a complete Phase I or Phase II Interconnection Study, staff is not able to fulfill the CEQA requirement to identify the indirect effects of the proposed project.

DATA REQUESTS

93. Please provide California ISO Affected System Study, if available.
94. Please provide the IID BHE Cluster System Impact Study and all the appendix and attachments.
95. Please clarify the length of the gen-tie line, which is listed as 3.2-miles long in Executive Summary and 2.3-miles long in Section 2.3.5.3.
96. Section 2.3.1 indicated that the System Impact Study identified system upgrades required to deliver additional energy to SCE Devers Substation. Would the BRGP generation be directly delivered to the SCE system in addition to the IID 230 kV grid?
97. As stated in Section 2.3.3.5.1, "The generator is anticipated to have a design rating of 174,000 megavolt-amperes (MVA) at a power factor of 0.85 lagging and leading." Please clarify the generator rating.
98. Please provide detailed IID Switching Station one-line diagram with the proposed project interconnection. Show all equipment ratings, including bay arrangement of the breakers, disconnect switches, buses, and other equipment that would be required for interconnection of the project.

MBGP DATA REQUESTS SET 1

WATER RESOURCES

Authors: James Ackerman and Adam White

BACKGROUND: GEOTHERMAL PLANT OPERATIONS WATER SUPPLY

Per Section 1.7.7, annual water demand for the Morton Bay Geothermal Project (MBGP) is estimated at 5,560 acre-feet per year (AFY), the majority of which would be to offset evaporation loss in the cooling towers. The combined annual operational water demand for the proposed MBGP, Elmore North, and Black Rock geothermal projects would be approximately 13,165 AFY. IID's Interim Water Supply Policy (IWSP) for Non-Agricultural Projects (IID 2009) sets aside up to 25,000 AFY that may be available for non-agricultural use projects through conservation and efficiency measures. As of July 2023, a total of 5,380 AFY has been committed through water use agreements, leaving up to 19,620 AFY that may be made available to new non-agricultural projects (CEC 2023). Water demand for Morton Bay, Elmore North, and Black Rock geothermal projects constitutes 67 percent of the available non-agricultural designation. Given that 97 percent of available water was allotted to agriculture in 2022 (CEC 2023) and water set aside for non-agricultural projects is dependent upon water conservation, a question arises about the reliability of IID's commitment to provide water for the three proposed geothermal projects. CEC staff needs documentation demonstrating that IID can provide reliable water supply to the MBGP as well as Elmore North and Black Rock geothermal projects during normal, as well as single and multiple-year dry periods throughout the life of the projects.

DATA REQUESTS

99. Please provide the draft water assessment prepared by Jacobs listed as a reference in Section 5.15.7.
100. Please provide a preliminary agreement or will-serve letter along with a statement from IID describing contingencies for providing water to non-agricultural projects during conditions of scarcity, as well as the process to conserve water to create annual water demand for the three geothermal projects.

BACKGROUND: LITHIUM OMITTED FROM PRODUCED FLUID CHEMICAL COMPOSITION

Table 2-2, *Expected Chemical Composition of Produced Fluids Constituent Concentrations* does not include an expected concentration of lithium. Section 5.4.2.3 lists lithium as one of the metals "contained in unusually high concentrations" within geothermal fluids of the Salton Sea Known Geothermal Resource Area (KGRA) that includes the proposed project site. Moreover, the typical lithium concentration of the Salton Sea KGRA geothermal fluids is estimated at 211 milligrams per liter (mg/L) (NREL 2015).

DATA REQUEST

101. Please provide an expected concentration for lithium in Table 2-2.

**MBGP
DATA REQUESTS SET 1**

BACKGROUND: CLARIFICATION OF NON-AGRICULTURAL PROJECT DESIGNATION

Section 5.15.1.9.1 states that *The IWSP currently designates up to 25,000 afy (each) of water for potential Non-Agricultural Projects within IID's water service area.* This statement is repeated in Section 5.15.2.1.2 and is paraphrased in Section 5.15.3. However, the IWSP states in the background section that "*This IWSP currently designates up to 25,000 afy of water for potential Non-Agricultural Projects within IID's water service area*". Based on this statement and other supporting text, it is apparent that the 25,000 AFY designation is the total for all projects that meet the IWSP requirements and not for each project.

DATA REQUEST

102. Please verify that the applicant realizes that the 25,000 AFY designation is for multiple non-agricultural projects and not for each project.

BACKGROUND: COOLING WATER FEASIBILITY

Application Page 5.15-28, states "The analysis of alternatives for the original project demonstrated that the use of reclaimed water for dry cooling were not reasonably feasible."

DATA REQUESTS

103. Please provide the referenced alternatives analysis cited.

104. Please include assumptions, evidence, references, and calculations used in the analysis to assess why alternative water supplies and alternative cooling are "environmentally undesirable," or "economically unsound".

BACKGROUND: PERCENTAGE OF WATER DEMAND GENERATED BY STEAM

Section 5.15.1.9.1 states in the first paragraph that *Approximately 50 percent of the operational water required by the facility will be generated by steam condensed in the main condenser.* This is reiterated in the first paragraph of Section 6.5.2. However, the paragraph describing the State Water Resources Control Board, Resolution 75-58 under Section 5.15.5.2, State LORS, describes the same portion of the operational water demand as 95 percent.

DATA REQUEST

105. Please explain the discrepancy in condensed steam percentage or modify the application text for consistency.

BACKGROUND: REQUEST TO REVISE BASE FLOOD ELEVATIONS DEPICTED ON FIRMS

Section 5.15.1.8 states that the applicant is preparing a Letter of Map Revision (LOMR) to the Federal Emergency Management Agency (FEMA) requesting revisions to the 100-year base flood elevations currently depicted on Flood Insurance Resource Maps

**MBGP
DATA REQUESTS SET 1**

(FIRMS) 06205C0700C and 06205C0725C (both effective 09-26-2008) based on declining Salton Sea surface elevation. The applicant expects to submit the LOMR in the second quarter of 2023.

DATA REQUESTS

106. Please explain the process used to determine the revised floodplain area shown in Figure 5.15-3b.
107. Please explain if the LOMR has already been prepared and submitted to FEMA. If so, please provide a copy to CEC staff. If not, please provide a copy as soon as it is submitted to FEMA.
108. Please provide any information about how long it should take FEMA to approve or deny the map revision.

BACKGROUND: CLASS II SURFACE IMPOUNDMENT CONSTRUCTION

Under the *Class II Surface Impoundment* portion of Section 2.3.3.2.4, the proposed Class II Surface Impoundment (brine pond) is described as a triple-lined basin with a concrete primary liner. No information was provided regarding the secondary and tertiary liners.

DATA REQUEST

109. Please provide the characteristics of the secondary and tertiary liner materials and describe how they relate to the Leachate Collection and Removal System (LCRS).

BACKGROUND: WASTEWATER DISPOSAL/CONTAINMENT

The first sentence in Section 5.15.2.3.2 *Operation* states “The Project will reinject fluid wastewater streams, in accordance with CalGEM injection parameters.” Since the majority of this section discusses the injection of spent geothermal fluids into Class II wells, it appears this statement was not meant to include the sanitary sewer at the end of the section. However, the term “fluid wastewater streams” implies that it does.

Sections 2.3.3.4.3 *Fluid Process Streams*, 2.3.3.4.11 *Plumbing*, 2.3.3.4.19 *Sanitary Sewer System*, and 5.15.2.3.2 *Operation*, list a leach field as a possible alternative for septic system dispersal. The IID Public Water Map, interactive mapping application indicates that a tile-drain system underlies and surrounds the proposed MBGP site (IID 2023a). Since this tile-drain system is meant to drain excess saline groundwater to below the level of crop roots and groundwater is shallow (3-6 feet), using a leach field does not seem like a viable option for septic system dispersal.

DATA REQUESTS

110. Please clarify Section 5.15.2.3.2 to provide any missing or unclear information.
111. Please explain how a leach field could be a viable option for septic system dispersal or remove from the text.

**MBGP
DATA REQUESTS SET 1**

REFERENCES

- CEC 2023 – California Energy Commission (TN 252077). Report of Conversation re: Remaining Non-Agricultural Project Set-Aside for 2023, dated August 31, 2023. Available online at:
<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-AFC-01>
- IID 2009 – Imperial Irrigation District (IID). IID Interim Water Supply Policy for Non-Agricultural Projects. Adopted September 9, 2009. Available online at:
<https://www.iid.com/home/showpublisheddocument/9599/638108689553970000>
- IID 2023a – Imperial Irrigation District (IID). Public Water Map, interactive mapping application. Available online at:
<https://mygis.iid.com/portal/apps/webappviewer/index.html?id=a33cfef3714f4eb8a1c85320613a2d1b>
- IID 2023b – Imperial Irrigation District (IID). 2022 Annual Report of Imperial Irrigation District, Pursuant to SWRCB Revised Order WRO 2002-0013, dated March 30, 2023. Available online at:
<https://www.iid.com/home/showpublisheddocument/21213/638157897431330000>
- NREL 2015 – National Renewable Energy Laboratory (NREL). The Potential for Renewable Energy Development to Benefit Restoration of the Salton Sea: Analysis of Technical and Market Potential. Technical Report NREL/TP-7A40-64969. November 2015. Available online at:
<https://www.nrel.gov/docs/fy16osti/64969.pdf>