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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 California Unions for Reliable Energy Comments on the Preliminary Decision to Grant a Preliminary Determination of Compliance for the Black Rock Geothermal Power Generation Plant

Dear Mr. Ramirez:

Black Rock 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 Black Rock Geothermal Project (BRGP or Black Rock).

The Applicant welcomes this opportunity to submit selected responses to certain comments submitted by the California Unions for Reliable Energy (CURE) on the PDOC for Black Rock. CURE's comments on the PDOC were docketed with the California Energy Commission (CEC) on March 25, 2024[1]. The Applicant remains available to provide additional information in furtherance of issuance of the Final Determination of Compliance (FDOC) for the Black Rock Geothermal Project.

1. The Analysis Used an Accurate Stack Height in Estimating Secondary Pollutant Impacts and is Consistent with U.S. Environmental Protection Agency Guidelines.

In Section IV, Subsection A.1 of its comments, CURE asserts that the hypothetical stack used to determine modeled secondary pollutant impacts is inappropriate based both on its location and height not being representative of the project area and project sources, respectively. This assertion is incorrect.

The Applicant used the framework from the U.S. Environmental Protection Agency's (EPA) 2019 guidance[2] to estimate single source impacts on the formation of secondary pollutants under the Tier 1 approach established in EPA's *Guideline on Air Quality Models*. The Tier 1 approach "involves use of appropriate and technically credible relationships between emissions and ambient impacts developed from existing modeling studies deemed sufficient for evaluating a project source's impacts."[3] EPA's guidance instructs the permit applicant to "identify a representative hypothetical source" and "if a representative

[1] The CURE PDOC comments for the project (Transaction Number [TN] #255266) are available at: https://efiling.energy.ca.gov/GetDocument.aspx?tn=255266&DocumentContentId=90938.
[2] U.S. Environmental Protection Agency (EPA). 2019. *Memorandum: Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program*. April. https://www.epa.gov/sites/default/files/2020-09/documents/epa-454_r-19-003.pdf.
[3] *Id.* at page 5.

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hypothetical source is not available, then consider whether any of these derived MERP values available for the geographic location of the project source may be appropriate to use."[4]

Although the project is not located within Los Angeles County, Los Angeles County is the nearest California county to the project site for which the EPA provides modeled impacts for hypothetical sources. Both the hypothetical source and the project sources also share proximity to bodies of water, providing similar terrain features. Using a California-specific hypothetical source is expected to be more representative of the terrain and meteorology of a California project than a hypothetical source from the larger southwest geographic region, particularly since complex terrain varies so dramatically throughout the southwest.

With regards to the stack height, EPA's guidance provides modeled results for only surface level emissions releases, with a stack height of 10 meters (m), or tall emissions releases, with a stack height of 90 m. Of these two options, the Applicant chose to use modeled results for the 10-m stack height since it more closely aligns to the stack height of the project sources.

Making the above determinations regarding representativeness is within the guidelines of what is recommended in EPA's framework for assessing Modeled Emission Rates for Precursors (MERPs). For this reason, the analysis is both appropriate and consistent with EPA guidance for demonstration purposes.

2. The Dispersion Model Used the Most Representative, Accurate, and Reliable Meteorological Data and Particulate Matter Background Concentrations Available and is Consistent with U.S. Environmental Protection Agency Guidelines.

In Section IV, Subsection A.2 of its comments, CURE asserts that the air quality model relied upon by the Air District to determine the project's compliance with Ambient Air Quality Standards (AAQS) failed to utilize a representative monitoring site for meteorological data and background particulate matter concentrations.[5] This assertion is incorrect.

First, the dispersion model utilized the most representative, accurate, and reliable meteorological data available, consistent with EPA Guidelines. In particular, the Applicant reviewed the meteorological data collected at the Sonny Bono monitoring station, which is the monitoring station that CURE recommended the Air District analyze within its comments.[6] Only two years of recent data (2020 and 2022) from that station meet the EPA requirements of 90 percent minimum completeness before substitution on a quarterly basis.[7] To ensure the worst-case meteorological conditions are adequately represented in the model results, the EPA requires the use of five years of adequately representative National Weather Service (NWS)

[4] *Id.* at page 8.
[5] CURE PDOC Comments, p. 6.
[6] *Id.* at page 8, CURE recommends "that meteorological data from the nearby IID-operated Sonny Bono monitoring station be used because it is the best representation of the conditions that will exist during Project operation."
[7] Refer to Section 5.3.2 of EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA-454/R-99-005), which is available online at https://www.epa.gov/sites/default/files/2020-10/documents/mmgrma_0.pdf.

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meteorological data, at least one year of site-specific data, or at least three years of prognostic meteorological data.[8]

In addition, the Sonny Bono monitoring station is not an Automated Surface Observing Systems (ASOS) station, unlike the Imperial County Airport NWS station. ASOS stations are those monitoring stations which collect sub-hourly 1 to 5-minute wind speed and wind direction readings. To reduce the number of calms and missing winds in the surface data, archived 1-minute winds for the ASOS stations can be used to calculate hourly average wind speeds and wind directions, which are used to supplement the standard archive of hourly observed winds processed in the American Meteorological Society/EPA Regulatory Model (AERMOD) Meteorological Preprocessor (AERMET).

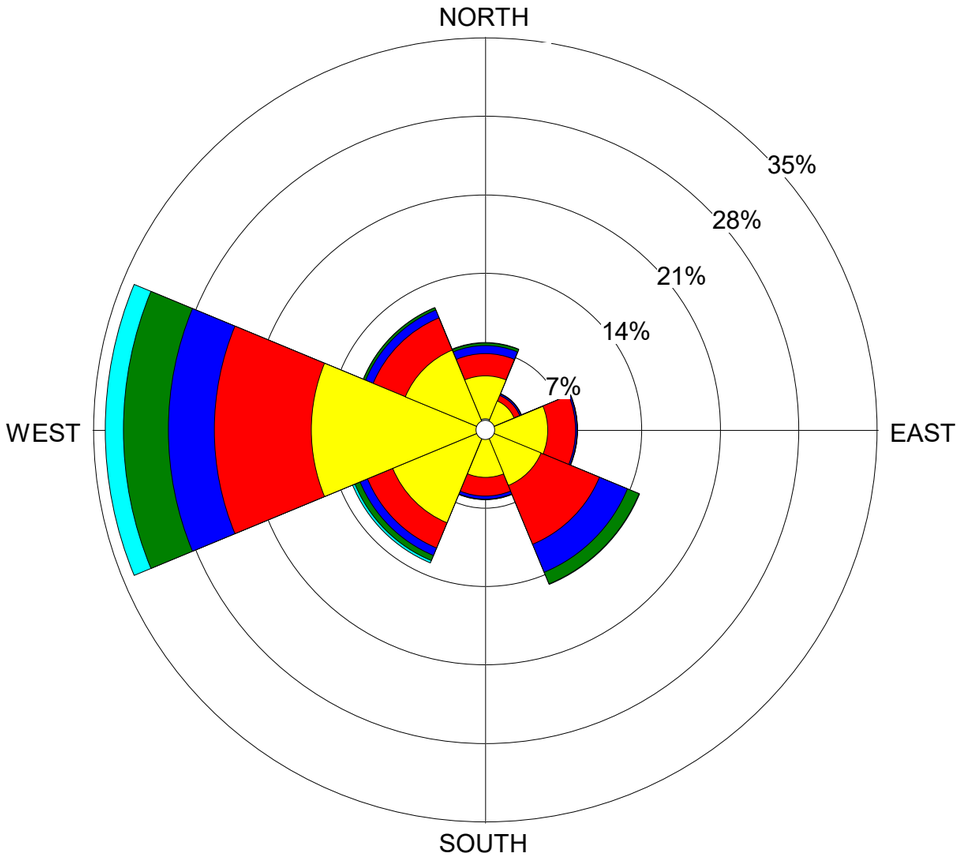
Lastly, although the Imperial County Airport is located over 28 miles from the project site, there are no significant geographic features between the two locations, and both are located south/southeast of the Salton Sea. The lack of significant geographic features between the two locations is itself an indicator of representativeness of the Imperial County Airport meteorological data,[9] but also leads to the expectation that wind speeds and wind directions in the project vicinity are similar to those incurred at the Imperial County Airport. This expected similarity is verified by comparing the wind rose for the Imperial County Airport (for years 2015 to 2018 and 2021) to the wind rose for the Sonny Bono monitoring station (for years 2020 to 2022). As shown in Figure IV.A.2-1, attached hereto, both wind roses share the predominant wind directions from the west and southeast.

Based on the above, the meteorological data collected at the Sonny Bono monitoring station is not more suitable for modeling as the data does not meet the minimum requirements for completeness, and would not be any more representative of the project site than the Imperial County Airport data based on a comparison of wind roses. Furthermore, as an ASOS station, the Imperial County Airport NWS station may provide fewer missing hours of wind speeds and wind directions. For these reasons, the Applicant supports the continued use of the Imperial County Airport NWS station meteorological data, as previously approved both by the ICAPCD and CEC.[10]

The Applicant also reviewed the particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}) and particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$) data collected at the Sonny Bono monitoring station and found only two years of recent PM_{10} 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.[11] Based on this evaluation, the Sonny Bono monitoring station does not provide a complete three-year dataset to compute a design value for PM_{10} or $PM_{2.5}$ for the air dispersion modeling analysis and is not recommended for use. Data collected from the community-level monitors enrolled in the Identifying Violations Affecting Neighborhoods (IVAN) network are also not recommended for use as these data are neither validated nor verified and do not come

[8] Refer to Section 8.4.2(e) of Appendix W to 40 Code of Federal Regulations (CFR) Part 51, *Guideline on Air Quality Models*.
[9] Refer to Section 8.4.1(b)(2) of Appendix W to 40 CFR Part 51, *Guideline on Air Quality Models*.
[10] CEC Staff provided informal approval via electronic mail to the Applicant on December 14, 2022 and did not have any subsequent data requests associated with the modeling protocol. ICAPCD similarly did not have any comments regarding the modeling protocol during its completeness review of the permit application.
[11] 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/aqmguide/collection/cp2/19990401_oaqps_epa-454_r-99-009_guideline_data_handling_pm_naaqs.pdf.

Imperial County Airport (2015 – 2018 and 2021)



Sonny Bono Monitoring Station (2020 – 2022)

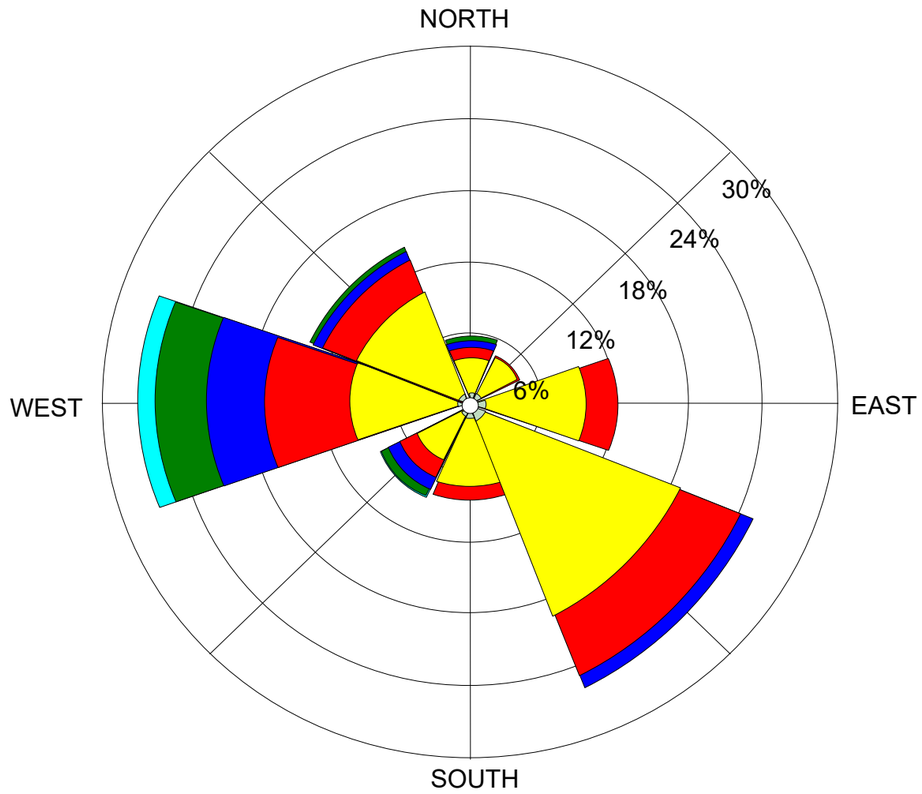


Figure IV.A.2-1
Comparison of Wind Roses
Black Rock Geothermal Project
Imperial County, California

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from regulatory monitors.[12] In turn, the Applicant appropriately used PM_{10} and $PM_{2.5}$ monitoring data collected at the quality assured air quality monitoring stations located in Niland and Brawley, respectively. These "regional" monitoring stations are located upwind of the project area, have recent quality assured data available, and are impacted by similar or adequately representative sources; therefore, they are 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*.

3. The Cumulative Impacts Modeling Appropriately Evaluated All Sources Not Represented in the Background Ambient Monitoring Data.

In Section IV, Subsection A.3 of its comments, CURE asserts that the cumulative impact analysis modeling "must also consider other existing and proposed facilities within 6 miles of the Project site including: CalEnergy Salton Sea Units 1 & 2/3&4/5 facilities, CalEnergy JM Leathers Facility, CalEnergy Central Services facility, CalEnergy Vulcan/Del Ranch facilities, and CalEnergy JJ Elmore Facility"[13] and "does not expressly include emissions from the Morton Bay and Elmore North facilities"[14] and other nearby solar farms and geothermal exploration projects including "the Wilkinson Solar Farm, Lindsey Solar Farm, Midway Solar Farm IV, and the Ormat Wister Solar Project, along with the Hell's Kitchen Geothermal Exploration Project and the Energy Source Mineral ALTiS project."[15] CURE is incorrect. As described below, the cumulative impacts analysis appropriately considered all existing and proposed facilities.

In a cumulative impact analysis, the EPA's guidance requires the evaluation of all sources which could contribute to impacts. However, the guidance only requires modeling of nearby sources that are not adequately represented in the background ambient monitoring data, particularly if those sources could contribute to areas where the project alone has Significant Impact Level (SIL) exceedances.[16] Of the facilities listed by CURE, all CalEnergy facilities and the Ormat Wister Solar Project are existing, operational facilities that are adequately represented in background monitoring data. Both Morton Bay and Elmore North were modeled in the cumulative impact analysis.[17] Further, as described in the *Air Dispersion Modeling Report for Black Rock, Elmore North, and Morton Bay Geothermal Projects*, Wilkinson Solar Farm, Lindsey Solar Farm, Midway Solar Farm IV, Hell's Kitchen, and Energy Source Mineral ALTiS were considered for inclusion in the cumulative impacts analysis as proposed future projects but ultimately not included. Although the Wilkinson Solar Farm, Lindsey Solar Farm, Midway Solar Farm IV, and Energy Source Mineral ALTiS have received construction permits, they are not expected to individually cause a net increase of 5 tons per year or more of $PM_{2.5}$. At such low emissions levels, each of these projects is not expected to be a major contributor to ground level $PM_{2.5}$ concentrations within the project vicinity. Hell's Kitchen was excluded because it is currently in the entitlement process, which occurs before any air emissions-related permitting and licensing. As such, it is impossible to predict what its potential emissions may be or if the project will even be built in the future.

[12] Refer to the disclaimer regarding the use of these data at https://ivan-imperial.org/air/map.
[13] CURE PDOC Comments, p. 10.
[14] *Id.* at page 11.
[15] *Id.* at pages 11 and 12.
[16] Refer to Section 8.3.1 of Appendix W to 40 CFR Part 51, *Guideline on Air Quality Models*.
[17] Refer to Attachment DRR 12-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080).

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In addition, as shown in Table 4-1 and Appendix A of the *Air Dispersion Modeling Report for Black Rock, Elmore North, and Morton Bay Geothermal Projects*, the SIL impact radius for the project's 24-hour and annual $PM_{2.5}$ impacts is small (i.e., 0.1 kilometer (km) or less). At such limited distances, it is unlikely that $PM_{2.5}$ impacts from nearby existing sources would overlap with the project's impact areas. This conclusion is further supported through consideration of the wind rose and the location and orientation of similar existing emission sources in the project vicinity. For example, Vulcan and Del Ranch are existing, operational facilities located southeast of the project and, like the project, emit $PM_{2.5}$ from cooling towers. The cooling towers at both Vulcan and Del Ranch are located along the southern edge of each property in a west to east configuration. Given the proximity of these two facilities to the project and their slightly staggered positioning, $PM_{2.5}$ impacts from all three facilities would be expected to occur in the same general direction (i.e., east of all property boundaries) under the same meteorological conditions instead of overlapping in an area requiring different wind directions (i.e., east of the project but north of Vulcan and Del Ranch). Furthermore, in the rare event that $PM_{2.5}$ impacts from all three facilities did overlap, they would have to do so persistently for 24-hours or the majority of a year to affect the modeled results, based on the averaging periods of the $PM_{2.5}$ standards. For these reasons, it is unlikely that the project's highest $PM_{2.5}$ impacts would overlap with the highest $PM_{2.5}$ impacts from nearby existing sources; therefore, inclusion of such nearby existing sources in the cumulative impact analysis is not warranted.

Further, a cumulative impacts analysis was conducted for $PM_{2.5}$ per the modeling protocol approved by both the ICAPCD and CEC,[18] based on the project's operational emissions exceeding the SIL for both 24-hour and annual $PM_{2.5}$.[19] As described in Section 4.2 of the *Air Dispersion Modeling Report for Black Rock, Elmore North, and Morton Bay Geothermal Projects*,[20] the predominant contributor to $PM_{2.5}$ emissions within Imperial County is windblown dust, which is not attributed to localized emission sources. Apart from windblown dust, on-road vehicles are a greater contributor of $PM_{2.5}$ emissions within Imperial County than electric generating facilities. Based on this profile, the Applicant selected background monitors located in urban areas near the predominant contributors (i.e., arterial streets, interstates, and highways), thereby providing for the purposes of the analyses a potentially higher localized $PM_{2.5}$ background concentration than what is expected to be emitted by existing geothermal power plants in the project vicinity. This approach is consistent with EPA's recently released draft guidance on the development of background concentrations for use in modeling analyses, which suggests that selecting a background monitor located in an urban area may provide a more conservative assessment when the project source is in a more rural location.[21]

The portion of Imperial County in which the project is located is currently designated as an attainment area for $PM_{2.5}$ under both federal and state standards. For consistency with the project's location and the location

[18] The *Air Dispersion Modeling Protocol for Black Rock Geothermal Plant Cumulative Impact Analysis* was docketed on September 28, 2023 (TN #252438). 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.
[19] The CEC does not require a cumulative assessment for pollutants in which the facility impact is less than the EPA's applicable SIL.
[20] Refer to Attachment DRR 12-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080).
[21] 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.

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of the meteorological monitoring data, the $PM_{2.5}$ background concentrations used in the Applicant's analysis were collected at monitoring stations located south of the Salton Sea, which are in or near the nonattainment portion of Imperial County. Use of these $PM_{2.5}$ background concentrations resulted in modeled cumulative impacts below the applicable standards, even with inclusion of contributions from the proposed Morton Bay and Elmore North Geothermal Projects. As documented above, electric generating facilities are a smaller contributor to $PM_{2.5}$ emissions within Imperial County than fugitive dust and on-road vehicles. As such, it is unlikely that existing electric generating facilities already adequately represented in background monitoring data within Imperial County, such as Vulcan and Del Ranch, present a significant $PM_{2.5}$ impact within the project vicinity.

Lastly, in considering potential cumulative impacts from the proposed Black Rock, Morton Bay, and Elmore North Geothermal Projects, CURE incorrectly states that "emissions from these three facilities would cause or contribute to violations of AAQS for PM_{10} and $PM_{2.5}$."[22] The combined maximum annual and hourly $PM_{2.5}$ and PM_{10} concentrations cited by the commenter arbitrarily sum the maximum modeled impacts reported within Table 5.1-31 of Attachment DRR 7-1 of each project's revised Data Request Response Set 1.[23] Because these modeled impacts occur in different locations, they cannot be directly summed. Rather, emissions from all three projects must be included in the same dispersion model. As shown in Table 6-1 of the *Air Dispersion Modeling Report for Black Rock, Elmore North, and Morton Bay Geothermal Projects*, the maximum modeled impacts from the concurrent operation of all three projects are less than the applicable AAQS.

4. Black Rock, Vulcan, and Hoch (Del Ranch) Are Not Under Common Control.

The Black Rock Geothermal Project will be owned and operated, if approved, by Black Rock Geothermal LLC, an indirect, wholly owned subsidiary of BHE Renewables, LLC (BHER) formed for development of the project. In contrast to this permitting process, the Vulcan and Hoch (Del Ranch) facilities are existing, operating facilities. The operating facilities have separate ownership and operations which will continue, with or without the approval of Black Rock. The three separate legal entities are affiliates; however, they are not under common control, as Vulcan and Hoch (Del Ranch) operate and will continue to operate independent of the yet to be approved Black Rock Geothermal Project.

To illustrate the point of the separate interests, while there are no current plans to divest either of these three projects, either project company could, in theory, be sold to a third party without any notice, review, or approval of the other. Each is independently formed. Each is required to remain in good standing with the entity governing formation. They have separate compliance obligations, none of which are ascribed to the other. From a liability perspective, the acts of one would not create a benefit or a liability for the other because they are separate. From a corporate perspective, they are not under common control and their ownership interests could be separately divested.

As a factual matter, the three project companies are separately operating entities with no commonalities. Of course, given that Vulcan and Hoch (Del Ranch) exist today, they share no common facilities with the proposed Black Rock. Assuming successful permitting of Black Rock, the project companies will remain

[22] CURE PDOC Comments, p. 11.
[23] TN #253080, TN #253082, and TN #253081, respectively.

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separate, independent entities. The independence of each of these three facilities is further supported by the following facts:

- The facilities will not share steam, brine, or other resources.
- Black Rock will have its own production and injection wells which are not interconnected to either Vulcan or Hoch (Del Ranch).
- The facilities will operate under their own, distinct power purchase agreements with individual responsibilities to their own counter-parties.
- Each facility will be operated independently to comply with North American Electric Reliability Corporation (NERC) regulations. Black Rock's high-side step up transformer has a voltage of 230 kilovolts (kV; above 100 kV), which will include Black Rock in the Bulk Electrical System (BES) as defined by NERC Glossary of Terms for entities subject to NERC compliance. Generating resources operated at voltages of 100 kV or higher at the high-side of the step-up transformer(s) are subject to NERC compliance. Whereas, Vulcan and Hoch (Del Ranch)'s high-side step up transformer voltages are 92 kV and 92 kV, respectively, which exclude both power plants from the BES.
- One facility's operations will not influence operations at the other, based in large part on their independent infrastructure.

In addition, Vulcan and Hoch (Del Ranch) are more than 30 years old and have continued to operate during this time under their own permits with periodic modifications. Black Rock is not a replacement of either Vulcan or Hoch (Del Ranch).

5. The Three Projects Cannot and Would Not Be Permitted as a Single Stationary Source Due to the CEC's Exclusive Jurisdiction Over Black Rock.

The CEC has exclusive siting jurisdiction over thermal power plants, defined as "any stationary or floating electrical generating facility using any source of thermal energy, with a generating capacity of fifty (50) megawatts or more, and any facilities appurtenant thereto" (California Public Resources Code Section 25120). Further, the issuance of a certificate by the CEC shall be in lieu of any permit, certificate or similar document required by any state, local or regional agency (California Public Resources Code Section 25500). There can be no dispute that the Black Rock Geothermal Project can and must be licensed by the CEC.

In contrast, Vulcan and Hoch (Del Ranch), both existing facilities, are not CEC jurisdictional projects because, at the time of their permitting, they were not both thermal and fifty megawatts or more capacity. As a matter of law, the three projects, separated in time, could and would not be permitted as a single project.

As further evidence of the separateness, a 1979 Memorandum of Understanding (MOU) between the CEC and the California Air Resources Board (CARB) sets forth how the CEC, CARB, and the local air pollution control districts are to integrate their permitting processes. The critical provision is as follows:

> C. Decision: The Commission AFC decision shall include findings and conclusions on conformity with air quality requirements based on the Determination of Compliance. ***If the Determination of Compliance concludes that the facility as proposed by the Applicant will comply with all applicable***

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> ***air quality requirements, the Commission shall include in its certification any and all conditions necessary to insure compliance.*** * * * (PDF page 7.)

This section has long been read to mean that the CEC incorporates the local air district's conditions into its Certification. This incorporation of an air district's FDOC into the CEC Certification verbatim has been the practice since the inception of the CEC in 1976.

6. The Project Would Not Cause or Contribute to a Violation of Newly Revised NAAQS for Annual PM2.5.

In conjunction with the EPA's release of its final rule to strengthen the annual National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$, the EPA also released an implementation guide[24] 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.

In addition, the Applicant's analysis conservatively assumed the project's cooling towers would operate 8,760 hours per year at the maximum $PM_{2.5}$ emission rate, without any consideration of periods of downtime or reduced cooling tower demand due to seasonal temperature variations. This condition simply cannot exist during operations. The Applicant could refine this assumption to reflect actual expected, much less frequent, cooling tower operations, rather than the conservative assumptions presented in the application, but nothing in Section A.2.b of Rule 207 requires such an exercise, especially where the project's application has already been deemed complete.

Further, the background concentration used in this modeling analysis comprises 96 percent of the new, reduced annual NAAQS for $PM_{2.5}$. During consideration of the $PM_{2.5}$ State Implementation Plan (SIP) for Imperial County, it was noted that Imperial County is impacted year-round by the international transport of pollutants from Mexicali, Mexico. Although the SIP is not required to address pollution originating from outside the borders of the United States, implementation of the revised $PM_{2.5}$ NAAQS will undoubtedly encourage implementation of additional control technologies throughout the state to bring down background concentrations within California. These new regulations and policies will ultimately reduce the project's potential $PM_{2.5}$ impacts.

7. The Project Would Not Cause or Contribute to a Violation of CAAQS and NAAQS for PM10 and PM2.5.

In Section VI, Subsection B, CURE again recommends the use of particulate matter background concentrations from the Sonny Bono monitoring station. The Applicant reviewed the PM_{10} and $PM_{2.5}$ data collected at the Sonny Bono monitoring station and found only two years of recent PM_{10} data (2018 and

[24] Available online at https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-implementation-fact-sheet.pdf.

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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.[25] Based on this evaluation, the Sonny Bono monitoring station does not provide a complete three-year dataset to compute a design value for PM_{10} or $PM_{2.5}$ for the air dispersion modeling analysis and is not recommended for use. In turn, the Applicant appropriately used PM_{10} and $PM_{2.5}$ monitoring data collected at the quality assured air quality monitoring stations located in Niland and Brawley, respectively. These "regional" monitoring stations are located upwind of the project area, have recent quality assured data available, and are impacted by similar or adequately representative sources; therefore, they are considered suitable for use per Section 8.3.2(b) of Appendix W to 40 CFR Part 51, *Guideline on Air Quality Models*. Furthermore, the use of these urban area monitors is consistent with EPA's recently released draft guidance on the development of background concentrations for use in modeling analyses, which suggests that selecting a background monitor located in an urban area may provide a more conservative assessment when the project source is in a more rural location.[26] As shown in Table 5.1-31 of Attachment DRR 7-1 of *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080), the project's modeled impacts using background PM_{10} and $PM_{2.5}$ concentrations from the quality assured Niland and Brawley stations would not cause or contribute to a violation of the 24-hour PM_{10} NAAQS, 24-hour $PM_{2.5}$ NAAQS, and annual $PM_{2.5}$ NAAQS and California Ambient Air Quality Standard (CAAQS).

With regards to control technologies, the project'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 *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080), the Applicant will implement control measures during project construction to minimize fugitive dust and equipment 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 CARB's 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.

[25] 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/aqmguide/collection/cp2/19990401_oaqps_epa-454_r-99-009_guideline_data_handling_pm_naaqs.pdf.

[26] 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.

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8. The Project Would Not Cause or Contribute to a Violation of CAAQS for Hydrogen Sulfide.

As stated in Section 5.1.9.6 of Attachment DRR 7-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (Transaction Number [TN] #253080), "H_2S in the ambient air near the Salton Sea is subject to episodic events that result in concentrations which temporarily exceed the CAAQS of 0.03 parts per million (ppm). These episodic events of H_2S exceedances are well known and largely due to biogenic sources and activity (SCAQMD 2021). As a result, monitoring data in the region may not be representative for use in a CAAQS modeling analysis and the project's modeled maximum impacts will instead be compared to the CAAQS directly."

To confirm these factual circumstances, the South Coast Air Quality Management District (SCAQMD) established hydrogen sulfide (H_2S) monitors along the north side of the Salton Sea to support notification and reporting of odor nuisances. Data collected at these monitors have exceeded the one-hour CAAQS of 0.03 ppm on numerous occasions. Despite these known and reported results, CARB continues to designate the area as attainment for H_2S. This designation supports the use of these monitored H_2S concentrations for odor evaluations only, which are often attributed to episodic events. Furthermore, the Salton Sea itself is a predominant source of naturally-occurring H_2S within the region; such biogenic sources should not prohibit the development of stationary sources which utilize the resources for renewable energy.

Consistent with the above, the Applicant initially proposed to model H_2S only as an odor nuisance. Following discussion with the ICAPCD and CEC, the Applicant agreed to conduct an H_2S modeling analysis for demonstration of compliance with the one-hour CAAQS despite such an analysis never having been requested for other geothermal power plants in the project vicinity. As shown in Table 5.1-31 of Attachment DRR 7-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080), the project's maximum modeled H_2S concentration of 25.2 micrograms per cubic meter ($\mu g/m^3$) is less than the one-hour CAAQS of 42 $\mu g/m^3$. This analysis, the methodology of which was agreed to by both the ICAPCD and CEC, demonstrates a good faith effort by the Applicant to comply with requests made by the reviewing agencies and that, during routine operations, the project will not cause or contribute to an exceedance of the one-hour CAAQS for H_2S.

9. The Measures Proposed to Reduce the Project's Hydrogen Sulfide Emissions Do Meet the Requirement for Best Available Control Technology.

At the request of the ICAPCD, the Applicant prepared a Best Available Control Technology (BACT) analysis.[27] The BACT analysis specifically considered the following additional control technologies for the project's H_2S emissions: direct injection of condensate for sour condensate liquid (H_2S) abatement and liquid redox technologies, including Stretford Process, SulFerox, and LO-CAT, for non-condensable gas (NCG) (H_2S) abatement.

The BACT analysis was performed following the EPA's top-down approach, which includes the following elements:

- Step 1: Identify potential control technologies

[27] Refer to Appendix 5.1E of Attachment DRR 7-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080).

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- Step 2: Eliminate technically infeasible options
- Step 3: Rank remaining control technologies by control effectiveness
- Step 4: Evaluate most effective controls
- Step 5: Select BACT

Per Step 2 of the above process, technically infeasible options are eligible for elimination from the BACT analysis and do not require further evaluation of control and cost effectiveness. As a result, the BACT analysis focused on technically feasible options that reduce emissions without formation of any associated secondary emissions. For example, although thermal oxidizers would reduce H_2S emissions, they require propane combustion to operate, which would lead to an increase in emissions of combustion contaminants.

ICAPCD Rule 207.B defines BACT as the most effective emission control device which has been achieved in practice or any other alternative emission control device determined to be technologically feasible and cost-effective by the Air Pollution Control Officer (APCO).[28] ICAPCD Rule 207.B further indicates that a cost-effectiveness analysis should be performed in accordance with methodology and criteria specified in the SCAQMD's BACT Guidelines.

Consistent with the EPA's top-down approach and the provisions of ICAPCD Rule 207.B, the cost-effectiveness of each technically feasible option was provided as part of the BRGP's administrative record, either in the 2017 BACT analysis or the Applicant's addendum. SCAQMD's BACT Guidelines indicate that a technology is considered to be cost effective if its "cost per ton of emissions reduced is less than the maximum required cost effectiveness."[29] However, no maximum required cost effectiveness is provided for H_2S. Therefore, the Applicant instead relied on a comparison of cost per ton of emissions reduced to determine which technology was the most cost-effective and recommended that technology for the project.

By preparing the BACT analysis, the Applicant adequately considered advancements in technology relevant to the project's H_2S emissions and ultimately proposed the technology that was both technically feasible and cost-effective, consistent with the provisions of ICAPCD Rule 207.B.

In addition, CURE's indication that the PDOC lacks "specific numerical limits from applicable regulations and standards" as well as "a clear discussion on the frequency and methodology of monitoring for both particulate and H_2S emissions"[30] is erroneous. Section F, Monitoring Program, of the PDOC Permit Conditions clearly specifies the frequency and nature of particulate and H_2S monitoring to be conducted during the life of the project. Regulatory limits are also presented throughout the Applicable Rules and Regulations portion of the PDOC, where applicable to the project. Comparison of the project's emissions to those regulatory limits is also provided throughout Attachment DRR 7-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080).

[28] https://apcd.imperialcounty.org/wp-content/uploads/2020/01/1RULE207.pdf
[29] https://www.aqmd.gov/docs/default-source/bact/bact-guidelines/bact-guidelines-2024/part-c_policy-and-procedures-for-non-major-polluting-facilities.pdf
[30] CURE PDOC Comments, p. 21.

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10. There Is Sufficient Evidence That Post-Mitigation Measures Proposed Will Reduce Particulate Matter and H2S Emissions.

The use of High Efficiency Cellular Type Drift Eliminators (0.0005 percent drift rate) is considered BACT for particulate matter emissions from cooling towers, as discussed in Section 5.1.8.1 of Attachment DRR 7-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080). Maintaining this control equipment in accordance with manufacturer specifications is critical to assuring its continued effectiveness at minimizing particulate matter emissions. Installation and upkeep of this control equipment will be required through Section C, Cooling Tower, of the PDOC Permit Conditions.

As CURE indicates, the Applicant has already indicated that filter cakes will be kept covered and that the handling thereof will be minimized. As with fugitive dust control, these best management practices are generally recognized and accepted as suitable methods for minimizing particulate emissions. The details of implementing these best management practices will be developed as part of the project's operating and maintenance procedures, which are not required to be established prior to issuance of the FDOC.

Contrary to CURE's indication, maintaining cooling tower drift losses and best management of filter cakes will not minimize H_2S emissions as they are directed towards minimizing particulate matter emissions. Rather, H_2S emissions will be controlled by a sparger and biological oxidation box, as described in Section 5.1.8.2 of Attachment DRR 7-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080). Details of these technologies, including their control efficiencies, are provided within the 2017 BACT analysis and the Applicant's addendum.[31]

11. The Air District Can Issue the Final Determination of Compliance Consistent with the Requirements of Rule 1401.

ICAPCD can issue an FDOC, consistent with Rule 1401. CURE's arguments to the contrary are unavailing. As presented in Table 5.9-9 of Attachment DRR 7-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080), the project's total acute hazard index (HI) does exceed the significance threshold of 1.0 only at the Point of Maximum Impact (PMI), which was the same receptor conservatively and arbitrarily used for the Maximum Exposed Individual Worker (MEIW).

For the purpose of calculating acute HI, SCAQMD Rule 1401 considers "any location outside the boundaries of the facility at which a person could experience acute exposure."[32] Although the PMI for acute risk is located in the vicinity immediately surrounding the project, it is reasonable to assume that an individual could be present at the project fenceline for 1 hour. However, ICAPCD has only formally established thresholds at which public notification of potential health risks is required.[33] Exceedance of

[31] Refer to Appendix 5.1E of Attachment DRR 7-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080).
[32] SCAQMD Rule 1401(c)(11)(A)
[33] https://ww2.arb.ca.gov/ab-2588-district-prioritization-scores-and-risk-threshold-levels

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these public notification thresholds does not prohibit ICAPCD from approving a permit for the emission source.

As stated in Section 5.9.3.5.1 of Attachment DRR 7-1 of the *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080), the Applicant will comply with the public notification requirements for the project's acute risks. Furthermore, the project has implemented source-specific Best Available Control Technology for Toxics (T-BACT), which is required by CARB's *Risk Management Guidance for Stationary Sources of Air Toxics*[34] for sources contributing acute health risks greater than the significance threshold.

12. The HRA Properly Analyzes and Accounts for Potential Radon Impacts.

CURE's claims related to potential radon impacts are unfounded. 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).[35] 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/m^2-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 the Office of Environmental Health Hazard Assessment's (OEHHA) guidelines for assessing radon emissions to ambient air.

The 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 picocuries per liter (pCi/L).[36] Studies conducted by CARB reported a statewide average outdoor air concentration of 0.49 pCi/L.[37, 38]

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 VII.B-1 below,

[34] https://ww2.arb.ca.gov/sites/default/files/classic/toxics/rma/rmgssat.pdf
[35] 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.
[36] Agency for Toxic Substances and Disease Registry (ATSDR). 2012. *Toxicological Profile for Radon*. May. https://www.atsdr.cdc.gov/ToxProfiles/tp145.pdf.
[37] 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.
[38] 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.

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the annual average concentration at the MEIR is 0.0033 pCi/L, which is well within existing (background) levels of radon in air in California.

Table VII.B-1. Radon Concentration at the MEIR

Parameter	**Value**
Annual Maximum Modeled TAC Impact [a]	12.89 µg/m^3 per g/s
	1.29E+07 pCi/m^3 per Ci/s
Annual Radon Emissions [b]	8.07 Ci/year
	2.56E-07 Ci/s
Annual Maximum Radon Impact [c]	3.30 pCi/m^3
	0.0033 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/m^3 per Ci/s using the following conversion factors:

1 µg = 1.00E-06 g
1 g = 1.50E+05 Ci[39]
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 *Black Rock Geothermal Project Data Request Response Set 1 (Revised Responses to Data Requests 3, 4, 7, 10 to 13, and 63 to 66)* (TN #253080) 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 m^3 = 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)
m^3 = cubic meter(s)
pCi = picocurie(s)
pCi/m^3 = 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 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 VII.B-2. Other hazards associated with radon (for example workplace hazards) are addressed through existing regulatory programs.

[39] https://www.ncbi.nlm.nih.gov/books/NBK158787/table/T23/

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Table VII.B-2 Lifetime Cancer Risk from Radon Concentration in Air at the MEIR

Parameter	Value
Radon-222 Concentration	0.0033 pCi/L
Working Level (WL) [a]	0.00001
Working Level Month (WLM) [b]	0.001
Lifetime Cancer Risk [c]	0.00000036 or 0.36 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 = Radon-222 Concentration (pCi/L) x Equilibrium Factor x Fraction of Time Exposed to Radon Concentration in Air / 100, where:
Equilibrium Factor = 0.4 for residences[40]
Fraction of Time Exposed to Radon Concentration in Air = 1 (default)

[b] The WLM is calculated per the following equation:

WLM = WL x Exposure Time (hours) / 170 hours per month, where:
Exposure Time = 7,000 hours for residential[41]

[c] The Lifetime Cancer Risk was calculated per the following equation, based on calculations presented in NRC training:[42]

Lifetime Cancer Risk = WLM x Risk Factor per WLM, where:
Risk Factor per WLM = 0.00066, based on the mid-point of the estimated range[43]

13. The HRA Modeling Uses Representative Meteorological Data

The metrological data the HRA relied upon in the PDOC is proper and representative. The Applicant reviewed the meteorological data collected at the Sonny Bono monitoring station and found only two years of recent data (2020 and 2022) to meet the EPA's requirements of 90 percent minimum completeness before substitution on a quarterly basis.[44] To ensure the worst-case meteorological conditions are adequately represented in the model results, the EPA requires the use of five years of adequately representative NWS meteorological data, at least one year of site-specific data, or at least three years of prognostic meteorological data.[45]

In addition, the Sonny Bono monitoring station is not an ASOS station, unlike the Imperial County Airport NWS station. ASOS stations are those monitoring stations which collect sub-hourly 1 to 5-minute wind speed and wind direction readings. To reduce the number of calms and missing winds in the surface data, archived 1-minute winds for the ASOS stations can be used to calculate hourly average wind speeds and

[40] 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.
[41] *Id*.
[42] https://www.nrc.gov/docs/ML1122/ML11227A237.pdf
[43] 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.
[44] Refer to Section 5.3.2 of EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA-454/R-99-005), which is available online at https://www.epa.gov/sites/default/files/2020-10/documents/mmgrma_0.pdf.
[45] Refer to Section 8.4.2(e) of Appendix W to 40 CFR Part 51, *Guideline on Air Quality Models*.

wind directions, which are used to supplement the standard archive of hourly observed winds processed in AERMET.

The Imperial County Airport is located approximately 28 miles from the project site. Significantly, for the purposes of the PDOC's conclusions, there are no significant geographic features between the two locations and both are located south/southeast of the Salton Sea. The lack of significant geographic features between the two locations is itself an indicator of representativeness of the Imperial County Airport meteorological data,[46] but also leads to the expectation that wind speeds and wind directions in the project vicinity are similar to those incurred at the Imperial County Airport. This expected similarity is verified by comparing the wind rose for the Imperial County Airport (for years 2015 to 2018 and 2021) to the wind rose for the Sonny Bono monitoring station (for years 2020 to 2022). As shown in Figure IV.A.2-1, both wind roses share the predominant wind directions from the west and southeast.

Based on the above, the meteorological data collected at the Sonny Bono monitoring station is not suitable for modeling as the data does not meet the minimum requirements for completeness. Beyond its incompleteness, the use of this data would not be any more representative of the project site than the Imperial County Airport data based on a comparison of wind roses. Furthermore, as an ASOS station, the Imperial County Airport NWS station may provide fewer missing hours of wind speeds and wind directions. For these reasons, the use of the Imperial County Airport NWS station meteorological data in the PDOC's analysis is representative, as previously approved both by the ICAPCD and CEC.[47]

14. The HRA Properly Analyzes the Emissions Estimates for Hydrochloric Acid.

As explained in the application materials submitted to the ICAPCD, the project's hydrochloric acid (HCl) emissions were conservatively attributed to a 20,000-gallon storage tank. As explained, however, the HCl emissions estimate was developed independent of the HCl concentration and size of the storage tank. Specifically, the project's HCl emissions assumed a maximum filling rate of 100 gallons per minute (gpm) with the scrubber operating up to 365 days per year. These conservative assumptions are inclusive of scrubber operation for both the 10,000-gallon and 300-gallon HCl storage tanks.

Furthermore, the project's HRA did include HCl emissions from an HCl scrubber. Because the source modeling parameters were based upon an estimated scrubber size (instead of a specific storage tank) and because the assigned emissions were inclusive of scrubber operation for both HCl storage tanks, the HRA results should be considered to reflect potential health risks resulting from both HCl storage tanks. For these reasons, the additional analysis specific to the 300-gallon HCl storage tank CURE seeks is not required.

15. Condition B.9 Was Developed Consistent With the Applicant's Potential To Emit Estimate and is Independent of the Yearly Anticipated HCl.

Although the project's HCl emissions were conservatively attributed to a 20,000-gallon storage tank, the HCl emissions estimate was developed independent of the HCl concentration and size of the storage tank. The project's HCl emissions assumed a maximum filling rate of 100 gpm with the scrubber operating up

[46] Refer to Section 8.4.1(b)(2) of Appendix W to 40 CFR Part 51, *Guideline on Air Quality Models*.
[47] CEC Staff provided informal approval via electronic mail to the Applicant on December 14, 2022 and did not have any subsequent data requests associated with the modeling protocol. ICAPCD similarly did not have any comments regarding the modeling protocol during its completeness review of the permit application.

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to 365 days per year. These conservative assumptions are inclusive of scrubber operation for both the 10,000-gallon and 300-gallon HCl storage tanks and represent the project's potential to emit (PTE) HCl. Permit Condition B.9 was developed consistent with the Applicant's PTE estimate and is independent of the anticipated annual HCl throughput expected each year.

The Applicant Remains Available to Support the Issuance of the FDOC

Thank you for the opportunity to address some of the selected comments of CURE. 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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