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Morton Bay Geothermal LLC
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Jon Trujillo
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May 24, 2024

Mr. Jesus Ramirez
APC Division Manager
Imperial County Air Pollution Control District
150 South Ninth Street
El Centro, California 92243

RE: **Selected Responses to the Jobs to Move America's Public Comments on Morton Bay Geothermal Facility Preliminary Determination of Compliance (PDOC)**

Dear Mr. Ramirez:

Morton Bay Geothermal LLC (the Applicant) appreciates the work of the Imperial County Air Pollution Control District (ICAPCD) to produce a comprehensive Preliminary Determination of Compliance (PDOC) for the Morton Bay Geothermal Project (MBGP or Morton Bay). The Applicant welcomes this opportunity to submit selected responses to certain comments submitted by the Jobs to Move America (JMA) on the PDOC for Morton Bay. JMA's comments on the PDOC were submitted to the ICAPCD on March 11, 2024. The Applicant remains available to provide additional information in furtherance of issuance of the Final Determination of Compliance (FDOC) for the Morton Bay Project.

I. Cumulative Impacts on Air Quality

- 1. The PDOC must study the direct and cumulative impact on air quality from the construction and operation of the proposed geothermal development. This development will be one of many future renewable energy projects in the Salton Sea region, and increased construction activities can potentially resuspend dust and particulate matter from unpaved roads. Additionally, decreased water flow into the Salton Sea would indirectly affect air quality, as the drying lakebed will release harmful dust into the atmosphere. Imperial County continues to experience high levels of air pollution and continued degradation will likely exceed legal thresholds, negatively impacting public health and resulting in more respiratory and heart diseases, among other worsened health outcomes.¹ Consider mitigation measures for air pollution, such as the use of electric vehicles for the construction and operations phases of projects. Also, consider Salton Sea restoration as a mitigation measure to reduce the negative air quality impacts from exposed dry bed playa. Paved roads are also recognized by the U.S. Department of Transportation Federal Highway Administration as a sustainability measure to improve air quality, thus it should be considered as a mitigation measure.²*

Response: MBGP's dust, stationary sources, and vehicle exhaust emissions will be minimized to the extent feasible during both construction and operation through a number of means, including the following:

- As presented in Section 5.1.7.2.2 of Attachment DRR 7-1 of the *Morton Bay Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 73 to 77)* (Transaction Number [TN] #253082), the Applicant will implement control measures during project construction to minimize fugitive dust and equipment



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and vehicle exhaust emissions.

- The project's construction-related emission estimates already assume the majority of construction equipment will meet Tier 4 final emission standards.
- The Applicant will comply with applicable provisions of the California Air Resources Board's (CARB) Airborne Toxic Control Measures for diesel-fueled on- and offroad vehicles, which strive to minimize equipment and vehicle exhaust emissions.
- Although the project's internal combustion engines are exempt from emission limits as standby emergency units, they will use state-of-the-art emissions controls to minimize stationary combustion emissions.
- The vehicle fleet used to support project operations will be subject to CARB's Advanced Clean Fleet Regulation, which requires a transition to electric and other zero-emission vehicles over time and will reduce vehicle exhaust emissions.

In addition, the project's construction emissions will be temporary and finite, ceasing with completion of construction activities after approximately 29 months. Potential air quality impacts associated with these finite construction emissions will be localized to the project site¹ based on the low modeled emission rates and release heights presented in Section 5.1.9.2.2 and Appendix 5.1D of Attachment DRR 7-1 of the *Morton Bay Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 73 to 77)* (TN #253082).

2. *Mitigation planning should also include continued monitoring of Valley Fever, asthma, and other respiratory and heart diseases with reportable data accessible to the public. Reporting on air quality should also include other respiratory irritants, including asbestos.*

Response: Imperial County comprises less than 1 percent of the State's total Valley Fever cases according to the California Department of Public Health's (CDPH) year-end surveillance report on suspect, probable, and confirmed Valley Fever cases in 2022.² Therefore, the potential exposure of construction workers and sensitive receptors to Valley Fever is expected to be very low. Furthermore, the implementation of the construction worker health and safety plans, which will include procedures for using personal protective equipment, as necessary, and training on the recognition of Valley Fever infection, and the air quality fugitive dust control measures proposed by the Applicant will reduce the already low potential impacts even further. These activities are consistent with CDPH's tips for reducing exposure to Valley Fever³ and the requirements of Assembly Bill (AB) 203 and are expected to similarly reduce exposure to other respiratory irritants that may lead to asthma, other respiratory diseases, and heart diseases.

3. *Lastly, it is worth noting on page 28 of the determination of compliance that "the maximum*

¹ Section 5.1.10.2 of Attachment DRR 7-1 of the *Morton Bay Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 73 to 77)* (TN #253082) states that "all modeled maximum facility impacts occurred well inside the fine gridded receptors with 25-m spacing," which extends only 500 meters from the facility center.

² <https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/CocciEpiSummary2022.pdf>

³ <https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/ValleyFeverPrevention.aspx>



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concentrations for each pollutant and averaging period were compared to the USEPA significant impact levels (SILs). The modeled concentrations were found to be less than the SIL for all pollutants and averaging periods with the exception of 24-hour PM₁₀, as well as 24-hour and annual PM_{2.5}." Particulate matter emissions are a major contributor to the degradation of public health in Imperial County. The Applicant is currently not in compliance with the EPA NAAQS limit of 9.0 µg/m³. The Applicant must reduce PM₁₀ and PM_{2.5} before this project moves forward.

Response: The U.S. Environmental Protection Agency (EPA) only recently released its final rule to lower the annual National Ambient Air Quality Standard (NAAQS) for particulate matter with aerodynamic diameter of 2.5 microns or less (PM_{2.5}) to 9.0 micrograms per cubic meter (9.0 µg/m³). In conjunction with the release of the revised PM_{2.5} NAAQS, the EPA also released an implementation guide⁴ to help affected parties understand the timeline under which changes to permitting, area designations, etc. would be made. According to this guidance, all applicants for permits to construct a new major source or major modification of an existing stationary source after the effective date of the final rule (60 days after publication in the *Federal Register* or May 6, 2024) will need to conduct an air quality analysis that considers the revised PM_{2.5} NAAQS. Because this project's permit application was deemed complete on June 22, 2023, which is well before the effective date of the final rule, and because the project is neither a major source nor a Prevention of Significant Deterioration (PSD) source of PM_{2.5} emissions, an air quality analysis considering the revised PM_{2.5} NAAQS is not required. Table 7 of the PDOC did demonstrate compliance with the current annual PM_{2.5} NAAQS of 12.0 µg/m³; therefore, a reduction of the project's PM_{2.5} emissions is not required.

As stated in Section 5.1.10.1.1 of Attachment DRR 7-1 of the *Morton Bay Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 73 to 77)* (TN #253082), "Although the Project is expected to have maximum impacts that exceed the 24-hour SIL for PM₁₀, its emissions are expected to be less than the ICAPCD Rule 207 offset thresholds and CEQA significance thresholds for PM₁₀, as presented in Tables 5.1-1 and 5.1-17, respectively. Furthermore, the Project will implement BACT to reduce particulate matter emissions from the cooling towers and to minimize emissions from diesel combustion by using a Tier 3-certified fire pump and Tier 4-certified emergency generators." With this language, the Applicant is demonstrating both that a project's significance in nonattainment areas is not strictly determined by a comparison to Significant Impact Levels (SILs) and that best available control technology (BACT) is being implemented to reduce emissions of particulate matter with aerodynamic diameter of 10 microns or less (PM₁₀) to the extent feasible.

4. *Consider monitoring data from stations closer to the proposed development. With the potential for the buildout of more geothermal developments and other renewable energy facilities, consideration should also be given to the cumulative impact of PM₁₀ and PM_{2.5} pollutants. Additional build-out of more renewable energy development will increase the potential for concentrations (or "hotspots") of PM₁₀, PM_{2.5}, and other air pollutants. Mitigation planning should include strategies to identify existing and emerging concentrations of PM₁₀ and PM_{2.5} pollutants.*

⁴ <https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-implementation-fact-sheet.pdf>



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Response: With regards to monitoring data, the Applicant reviewed PM₁₀ and PM_{2.5} data collected at the Sonny Bono monitoring station and found only two years of recent PM₁₀ data (2018 and 2019) and none of the recent PM_{2.5} data to meet the EPA's minimum requirements of 75 percent completeness of the scheduled sampling days on a quarterly basis.⁵ Based on this evaluation, the Sonny Bono monitoring station does not provide a complete three-year dataset to compute a design value for PM₁₀ or PM_{2.5} for the air dispersion modeling analysis and is not recommended for use. Instead, the Applicant appropriately used PM₁₀ monitoring data collected at the quality assured air quality monitoring station located in Niland. This "regional" monitoring station is located upwind of the project area, has recent quality assured data available, and is impacted by similar or adequately representative sources; therefore, it is considered suitable for use per Section 8.3.2(b) of Appendix W to 40 Code of Federal Regulations (CFR) Part 51, *Guideline on Air Quality Models*.

PM_{2.5} monitoring data is not collected at the air quality monitoring station located in Niland. Therefore, the Applicant instead used PM_{2.5} monitoring data collected at the air quality monitoring stations located in Brawley and El Centro. These stations are the closest stations to the project with quality assured data and are, therefore, appropriate for use. In addition, these monitors are located in urban areas which provide a potentially higher localized PM_{2.5} background concentration⁶ than what is expected to be emitted by existing geothermal power plants in the project's rural vicinity, the incorporation of which provides a more conservative assessment of PM_{2.5} impacts.

With regards to cumulative impacts, a cumulative impacts analysis was conducted for PM_{2.5} per the modeling protocol approved by both the ICAPCD and CEC,⁷ based on the project's operational emissions exceeding the SIL for both 24-hour and annual PM_{2.5}. This analysis appropriately considered all existing and proposed facilities, consistent with EPA guidance,⁸ and resulted in modeled cumulative impacts below the applicable standards, even with inclusion of contributions from the proposed Elmore North and Black Rock Geothermal Projects.⁹

Because PM₁₀ background concentrations already exceed the California Ambient Air Quality Standards (CAAQS), a cumulative impacts analysis for PM₁₀ would not provide any additional

⁵ Refer to Table 8-1 of EPA's *Guideline on Data Handling Conventions for the PM NAAQS* (EPA-454/R-99-009), which is available online at https://www3.epa.gov/ttn/naaqs/aqmguides/collection/cp2/19990401_oaqps_epa-454_r-99-009_guideline_data_handling_pm_naaqs.pdf.

⁶ Refer to Section 4.3 of EPA's *Draft Guidance on Developing Background Concentrations for Use in Modeling Demonstrations* (EPA-454/P-23-001), which is available online at <https://www.epa.gov/system/files/documents/2023-10/draft-guidance-on-developing-background-concentrations-for-use-in-modeling-demonstrations.pdf>.

⁷ The *Air Dispersion Modeling Protocol for Morton Bay Geothermal Plant Cumulative Impact Analysis* was docketed on September 28, 2023 (TN #252436). CEC Staff did not have any subsequent data requests associated with this submittal. ICAPCD similarly did not have any comments regarding this modeling protocol during its completeness review of the permit application.

⁸ Refer to Section 8.3.3 of Appendix W to 40 CFR Part 51, *Guideline on Air Quality Models*.

⁹ Refer to Table 6-1 of Attachment DRR 12-1 of the *Morton Bay Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 73 to 77)* (TN #253082).



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value and was not conducted. However, the project is expected to have a less-than-significant impact for PM₁₀ for the reasons noted in the response to Comment I.3 above.

Future modifications to the project's proposed PM₁₀ and PM_{2.5} emission sources or new emission sources will be evaluated and permitted, if required, consistent with ICAPCD regulations.

II. Potential Hazardous Waste Storage Impacts on Air Quality

1. Proper hazardous and non-hazardous waste and material handling, storage, and disposal must be analyzed thoroughly to prevent atmospheric pollutants and unnecessary emissions. It's important to highlight that in 2007, CalEnergy / BHE Renewables, the parent company of Morton Bay Geothermal, LLC, agreed to pay penalties worth \$910,000 to settle allegations that it violated hazardous waste regulations.³ This action was taken by the California Environmental Protection Agency's Department of Toxic Substances Control. On page 7 of the Morton Bay PDOC, "the brine pond will be used to temporarily store the spent geothermal fluid, solids that have precipitated out of the fluid during power generation, as well as fluids generated from emergency situations, maintenance, hydro blasting, safety showers, eye wash stations, vehicle wash stations, plant conveyor systems, and reject water from reverse osmosis." Due to the chemical composition within brine ponds, it can potentially be hazardous.⁴ Consider mitigation measures and alternatives, such as the use of above-ground waste management containment systems that are effectively sealed and secured to prevent spillage. Also, consider the implementation of stormwater management plans to prevent the risk of overflow and control spillage of hazardous wastes. The cumulative risks of hazardous waste will increase if future renewable energy developments do not consider effective mitigation measures and alternatives.

Response: The contents of the brine pond will largely be reinjected into the geothermal reservoir. Furthermore, the brine pond is being permitted through the Regional Water Quality Control Board (RWQCB) via the CEC's Application for Certification process. The brine pond will be managed in accordance with waste discharge requirements issued by the RWQCB and incorporated into the CEC license for the facility, which the Applicant anticipates will include measures to validate the brine pond integrity, testing, and reporting.

III. Non-Condensable Gasses in the Atmosphere

1. In the Morton Bay Geothermal Project Response to ICAPCD Data Request #1, the plant may emit 2515 pCi/L of radon. Radon is a naturally occurring gas and prolonged exposure can cause lung cancer.⁵ Furthermore, it can be transferred to the surface onto the soil via geothermal fluid movement.⁶ Plant workers and nearby communities risk exposure. According to OSHA, the limit that a worker can be exposed to in 40 hours in a consecutive 7 day period is 100 pCi/L.⁷ The CDC also recommends taking action if a home is between 2 pCi/L through to 4 pCi/L.⁸ Mitigation must consider OSHA, Center for Disease Control, or higher standards to limit exposure. Additionally, the cumulative total of radon emissions will increase as more geothermal sites are developed. The PDOC must more thoroughly center its analysis on radon.

Response: According to the commentor, "the plant may emit 2515 pCi/L of radon." This statement is incorrect. The estimated value of 2,515 picocuries per liter (pCi/L) is not a measure



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of the project's radon emissions, but the concentration of radon within the inlet stream to the sparger, as measured by source testing at other nearby geothermal facilities. This concentration was incorporated into the Applicant's estimates of radon emissions from the geothermal processes, based on the project- and process-specific steam flowrates. Potential worker exposure to the project's radon emissions is discussed below.

Radon (Rn-222) primarily is a hazard in occupations where workers may be exposed to Naturally Occurring Radioactive Materials (NORM) and to occupants in buildings overlying soils high in radium (Ra-226).¹⁰ Radon workplace hazards are addressed as part of a facility occupational health and safety program; risks to the general public from radon exposure are addressed by programs administered by state and county health departments, which primarily involve education about indoor air testing and building mitigation. Selected sources of radon are managed under federal standards, including U.S. Nuclear Regulatory Commission (NRC) regulations and EPA's National Emissions Standards for Hazardous Air Pollutants (NESHAPs). For example, NRC regulations for uranium mill tailings include requirements to control the release of radon. The NESHAP for emissions of radon from U.S. Department of Energy facilities establishes a surface emission standard of 20 picocuries per square meter per second (pCi/m²-s) from impoundments or disposal facilities. Because radon is managed as a radiation health hazard under other programs, it has not been identified as a toxic air contaminant (TAC) in California. An outcome of not being a TAC is that there are no risk assessment methods in Office of Environmental Health Hazard Assessment (OEHHA) guidelines for assessing radon emissions to ambient air.

The study cited by the commentator¹¹ measured static ground surface fluxes of radon emissions in geothermally active and background locations in western Turkey. The highest radon surface flux reported was 484 becquerels per square meter per hour (Bq/m²-hr) or 3.6 pCi/m²-s, in a sample from a geothermally active location. This highest flux estimate was lower than the guideline value for radon surface flux of 20 pCi/m²-s, which was developed in a risk assessment conducted by the EPA.¹² The results from this comparison suggest that radon surface fluxes to outdoors do not pose an increased human health risk. The closest human habitation, approximately 0.6 miles (1.0 kilometers) from the project site, would be unaffected by radon surface fluxes related to site geothermal activity; therefore, there are no indoor air risks from the project's radon emissions.

The potential risk from the project's radon emissions can be assessed based on comparison with background levels in ambient air. An authoritative estimate of a typical concentration of radon in ambient (outdoor) air is 0.4 pCi/L.¹³ Studies conducted by CARB reported a statewide average

¹⁰ International Commission on Radiological Protection (ICRP). 1993. *Protection Against Radon-222 at Home and at Work*. ICRP Publication 65. https://journals.sagepub.com/doi/pdf/10.1177/ANIB_23_2.

¹¹ Aydar, E. and C. Dikar. 2021. Carcinogen soil radon enrichment in a geothermal area: case of Guzelcamli-Davutlar district of Aydin city, western Turkey. *Ecotoxicology and Environmental Safety*. 208:111466. <https://www.sciencedirect.com/science/article/pii/S0147651320313038>.

¹² U.S. Environmental Protection Agency (EPA). 1982. *Final Environmental Impact Statement for Remedial Action Standards for Inactive Uranium Processing Sites (40 CFR 192), Volume 1*. EPA 520-4-82-013-1. <https://semspub.epa.gov/work/05/145482.pdf>.

¹³ Agency for Toxic Substances and Disease Registry (ATSDR). 2012. *Toxicological Profile for Radon*. May. <https://www.atsdr.cdc.gov/ToxProfiles/tp145.pdf>.



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outdoor air concentration of 0.49 pCi/L.^{14, 15}

Radon emissions from the project’s cooling tower were modeled to estimate the annual average radon concentration for the Maximum Exposed Individual Resident (MEIR). As shown in Table III.1-1, the annual average concentration at the MEIR is 0.0076 pCi/L, which is well within existing (background) levels of radon in air in California.

Table III.1-1. Radon Concentration at the MEIR

Parameter	Value
Annual Maximum Modeled TAC Impact ^a	20.91 µg/m ³ per g/s
	2.09E+07 pCi/m ³ per Ci/s
Annual Radon Emissions ^b	11.4 Ci/year
	3.62E-07 Ci/s
Annual Maximum Radon Impact ^c	7.57 pCi/m ³
	7.57E-03 pCi/L

^a The Annual Maximum Modeled TAC Impact was taken as the maximum annual impact for the cooling towers from the 1 g/s TAC AERMOD run and converted to units of pCi/m³ per Ci/s using the following conversion factors:

- 1 µg = 1.00E-06 g
- 1 g = 1.50E+05 Ci¹⁶
- 1 Ci = 1.00E+12 pCi

^b Annual Radon Emissions were taken from Appendix 5.1A, Table 1 of Attachment DRR 7-1 of the *Morton Bay Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 73 to 77)* (TN #253082) and converted to units of Ci/s using the following conversion factor:

- 1 year = 3.15E+07 s

^c The Annual Maximum Radon Impact was calculated by scaling the Annual Maximum Modeled TAC Impact by the Annual Radon Emissions and converted to units of pCi/L using the following conversion factor:

- 1 m³ = 1,000 L

Notes:

- µg = microgram(s)
- Ci = curie(s)
- Ci/s = curie(s) per second
- g = gram(s)
- g/s = gram(s) per second
- L = liter(s)
- m³ = cubic meter(s)
- pCi = picocurie(s)
- pCi/m³ = picocurie(s) per cubic meter
- s = second(s)

While radon cancer risk may not have been included in the project’s health risk assessment (HRA), there is sufficient basis to show that radon emissions from the proposed project do not

¹⁴ Liu, K-S et al. 1990. *Survey of Residential Indoor and Outdoor Radon Concentrations in California*. <https://ww2.arb.ca.gov/sites/default/files/classic/research/apr/past/a6-194-53.pdf>.

¹⁵ Liu, K-S et al. 1991. *Annual Average Radon Concentrations in California Residences*. Journal of Air and Waste Management Association. 41(9):1207-1212. <https://www.tandfonline.com/doi/abs/10.1080/10473289.1991.10466917>.

¹⁶ <https://www.ncbi.nlm.nih.gov/books/NBK158787/table/T23/>



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represent an increased health risk. Specifically, the lifetime cancer risk from the radon concentration at the MEIR location is estimated to be less than 1 in 1 million, as shown in Table III.1-2. Other hazards associated with radon (for example workplace hazards) are addressed through existing regulatory programs.

Table III.1-2 Lifetime Cancer Risk from Radon Concentration in Air at the MEIR

Parameter	Value
Radon-222 Concentration	0.0076 pCi/L
Working Level (WL) ^a	0.00003
Working Level Month (WLM) ^b	0.001
Lifetime Cancer Risk ^c	0.00000083 or 0.83 in 1 million

^a The WL represents the energy of radon daughters (i.e., isotopes from rapidly decaying radon) and is calculated per the following equation:

$$WL = \text{Radon-222 Concentration (pCi/L)} \times \text{Equilibrium Factor} \times \text{Fraction of Time Exposed to Radon Concentration in Air} / 100, \text{ where:}$$

Equilibrium Factor = 0.4 for residences¹⁷
 Fraction of Time Exposed to Radon Concentration in Air = 1 (default)

^b The WLM is calculated per the following equation:

$$WLM = WL \times \text{Exposure Time (hours)} / 170 \text{ hours per month, where:}$$

Exposure Time = 7,000 hours for residential¹⁸

^c The Lifetime Cancer Risk was calculated per the following equation, based on calculations presented in NRC training:¹⁹

$$\text{Lifetime Cancer Risk} = WLM \times \text{Risk Factor per WLM, where:}$$

Risk Factor per WLM = 0.00066, based on the mid-point of the estimated range²⁰

- Other non-condensable gasses (i.e. hydrogen sulfide, ammonia, arsenic, mercury, benzene, toluene, and xylene) pose a risk and should be monitored and mitigated to protect geothermal workers and surrounding communities before issuing a decision for this project. Workers and nearby communities may be more exposed to hazardous non-condensable gasses during normal operations of the facility. Mitigation should also include regular health risk assessment to ensure there are no concentrations of hazardous air pollutants in the region.*

Response: The project’s H₂S emissions were evaluated for comparison to the 1-hour CAAQS and as a TAC contributing to the project’s potential health risks. Based on this evaluation, many of the conditions included in the PDOC aim to limit the project’s H₂S emissions, thereby limiting exposure to workers and nearby communities. The Applicant will also implement BACT for H₂S.

Ammonia, arsenic, mercury, benzene, toluene, and xylene are all identified TACs in California, were included in the Applicant’s HRA per OEHHA guidance, and contribute to the project’s modeled potential health risks. Because there are no established state or federal ambient air

¹⁷ ICRP. 1993. *Protection Against Radon-222 at Home and at Work*. ICRP Publication 65.

https://journals.sagepub.com/doi/pdf/10.1177/ANIB_23_2.

¹⁸ *Id.*

¹⁹ <https://www.nrc.gov/docs/ML1122/ML11227A237.pdf>

²⁰ EPA. 2003. EPA Assessment of Risks from Radon in Homes. EPA 402-R-03-003. Available online at <https://www.epa.gov/sites/default/files/2015-05/documents/402-r-03-003.pdf>.



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quality standards for these TACs, there is no need to address them outside of the HRA.

To determine the relative importance of each of the above pollutants, the per-pollutant contribution to the project's modeled health risks were estimated. Table III.2-1 presents the per-pollutant contribution to the project's estimated cancer risk of 0.48 in 1 million at the MEIR. As shown, arsenic is the predominant contributor to the project's cancer risks.

Table III.2-1. Per-pollutant Contribution to Cancer Risk

Pollutant	Cancer Risk (per million) ^a	Contribution (%)
Ammonia	0	0
Arsenic	0.29	61
Mercury	0	0
Benzene	0.12	25
Toluene	0	0
Xylene	0	0
H ₂ S	0	0

^a The per-pollutant cancer risk was extracted from the Applicant's HRA modeling file titled 'MB_8760_MEIR_CancerRisk.csv' for Receptor 5698.

Similarly, Attachment III.2-1 presents the per-pollutant contributions to the project's estimated chronic and acute health risks at the MEIR. As shown, the respiratory system has the highest chronic health risk, with arsenic contributing up to 83 percent of the estimated risk. The central nervous system has the highest acute health risk, with H₂S contributing up to 99 percent of the estimated risk.

Based on the above analysis, arsenic is the only pollutant apart from H₂S that is notably driving the project's modeled potential health risks. Although arsenic is a predominant contributor to the project's estimated cancer and chronic risks, those risks are considered to be less than significant for the following reasons:

- Cancer risk is less than 1 in 1 million at the MEIR, Maximum Exposed Individual Worker (MEIW), and Maximum Exposed Sensitive Receptor.
- Chronic risk is less than 1.0 at the MEIR and Maximum Exposed Sensitive Receptor, with risks greater than 1.0 limited to 400-feet of the facility's eastern fence line. Although technically not within the project property, it is not expected to be a location presenting a potential for long-term or chronic exposure because public access to this land is restricted as it is private property and not open to the public.

Because the arsenic-driven risks are considered to have a less-than-significant impact on public health, additional scrutiny of the project's arsenic emissions is not warranted.



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IV. Continued Monitoring of Cumulative Impacts

- 1. BHER, the Imperial County Air Pollution Control District, and other agencies and developers must implement monitoring of the cumulative impacts as more geothermal, lithium, and renewable energy developers seek to build projects by the Salton Sea. Regular reviews of the best available control technology (BACT) and other best practices should be employed. Monitoring should be thorough, and data should be readily available, accessible, and reportable to the public. Periodic review of monitoring should also include mitigation measures and recommended alternatives.*

Response: As stated in the response to Comment I.4 above, the Applicant prepared a cumulative impacts analysis per the modeling protocol approved by both the ICAPCD and CEC. This analysis appropriately considered all existing and proposed facilities at the time of permitting, consistent with EPA guidance.²¹ Any new geothermal, lithium, or renewable energy projects subject to environmental analysis under the California Environmental Quality Act will be similarly subject to a cumulative impacts analysis.

The Applicant also prepared a BACT analysis consistent with the EPA's top-down approach. This analysis was appropriate for the project's new emission sources as BACT applies to new and modified stationary sources.

The Applicant Remains Available to Support the Issuance of the FDOC

Thank you for the opportunity to address some of the selected comments of JMA. The Applicant looks forward to working with the ICAPCD during the finalization of the Determination of Compliance. Please contact Anoop Sukumaran at (760) 348-4275 (email address: Anoop.Sukumaran@calenergy.com) or Jerry Salamy at (916) 769-8919 (email address: Jerry.Salamy@jacobs.com) if you have any questions or if you need additional information.

Sincerely,

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²¹ Refer to Section 8.3.3 of Appendix W to 40 CFR Part 51, *Guideline on Air Quality Models*.

Attachment III.2-1

Per-pollutant Contribution to Chronic and Acute Health Risks
Morton Bay Geothermal Project

Chronic Risks at Receptor 5698

Target Organ	Cardiovascular System	Central Nervous System	Immune System	Kidney	Gastrointestinal Tract and Liver or Alimentary Tract	Reproductive and Development System	Respiratory System	Skin	Eye	Bone and Teeth	Endocrine System	Blood	Odor	General
Risk by Target Organ ^a	0.02	0.02	0.00	0.00	0.00	0.02	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00
<i>Per-pollutant Contribution to Target Organ</i>														
Ammonia	0%	0%	0%	0%	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%
Arsenic	100%	100%	0%	0%	0%	100%	83%	100%	0%	0%	0%	0%	0%	0%
Mercury	0%	0%	0%	96%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Benzene	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Toluene	0%	0%	0%	0%	0%	0%	0%	0%	62%	0%	0%	0%	0%	0%
Xylene	0%	0%	0%	0%	0%	0%	0%	0%	38%	0%	0%	0%	0%	0%
H ₂ S	0%	0%	0%	0%	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%
<i>Per-pollutant Risk by Target Organ^b</i>														
Ammonia	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	2.39E-02	2.39E-02	0.00E+00	0.00E+00	0.00E+00	2.39E-02	2.39E-02	2.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	0.00E+00	2.19E-05	0.00E+00	2.19E-05	0.00E+00	2.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.79E-04	0.00E+00	0.00E+00
Toluene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.87E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylene	0.00E+00	1.76E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-08	0.00E+00	1.76E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H ₂ S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.16E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Maximum Risk

^a The total chronic risk was extracted from the Applicant's HRA modeling file titled 'MB_8760_Chronic_NCChronicRiskSumByRec.csv' for Receptor 5698.

^b The per-pollutant chronic risk was extracted from the Applicant's HRA modeling file titled 'MB_8760_Chronic_NCChronicRisk.csv' for Receptor 5698.

Attachment III.2-1

Per-pollutant Contribution to Chronic and Acute Health Risks
Morton Bay Geothermal Project

Acute Risks at Receptor 5695

Target Organ	Cardiovascular System	Central Nervous System	Immune System	Kidney	Gastrointestinal Tract and Liver or Alimentary Tract	Reproductive and Development System	Respiratory System	Skin	Eye	Bone and Teeth	Endocrine System	Blood	Odor	General
Risk by Target Organ ^a	0.00	0.40	0.05	0.00	0.00	0.05	0.11	0.00	0.11	0.00	0.00	0.05	0.00	0.00
<i>Per-pollutant Contribution to Target Organ</i>														
Ammonia	0%	0%	0%	0%	0%	0%	99%	0%	99%	0%	0%	0%	0%	0%
Arsenic	100%	1%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%
Mercury	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Benzene	0%	0%	100%	0%	0%	93%	0%	0%	0%	0%	0%	100%	0%	0%
Toluene	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Xylene	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
H ₂ S	0%	99%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<i>Per-pollutant Risk by Target Organ^b</i>														
Ammonia	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-01	0.00E+00	1.05E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	3.97E-03	3.97E-03	0.00E+00	0.00E+00	0.00E+00	3.97E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	0.00E+00	7.55E-05	0.00E+00	0.00E+00	0.00E+00	7.55E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	0.00E+00	0.00E+00	4.99E-02	0.00E+00	0.00E+00	4.99E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-02	0.00E+00	0.00E+00
Toluene	0.00E+00	3.18E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.18E-06	0.00E+00	3.18E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylene	0.00E+00	6.37E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.37E-07	0.00E+00	6.37E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H ₂ S	0.00E+00	3.93E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Maximum Risk

^a The total acute risk was extracted from the Applicant's HRA modeling file titled 'MB_8760_Acute_NCAcuteRiskSumByRec.csv' for Receptor 5695.

^b The per-pollutant acute risk was extracted from the Applicant's HRA modeling file titled 'MB_8760_Acute_NCAcuteRisk.csv' for Receptor 5695.