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Description:	Item 09 Back up Materials for October 12, 2022 Business Meeting LMEC Petition to Amend
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CALIFORNIA
ENERGY COMMISSION

DATE: September 30, 2022

TO: Interested Parties

FROM: John Heiser, Compliance Project Manager

SUBJECT: **LOS MEDANOS ENERGY CENTER (98-AFC-01C)**

Staff Analysis of Post Certification Petition to Amend the Final Commission Decision

On April 23, 2021, Los Medanos Energy Center (LMEC), LLC (project owner) filed a post-certification petition (petition) with the California Energy Commission (CEC) for the Los Medanos Energy Center (LMEC).

LMEC is an operational 500-megawatt (MW) natural gas fired, combined-cycle energy facility that includes heat recovery steam generator (HRSG) units, steam turbine generator units, transformers, and water treatment and cooling towers. The project was certified by the CEC on August 17, 1999 and began commercial operation in October 2001. The facility, formerly known as Pittsburg District Energy Facility, is in the City of Pittsburg, in eastern Contra Costa County, California.

Description of Proposed Change

The project owner seeks approval for a petition that would allow the LMEC to work with ION Clean Energy (ION) to demonstrate, on a pilot scale, its solvent technology to capture carbon dioxide (CO2) from a small portion of flue gas from a single turbine exhaust at LMEC. The project would require LMEC to supply approximately 0.04 percent of its stack gas via an above-ground pipeline to an onsite carbon capture pilot project. The CO2 capture pilot project will consist of the following components:

- 80-foot absorber column
- Wet sac cooling unit
- Chemical delivery tanks
- Supporting pumps and diagnostic equipment.

The CO2 product will then either be emitted to the atmosphere, recombined with the absorber effluent gas, or provided to a third-party user. A carbon filter package and electrodialysis reclaimer will process a slipstream of lean solvent to remove accumulated salts, particulates, and thermal decomposition products. The pilot project would be in operation for approximately 15 months with the equipment removed from the site after the pilot project is completed.

Staff recommends the addition of seven new Air Quality conditions of certification to the LMEC's CEC certificate (license) to address increases in ammonia and Volatile Organic Compounds (VOCs), also known as Primary Organic Contaminants (POCs) emissions resulting from the CO2 pilot project.

The petition requesting the project change has been docketed and is available on the CEC's project webpage at https://www.energy.ca.gov/powerplant/combined-cycle/los-medanos-energy-center.

CEC Staff Review and Conclusions

California Code of Regulations, title 20, section 1769 requires a project owner to petition the CEC for the approval of any change the project owner proposes to the project, design, operation, or performance requirements of a certified facility.

Consistent with California Code of Regulations, title 20, section 1769, CEC staff has reviewed the petition for potential environmental effects; consistency with applicable laws, ordinances, regulations, and standards (LORS); and LMEC's conditions of certification. Based on staff's analysis, contained below, staff has concluded that: (1) there is no possibility the changes would have a significant effect on the environment, (2) the changes would not cause the project to fail to comply with any applicable LORS, but (3) the changes would require the addition of Air Quality conditions of certification as adopted in the Final Commission Decision to address potential increase in emission limits. Thus, staff is bringing this petition to the Commission for approval pursuant to California Code of Regulations, title 20, section 1769(a)(4).

Staff recommends the addition of new Conditions of Certification **AQ-ION 1** through **AQ-ION 7** for consistency with the new Authority to Construct permit issued by the Bay Area Air Quality Management District (BAAMQD) to make the effect on the environment less than significant.

Staff concludes that none of the findings specified in California Code of Regulations, title 20, section 1748(b) apply to the proposed change. Lastly, staff concludes the proposed change does not meet any of the criteria requiring the production of subsequent or supplemental review pursuant to Public Resources Code section 21166.

Staff also concludes that, with the adoption of the recommendations in the analysis below, LMEC would remain in compliance with applicable LORS, and the proposed changes to LMEC would not result in any significant adverse direct, indirect, or cumulative impacts to the environment.

Staff intends to recommend approval of the petition at the October 12, 2022, Business Meeting of the CEC.

The CEC's project webpage, https://www.energy.ca.gov/powerplant/combined-cycle/los-medanos-energy-center, has a link to the petition and the Staff Analysis on

the right side of the webpage in the box labeled "Compliance Proceeding." Click on the "Docket Log (98-AFC-01C)" option. If approved, the CEC's Order approving this petition will also be available from the same webpage.

This letter has been mailed to the CEC's list of interested parties and property owners of all parcels within 500 feet of any affected project linears and 1,000 feet of the project site. It has also been emailed to the LMEC list serve. The list serve is an automated the CEC email system by which information about this facility is emailed to parties who have subscribed. To subscribe, go to the CEC's project webpage, cited above, scroll and the right side of the project's webpage to the box labeled "Subscribe," and provide the requested contact information.

Any person may comment on the Staff Analysis. Those who wish to submit comments on the analysis prior to the CEC Business meeting may do so by using the CEC's electronic commenting feature. Go to the CEC's project webpage and click on either the "Comment on this Proceeding," or "Submit e-Comment" link. When your comments are filed, you will receive an email with a link to them.

Written comments may also be mailed or hand-delivered to:

California Energy Commission
Docket Unit, MS-4
Docket No. 98-AFC-01C
715 P Street
Sacramento, CA 95814-5512

Comments will also be accepted during the scheduled business meeting. All comments and materials filed with the Docket Unit will be added to the facility Docket Log and become publicly accessible on the CEC's project webpage.

If you have questions about this notice, please contact Compliance Project Manager John Heiser, Safety and Reliability Office, Compliance Monitoring and Enforcement Unit, at (916) 628-5566 or via e-mail at John.Heiser@energy.ca.gov.

For information on public participation, please contact the CEC's Office of Public Advisor, Energy Equity, and Tribal Affairs at (916) 957-7910 or email at publicadvisor@energy.ca.gov.

News media inquiries should be directed to the CEC's Media Office at (916) 654-4989, or by e-mail to mediaoffice@energy.ca.gov.

Mail List: 712
Listserve: Los Medanos Energy Center

LOS MEDANOS ENERGY CENTER (98-AFC-01C)

Petition to Amend Commission Decision

EXECUTIVE SUMMARY

John Heiser

INTRODUCTION

On April 23, 2021, Los Medanos Energy Center (LMEC), LLC (project owner) filed a post-certification petition (petition) with the California Energy Commission (CEC) for the Los Medanos Energy Center (LMEC).

LMEC is an operational 500-megawatt (MW) natural gas fired combined cycle energy facility that includes heat recovery steam generator (HRSG) units, steam turbine generator units, transformers, and water treatment and cooling towers. The project was certified by the CEC on August 17, 1999 and began commercial operation in October 2001. The facility, formerly known as Pittsburg District Energy Facility, is in the City of Pittsburg, in eastern Contra Costa County, California.

DESCRIPTION OF PROPOSED CHANGE(S)

The project owner seeks approval for a petition that would allow the LMEC to work with ION Clean Energy (ION) to demonstrate, on a pilot scale, its solvent technology to capture carbon dioxide (CO2) from a small portion of flue gas from a single turbine exhaust at LMEC. The project would require LMEC to supply approximately 0.04 percent of its stack gas via an above-ground pipeline to an onsite carbon capture pilot project. The CO2 capture pilot project will consist of the following components:

- 80-foot absorber column
- Wet sac cooling unit
- Chemical delivery tanks
- Supporting pumps and diagnostic equipment.

The CO2 product will then either be emitted to the atmosphere, recombined with the absorber effluent gas, or provided to a third-party user. A carbon filter package and electrodialysis reclaimer will process a slipstream of lean solvent to remove

accumulated salts, particulates, and thermal decomposition products. The pilot project would be in operation for approximately 15 months with the equipment removed from the site after the pilot project is completed.

NECESSITY FOR THE PROPOSED CHANGE(S)

The primary purpose and need for this CO2 capture pilot project for post certification project change (petition) is to support California's greenhouse gas emissions reductions goals. Furthermore, experience gained from this pilot will further the maturation of technologies for the beneficial use of sequestered carbon. The CO2 capture pilot project

will provide a first-hand opportunity to learn about the implications of integrating post combustion carbon capture ("PCC") with power plant operations prior to progressing into a commercial-scale path for use at other natural gas fueled power plants.

EC STAFF REVIEW AND CONCLUSION

The purpose of the CEC's review process is to assess whether the project changes proposed in the petition would have a significant impact on the environment or cause the project to not comply with applicable laws, ordinances, regulations, and standards (Cal. Code Regs., tit. 20, § 1769).

California Code of Regulations, title 20, section 1769 requires a project owner to petition the CEC for the approval of any change the project owner proposes to the project, design, operation, or performance requirements of a certified facility.

The purpose of the CEC's review process is to assess whether the project changes proposed in the petition would have a significant impact on the environment or cause the project to not comply with applicable laws, ordinances, regulations, and standards (Cal. Code Regs., tit. 20, § 1769).

The CEC staff has reviewed the petition for potential environmental effects; consistency with applicable laws, ordinances, regulations, and standards (LORS); and LMEC's conditions of certification. Based on staff's analysis, contained below, staff concludes that: (1) there is no possibility the changes would have a significant effect on the environment, (2) the changes would not cause the project to fail to comply with any applicable LORS, but (3) the changes would require additions of Air Quality conditions of certification as adopted in the Final Commission Decision (Decision) to address potential increase in emission limits. Thus, staff is bringing this petition to the Commission for approval pursuant to California Code of Regulations, title 20, section 1769(a)(4).

Staff recommends the addition of new Conditions of Certification **AQ-ION 1** through **AQ-ION 7** for consistency with the new Authority to Construct permit issued by the Bay Area Air Quality Management District (BAAMQD) to ensure the project would have a less than significant impact on the environment with the potential for an increase in emissions of ammonia and VOCs or POCs, including acetaldehyde and formaldehyde resulting from the CO2 pilot project.

Staff also concludes that none of the findings specified in California Code of Regulations, title 20, section 1748(b) apply to the proposed changes. Lastly, staff concludes the proposed change does not meet any of the criteria requiring the production of subsequent or supplemental review pursuant to Public Resources Code section 21166.

STAFF'S ASSESSMENT OF THE PROPOSED PETITION

Staff reviewed the petition for potential environmental effects and consistency with applicable LORS. Staff's conclusions for all technical and environmental areas are summarized in **Executive Summary Table 1.**

Staff's assessment of the proposed changes considered the potential impacts to the population within the disadvantaged community, including the environmental justice population within a six-mile radius of LMEC.

Executive Summary Table 1
Summary of Conclusions for all Technical and Environmental Areas

Technical Areas Reviewed	CEQA				Conforms with applicable LORS
	Potentially Significant Impact	Less Than Significant Impact with Mitigation (with Revised or New COCs)	Less Than Significant Impact (with or without Existing COCs)	No Impact	
Air Quality		X			X
Biological Resources			X		X
Cultural Resources			X		X
Efficiency				X	
Facility Design					X
Geological and Paleontological Resources				X	X
Hazardous Materials Management			X		X
Land Use			X		X
Noise and Vibration			X		X
Public Health			X		X
Reliability					
Socioeconomics			X		
Soil and Water Resources				X	X
Traffic and Transportation			X		X
Transmission Line Safety and Nuisance				X	X
Transmission System Engineering					X
Visual Resources			X		X
Waste Management			X		X
Worker Safety and Fire Protection			X		X

Areas shown in gray are not subject to CEQA consideration or have no applicable LORS the project must comply with.

Staff has concluded that the proposed CO2 pilot project would have less than significant effects on the environment and would comply with all applicable LORS with the continued implementation of existing COCs in the Decision, and with the implementation of new conditions in the areas of Air Quality. Staff recommends the addition of new Conditions of Certification **AQ-ION 1** through **AQ-ION 7** for consistency with the new Authority to Construct permit issued by BAAMQD to ensure the project would have a less than significant impact on the environment with the potential for an increase in emissions of ammonia and VOCs or POCs, including acetaldehyde and formaldehyde resulting from the CO2 pilot project.

For the remaining environmental and technical areas, CEC staff has determined that the modified project would continue to comply with applicable LORS, and the project change would not result in any significant adverse environmental impacts or require a change to any conditions of certification.

In addition, decommissioning would not affect any population including the environmental justice population as shown in **Environmental Justice Figure 1**, **Figure 2**, and **Table 1** in the Staff Analysis.

The basis for each of the CEC staff's conclusions are provided below:

AIR QUALITY. The project owner is proposing to install equipment on-site that would allow LMEC to supply approximately 0.04 percent of its stack gas from a single turbine to an engineering scale carbon capture and utilization pilot that would capture 11 tons CO2 per day (tpd). With the addition of Air Quality Conditions of Certification **AQ-ION 1** through **AQ-ION 7**, the project would continue to comply with all applicable LORS. The proposed project modification would have less than significant impacts to ambient air quality and a net positive impact to greenhouse gases.

Please see the Air Quality analysis within this document for additional details of CEC staff's conclusions, including Public Health and GHG emissions.

BIOLOGICAL RESOURCES. Construction activities would not occur in any biologically sensitive areas and there would likely be no impacts to special-status biological resources. However, work would occur near ruderal habitats along the eastern property boundary and protected bird species such as killdeer often nest in open gravel areas, such as those found in the project area. Implementation of Conditions of Certification **BIO-1** through **BIO-3** (Designated Biologist Selection, Duties, and Authority), **BIO-4** (Worker Environmental Awareness Program (WEAP), and **BIO-5** (Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) in the Decision would ensure impacts to biological resources would be less than significant and the project would remain in compliance with biological resources-related LORS.

CULTURAL RESOURCES. There were several archaeological discoveries during the original construction of the LMEC, summarized in a monitoring report (Hatoff and Bass

1999). Additionally, several cultural resource discoveries occurred during the construction of a 115-kilovolt transmission line in 2009 (Bastian 2009; LMEC 2008). None of these cultural resources were considered eligible as historical resources under the California Environmental Quality Act.

Conditions of certification **CUL-1** through **CUL-15**, applicable to this proposed project change, were developed to ensure that, if cultural resources are encountered during construction, adequate measures are in place to mitigate any project-level impacts to less than significant. Minor changes were made to **CUL-6** and **CUL-10** in September 2008, to bring the conditions into consistency with then current practice for a previous petition (CEC 2008).

EFFICENCY AND RELIABILITY. This petition would not affect the power plant's overall heat rate or its thermal efficiency. The power plant's reliability, or its ability to deliver power to the power grid, would not be affected as the result of this petition.

FACILITY DESIGN. Installation of the new concrete pad, absorber column, wet sac cooling unit, chemical delivery tanks, steam and gas piping, and supporting pumps and diagnostic equipment on the LMEC site must be in accordance with the 2019 edition of the California Building Code. Implementations of the existing Facility Design conditions of certification adopted in the CEC Decision and construction compliance oversight by the CEC's delegate chief building official would ensure this compliance.

GEOLOGICAL AND PALEONTOLOGICAL RESOURCES. Components of the proposed system will be fabricated off-site and then installed on-site on a concrete pad. Construction of the concrete pad will not involve disturbance of pre-Holocene age soils, therefore, there will be no impact to geological hazards or paleontological resources.

HAZARDOUS MATERIALS MANAGEMENT. The proposed installation of the project would use several hazardous materials onsite. Like hazardous materials used for equipment maintenance activities, they would include gasoline, solvents, lubricants, paint, and welding gases. In addition, these hazardous materials would be used in small quantities and no extremely hazardous materials would be used on site for the installation of the proposed project. Therefore, the proposed project modification would have a less than significant impact on hazardous materials management and would comply with applicable LORS.

LAND USE. Impacts to land use would be less than significant. Staff confirmed with City of Pittsburg planning staff that the proposed 80-foot absorber column would not exceed the height maximum set in the city's zoning code, which was determined to be 95 feet and would meet the setback requirements. The construction of this column would still be subject to a design review application. Condition of Certification **LAND-2**, requiring a design review would be applicable to this petition. With adherence to **LAND-2**, land use impacts would be less than significant.

NOISE AND VIBRATION. Construction associated with this petition to amend would be temporary and would occur during daytime hours that are consistent with the local ordinance (city's zoning code and General Plan). Any noise generated during these activities would result in a less-than-significant impact with implementation of the existing Noise conditions of certification in the Decision.

The carbon capture pilot project would not increase noise at nearby residents. Furthermore, the project would continue to meet operational noise requirements established in the Decision. Therefore, the changes in this petition would create a less-than-significant impact due to operational noise.

PUBLIC HEALTH. Staff expects the public health impacts during construction would be less than significant due to limited construction activities on-site for the project modification.

The health risk assessment (HRA) indicated that the ION pilot project's cancer risk is estimated at 0.051 in a million, with a chronic hazard index estimated at 0.0088, and an acute hazard index estimated at 0.044. The ION pilot project, therefore, complies with all the project risk requirements and would have a less than significant impact to public health.

SOCIOECONOMICS. Impacts to socioeconomics would be less than significant. The construction and operations workforce needed for the project change is limited (30 construction and 4 operation staff) and the workforce in the Oakland-Hayward-Berkeley Metropolitan District and Vallejo-Fairfield Metropolitan Statistical Area would be sufficient to meet the project's needs and thus, not lead to a population influx in the project area. **SOCIO-1**, requiring workforce recruitment first in Contra Costa County, then Alameda County followed by Solano County, is applicable to the project.

SOIL AND WATER. The proposed installation would be constructed on a previously disturbed site and construction would occur on a previously disturbed, graded, and leveled area. Thus, there would be no impact to soil and water resources.

TRAFFIC AND TRANSPORTATION. Impacts to transportation would be less than significant. The installation of the 80-foot absorber column, a wet sac cooling unit, chemical delivery tanks, and supporting pumps and diagnostic equipment would not create a significant impact with the implementation of existing Conditions of Certification **TRANS-1** (utilize existing truck route) and **TRANS-2** (obtain transportation permits). Also, the construction and operations workforce needed for the project change is limited (30 construction and 4 operation staff) so the additional trips from these workers would not have a significant impact on the transportation system.

TRANSMISSION LINE SAFETY AND NUISANCE. The proposed modification to add the ION Carbon Capture system would not impact the transmission line. The modification will comply with applicable LORS and will not require a change to any of

the COCs. Therefore, there would be no transmission line safety and nuisance impacts, and the change would not result in a significant effect on the environment. LMEC would continue to comply with existing Conditions of Certification **TLSN-1** through **TLSN-6**.

TRANSMISSION SYSTEM ENGINEERING. The proposed changes to the project for both onsite and offsite carbon capture would have no impact on the transmission interconnection facilities of the LMEC. Compliance with existing Transmission System Engineering conditions of certification in the Decision would ensure LORS requirements are met and that any changes around existing transmission facilities would not result in unsafe reduction in line clearances.

VISUAL RESOURCES. Impacts to visual resources would be less than significant. The modification includes the installation of an 80-foot absorber column, a wet sac cooling unit, chemical delivery tanks, and supporting pumps and diagnostic equipment. As the tallest new structure, the absorber column is shorter than two existing taller structures, the HRSG at 120 feet and steam boiler stack at 100 feet. No visible change to thermal plumes on the site would be expected. The new structure and equipment would be visually consistent with existing structures. With implementation of Conditions of Certification **VIS-1** (surface treatment of project structures) and **VIS-6** (site maintenance) in the Decision, the new absorber column and equipment would blend in with the surroundings and would be kept in a state of good repair, be clean and well maintained, consistent with City of Pittsburg's zoning ordinance.

WASTE MANAGEMENT. Components of the proposed system will be fabricated off-site and then installed on-site on a concrete pad. No new waste streams will be created. The amount of construction waste generated will be minimal and within the quantities projected for waste generated by routine operation of the LMEC.

WORKER SAFETY AND FIRE PROTECTION. The impacts from the proposed installation of the CO2 capture pilot project equipment would be less than significant with implementation of existing Condition of Certification **WORKER SAFETY-1**. Therefore, the proposed project modification would not have a significant impact on worker health and safety and would comply with applicable LORS.

ENVIRONMENTAL JUSTICE

CALENVIROSCREEN

Staff reviewed CalEnviroScreen 4.0 data to determine whether the United States census tract where the LMEC is located (6013309000) is identified as a disadvantaged community. This science-based mapping tool is used by the California Environmental Protection Agency (CalEPA) to identify disadvantaged communities based on geographic, socioeconomic, public health, and environmental hazard criteria pursuant to Health and Safety Code section 39711 as enacted by Senate Bill 535 (De León, Chapter

830, Statutes of 2012). The CalEnviroScreen 4.0 overall percentile score for this census tract is 83.30 and, thus, is identified as a disadvantaged community[1].

ENVIROMENTAL JUSTICE

Figure 1 shows 2020 census blocks in the six-mile radius of the LMEC site with a minority population greater than or equal to 50 percent. The population in these census blocks represents an environmental justice (EJ) population based on race and ethnicity as defined in the United States Environmental Protection Agency's *Guidance on Considering Environmental Justice During the Development of Regulatory Actions*. Staff conservatively obtains demographic data within a six-mile radius around a project site based on the parameters for dispersion modeling used in staff's air quality analysis. Air quality impacts are generally the type of project impacts that extend the furthest from a project site. Beyond a six-mile radius, air emissions have either settled out of the air column or mixed with surrounding air to the extent the potential impacts are less than significant. The area of potential impacts would not extend this far from the project site for most other technical areas included in staff's EJ analysis.

Based on California Department of Education data in the **Environmental Justice – Table 1**, staff concluded that the percentage of those living in the Antioch Unified, Mt. Diablo Unified, and Pittsburg Unified school districts (in a six-mile radius of the project site) and enrolled in the free or reduced price meal program is larger than those in the reference geography, and thus are considered an Environmental Justice population based on low income as defined in *Guidance on Considering Environmental Justice During the Development of Regulatory Actions*. **Environmental Justice – Figure 2** shows where the boundaries of the school district are in relation to the six-mile radius around the Los Medanos Energy Center site.

Environmental Justice – Table 1
Low Income Data within the Project Area

SCHOOL DISTRICTS IN SIX-MILE RADIUS	Enrollment Used for Meals	Free or Reduced-Price Meals	
Antioch Unified	16,181	10,524	65.0%
Mt. Diablo Unified	29,789	13,839	46.5%
Pittsburg Unified	10,793	7,085	65.6%

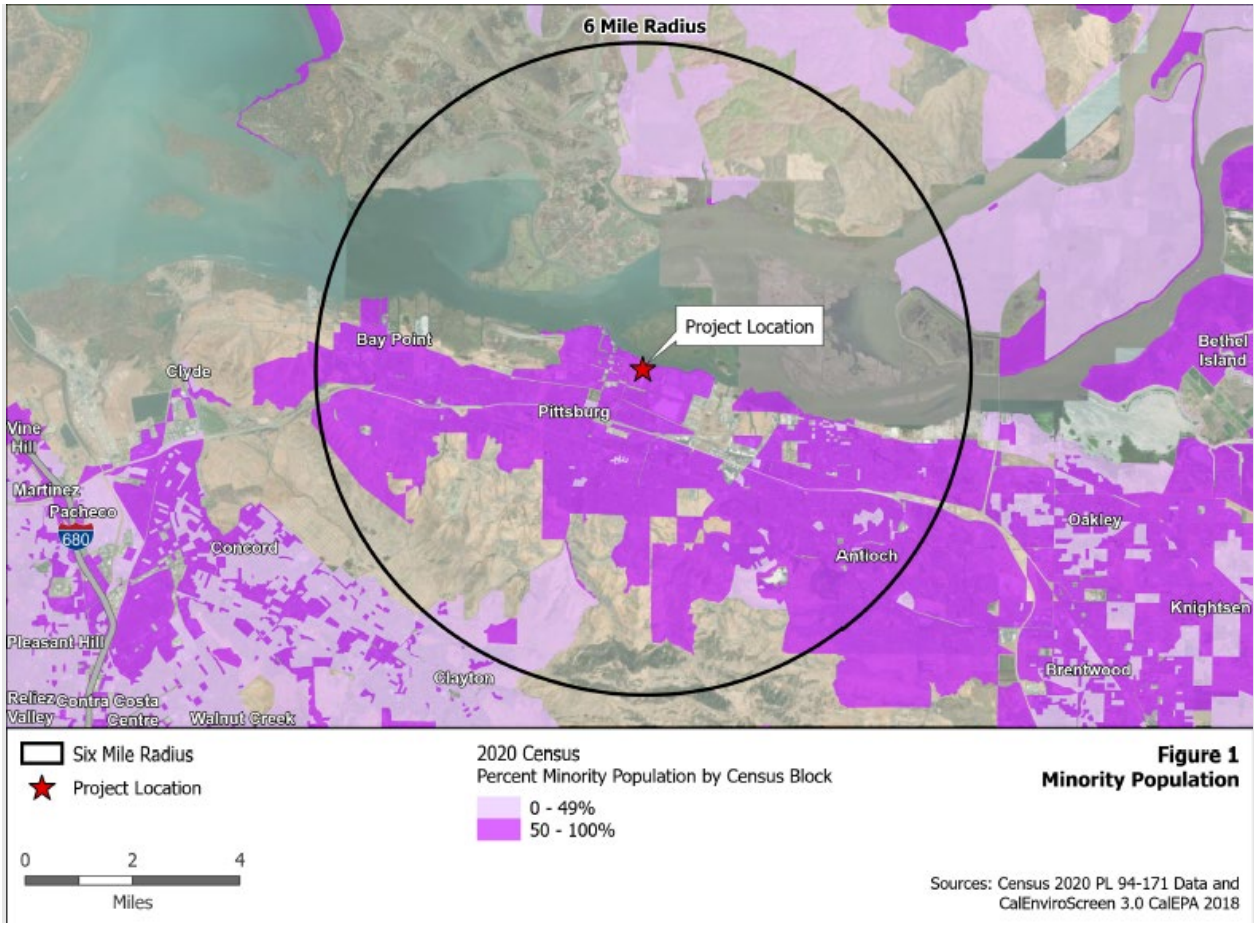
[1] The four categories of geographic areas identified by CalEPA as disadvantaged are: 1) Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0, 2) Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps, but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores, 3) Census tracts identified in the 2017 DAC designation, regardless of their scores in CalEnviroScreen 4.0, and 4) Lands under the control of federally recognized Tribes. Source: CalEPA Final Designation of Disadvantaged Communities: May 2022 https://calepa.ca.gov/envjustice/ghginvest/

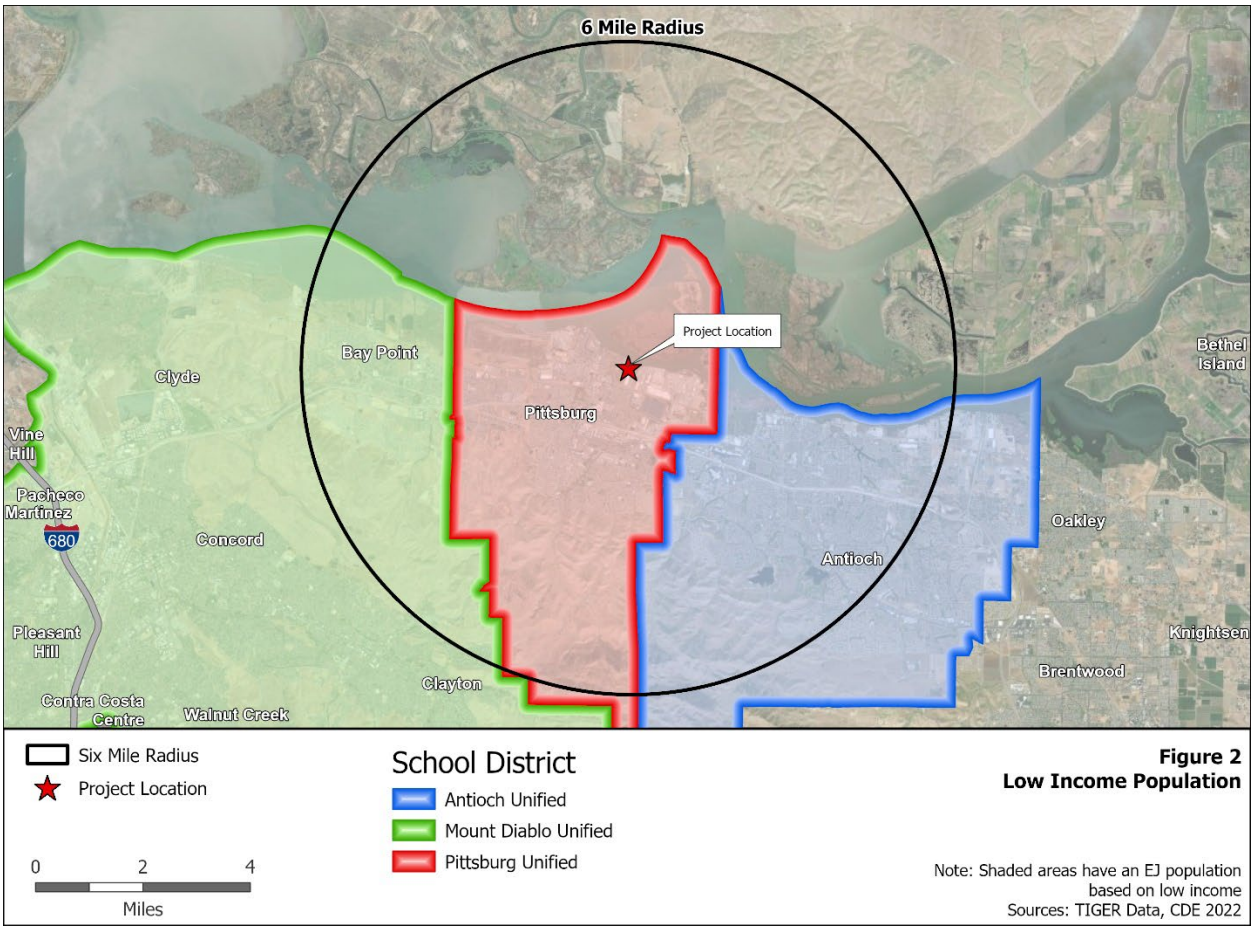
REFERENCE GEOGRAPHY			
Contra Costa County	169,604	60,513	35.7%
Source: CDE 2022. California Department of Education, DataQuest, Free or Reduced Price Meals, District level data for the year 2020-2022, <http://dq.cde.ca.gov/dataquest/>.			

The following technical areas consider impacts to EJ populations: Air Quality, Cultural Resources (indigenous people), Hazardous Materials Management, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soil and Water resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, Waste Management, and Worker Safety and Fire Protection.

Environmental Justice Conclusions

Staff concludes that the proposed CO2 pilot project would not result in significant adverse environmental impacts and would comply with all applicable LORS, with implementation of existing conditions of certification in the LMEC Decision and the additional proposed conditions of certification, **AQ-ION 1** through **AQ-ION 7**. Thus, impacts would be less than significant on any population including the environmental justice population represented in **Environmental Justice Figure 1**, **Figure 2**, and **Table 1** in the Staff Analysis.





CEC STAFF RECOMMENDATIONS AND CONCLUSIONS

Staff has reviewed the petition pursuant to California Code of Regulations, title 20, section 1769, and has determined that the petition does not meet the criteria for staff approval. Thus, under section 1769(a)(4), staff is submitting the petition for consideration by the Commission. Staff recommends the Commission approve the petition.

Staff has reviewed the petition for potential environmental effects; consistency with applicable LORS; and LMEC's conditions of certification. Staff concludes that: (1) there is no possibility the changes may have a significant effect on the environment, (2) the changes would not cause the project to fail to comply with any applicable LORS, but (3) the changes would additions of Air Quality conditions of certification as adopted in the Decision to address potential increase in emission limits. With the addition of new Conditions of Certification **AQ-ION 1** through **AQ-ION 7** for consistency with the new Authority to Construct permit issued by the Bay Area Air Quality Management District, the effect on the environment would be less than significant.

Staff also concludes the findings specified in California Code of Regulations, title 20, section 1748(b) do not apply to the proposed changes.

Lastly, staff concludes the proposed changes do not meet any of the criteria requiring the production of subsequent or supplemental review pursuant to Public Resources Code section 21166.

Los Medanos Energy Center (98-AFC-01)
Petition to Amend – CO2 Capture ION Pilot Project
AIR QUALITY, PUBLIC HEALTH, AND GREENHOUSE GASES
Jacquelyn Record

INTRODUCTION AND SUMMARY

On April 23, 2021 Los Medanos Energy Center, LLC (project owner) submitted a petition to amend (petition) the California Energy Commission (CEC) license for the Los Medanos Energy Center (LMEC). The project owner proposes to demonstrate, on a pilot scale, the ION Clean Energy (ION) solvent technology to capture carbon dioxide (CO2) from a single turbine exhaust at LMEC. The project owner proposes to install equipment on-site that would allow LMEC to supply approximately 0.04 percent of its stack gas from a single turbine to an engineering scale carbon capture and utilization pilot (LMEC 2021 or Petition). A previous amendment Order No. 22-0309-4 approved the installation of an 8-inch pipe to transfer stack gas from the LMEC to a carbon capture and utilization facility located on a neighboring property, the San Francisco Bay Aggregates.

LMEC is a 500-megawatt natural gas-fired, combined cycle power plant located in Contra Costa County, Pittsburg, California. The proposed ION pilot project would install a carbon dioxide capture system, referenced throughout this document as new source (**S-8**) at the LMEC, which would include a direct contact cooler, an absorber, a stripper, pumps, various heat exchangers, and a solvent management system. The applicant proposes to withdraw approximate 0.04% (by volume) of the post-abatement flue gas from the existing stack of a single turbine. The proposed ION pilot project is expected to last two years. During the first year, three ION solvents, monoethanolamine (MEA) (20-days), ICE-21 (30-days), and ICE-31 (300-days), would be used and evaluated for a total of 350 days. During the second year, Solvent ICE-31 would be used and evaluated for up to 75 days (BAAQMD 2022 and LMEC 2022).

The project owner also submitted an application for Authority to Construct to the Bay Area Air Quality Management District (BAAQMD or District). The BAAQMD completed an analysis of the proposed ION pilot project and issued a draft Authority to Construct (ATC) and Engineering Evaluation on September 30,2022. Staff reviewed the project owner's petition and a draft BAAQMD Engineering Evaluation.

The ION CO2 pilot project is anticipated to capture 11 tons of CO2 per day (tpd) from a supply of just 0.04 percent of its stack gas from a single turbine. However, the proposed demonstration project would result in a small increase in emissions of ammonia and Volatile Organic Compounds or Primary Organic Contaminants (VOCs or POCs), including acetaldehyde and formaldehyde. In this analysis, staff demonstrates that the air quality, public health, and greenhouse gas impacts of the proposed demonstration project would be less than significant.

To incorporate the new and temporary District ATC conditions for the proposed ION pilot project into the CEC license, staff proposes to add new Conditions of Certification **AQ-ION 1** through **AQ-ION 7**.

The modified project would comply with all laws, ordinances, regulations, and standards (LORS). Air quality, public health, and greenhouse gas impacts from the evaluated changes would be less than significant, including impacts to environmental justice populations. Therefore, there are no air quality, public health, or greenhouse gas environmental justice issues related to the evaluated facility modifications and no minority or low-income populations would be significantly or adversely impacted.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS COMPLIANCE

CEC staff reviewed the petition and the BAAQMD evaluation for consistency with all federal, state, and BAAQMD LORS. The BAAQMD will issue a draft ATC and Engineering Evaluation on September 30,2022, demonstrating that the proposed ION pilot project would comply with all applicable LORS. After addressing all comments made during the 30-day public notice period, the District intends to issue the final ATC (BAAQMD 2022).

Air Quality Table 1 includes a summary of the air quality LORS relevant to the proposed ION pilot project. The proposed new Conditions of Certification **AQ-ION 1** through **AQ-ION 7** would ensure that the proposed ION pilot project would comply with all LORS.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description	Compliance
Federal	**U.S. Environmental Protection Agency**	
Federal Clean Air Act Amendments of 1990 (FCAAA), Title 40 Code of Federal Regulations (CFR) Part 50	National Ambient Air Quality Standards (NAAQS).	The owner/operator of S-1 is expected to continue to comply with all applicable requirements for this applicable rule.
40 CFR 60 Appendix B and 40 CFR 75 Appendix F	Established operating specifications and test procedures for continuous emission monitoring systems (CEMS) in stationary sources. Requires specifications, test procedures and continuous monitoring systems for Stationary Sources.	The owner/operator of S-1 is expected to continue to comply with all applicable requirements for this applicable rule.
State	**California Air Resources Board**	
California Health & Safety Code 42301.6 (School Notice)	It requires public notification prior to approving an application for permit to construct or modify a source that emits hazardous air emissions if the source is located within 1,000 feet of the outer boundary of a school.	The proposed source(s) is (are) located within an Overburdened Community as defined in BAAQMD Regulation 2-1-243. Therefore, the proposed ION Pilot Project is subject to the public notification requirements of Regulation 2-1-

		412. A public notice will be prepared and sent to all addresses within 1,000 feet of the proposed source(s).
Local	**Bay Area Air Quality Management District**	
Regulation II – Permits Rule 1 General Requirements	The purpose of Regulation 2 is to provide an orderly procedure for the review of new sources of air pollution, and of the modification and operation of existing sources, and of associated air pollution control devices, through the issuance of authorities to construct and permits to operate.	The District draft ATC includes condition 4 to demonstrate compliance with the emissions limits in conditions 1 and 2. Staff proposes to add this condition as **AQ-ION4**.
Regulation II – Permits Rule 2 New and Modified Stationary Source Review Rule	This rule applies to all new stationary sources and all modifications to existing stationary sources which are subject to the District permit requirements and after construction emit or may emit one or more affected pollutant. This rule also requires surrendering offsets for facilities with the potential to emit more than 35 tons per year of NOx or POC, or 100 tons per year of PM10 or SOx.	Secondary pollutants from new sources are limitedly exempt from the requirements of Best Available Control Technology (BACT) pursuant to Regulation 2-2-102. However, the carbon capture system does not qualify for this exemption because it is not installed to comply with any BACT or BARCT requirements. Therefore, **S-8** is subject to all applicable requirements in Regulation 2-2. The District draft ATC includes condition 7 to limit the emissions to a level at or below the emissions associated with the maximum design capacity. Staff proposes to add this condition as **AQ-ION7** Source testing, monitoring, or reporting are required to demonstration compliance with Rule 6. The project is subject to the offset requirements in District Regulation 2-2 for POC. Pursuant to Regulation 2-2-302, facilities that have the potential to emit (PTE) 10 tons per year or more of POC must offset their emissions of POC.
Regulation II – Permits Rule 5 – New Source Review of Toxic Air Contaminants	NSR of Toxic Air Contaminants – Requires preconstruction review for new and modified sources of toxic air contaminants. Contains project health risk limits and requirements for Toxics BACT.	Two sources of Toxic Air Contaminant (TAC) emissions would be emitted at the stack of **S-8**. TAC emissions from the combustion of natural gas in the slip stream of flue gas from S-1. The use of ION solvents would also result in emissions of three TACs, acetaldehyde, ammonia, and formaldehyde. The project

		emission rate for formaldehyde exceeds the chronic TAC trigger level (14 lbs./year) set forth in Regulation 2-5, Table 2-5-1 (Amendments Adapted 12/7/2016), so a health risk assessment is required. The District draft ATC includes conditions 2 and 3 to demonstrate compliance. Staff proposes to add these conditions as **AQ-ION2 and AQ-ION3.**
Regulation II – Permits Rule 6 Major Facility Review	This rule Requires an application be submitted for the federal operating permit within 12 months after commencing operation, as specified by Title V federal Clean Air Act.	This project would result in a minor revision to the Title V permit for the Los Medanos Energy Center. The facility is required to submit a Title V permit application to incorporate the changes into their Title V permit. The District draft ATC includes condition 6 to demonstrate compliance with emissions and record keeping. Staff proposes to add this condition as **AQ-ION6**.
Regulation II – Permits Rule 7 Acid Rain	This rule requires monitoring, recordkeeping, and holding of allowances for pollutants that contribute to the formation of acid rain, as specified by Title IV of the federal Clean Air Act.	The owner/operator of S-1 is expected to continue to comply with all applicable requirements in District's permit, District Regulation 2-7 (Acid Rain) with current Air Quality Conditions of Certification. This rule would not apply to thenew source (**S-8**).
Regulation VI – Particulate Matter Rule 1 General Requirements	This rule Limits particulate matter and visible emissions to less than Ringlemann 1 and 20% opacity. Prohibits emissions from any activity for more than 3 minutes in any 1 hour that result in visible emissions as dark or darker than Number 1 on the Ringlemann Chart or greater than 20% opacity.	The owner/operator of S-1 is expected to continue to comply with all applicable requirements in District's permit, District Regulation 6-1 (Particulate Matter) with current Air Quality Conditions of Certification. This rule would not apply to the new source (**S-8**).
Regulation IX – Inorganic Gaseous Pollutants Rule 1 Nitrogen Oxides And Carbon Monoxide from Stationary Gas Turbines	This rule incorporates the National Emission Standards for Hazardous Air Pollutants from Part 61, Chapter I, Subchapter C, Title 40 CFR and the National Emission Standards for Hazardous Air Pollutants for Source Categories from Part 63, Chapter I, Subchapter C, Title 40 CFR.	The owner/operator of S-1 is expected to continue to comply with all applicable requirements in District's permit, District Regulation 9-1 (Sulfur Dioxide) with current Air Quality Conditions of Certification. This rule would not apply to the new source(**S-8**).
Regulation IX – Inorganic Gaseous Pollutants Rule 9 Visible Emissions	This rule Specifies emission limits of 9 parts per million by volume (ppmv) NOx or 0.43 pounds NOx per megawatt-hour (lb/MWh), applicable to the proposed combustion turbines.	The owner/operator of S-1 is expected to continue to comply with all applicable requirements in District's permit, District Regulation 9-9 (NOx for Stationary Gas Turbines) with current Air Quality

		Conditions of Certification. This rule would not apply to the new source (**S-8**).

ANALYSIS

The project owner is proposing to install equipment on-site that would allow LMEC to supply approximately 0.04 percent of its stack gas from a single turbine to an engineering scale carbon capture and utilization pilot that would capture 11 tons CO2 per day (tpd).

Air Quality

Construction

The ION pilot project would consist of the placement of an 80-foot absorber column and a wet sac cooling unit, chemical delivery tanks, and supporting pumps and diagnostic equipment. Most of the project components would be constructed off-site then delivered to the LMEC site over a seven-to-ten-day period for installation on a new concrete pad. The dimensions of the on-site concrete pad would be approximately 40 by 40 feet (LMEC 2021). Staff expects the emissions and impacts during construction would be less than significant with existing Conditions of Certification **AQ-54** and **AQ-59**.

Operation

The proposed ION's pilot project at LMEC would demonstrate CO2 capture from natural gas combined cycle projects by utilizing the slip stream from a single turbine at LMEC to demonstrate the benefits of ION's innovative ICE-31 solvent to make a transformational reduction in the levelized cost of electricity (LCOE) while limiting CO2 emissions from natural gas-fired power plants.

The slip stream of the post-abatement flue gas withdrawn from the existing stack of the combustion turbine (CT) and heat recovery steam generator (HRSG) has oxides of nitrogen (NOx), carbon monoxide (CO), primary organic contaminants (POC), particulate matter (PM), sulfur dioxide (SO_2), ammonia, and other toxic air contaminant emissions from the combustion of natural gas. Combustion emissions other than CO2 in the slip stream are not expected to be affected by the CO2 capture process and would be re-emitted in the new absorber stack.

CO2 in the slip stream is expected to be reduced by about 94 percent by weight or 0.5 tons per hour. However, the reduction efficiency is not guaranteed as this project is a pilot project to demonstrate the efficiency and cost-effectiveness of this new CO2 capture system. Therefore, the CO2 reduction efficiency is not a permit limit for this project.

The applicant proposes to withdraw approximate 0.04 percent (by volume) of the post-abatement flue gas from the existing stack of a single turbine. The proposed pilot project would last approximately two years. During the first year, three ION solvents, MEA, ICE-21, and ICE-31, would be used and evaluated for a total of 350 days. During the second year, Solvent ICE-31 would be used and evaluated for up to 75 days.

Air Quality Table 2 shows the maximum estimated pass-through daily and annual combustion emissions for criteria pollutants due to the proposed ION pilot project. Assuming the slip stream of the abated flue gas from S-1, has 0.04 percent of mass emissions of the maximum permitted emissions for S-1 in LMEC's permit and in COCs **AQ-32** and **AQ-33**, the slip stream would pass through the following emissions to the new absorber stack as shown below.

Air Quality Table 2
Maximum Estimated Pass-Through
Daily and Annual Emissions (Criteria Pollutants)

Pollutant	Maximum Daily Emissions (lbs/day)	Maximum Annual Emissions (lbs/yr)
NOx (as NO2)	0.27	70.28
CO	1.29	202.56
POC (as CH4)	0.05	13.56
PM10	0.09	27.68
SO2	0.06	18.84

Sources: BAAQMD 2022and CEC staff analysis

Air Quality Table 3 shows the maximum estimated pass-through combustion emissions for toxic air contaminants (TACs). For criteria pollutants, daily and annual permitted emissions are specified as limits in the permit conditions for **S-1**. For toxic air contaminants, daily or annual permitted emissions are not specified as limits, so maximum hourly and annual permitted emissions are calculated based on the maximum permitted natural gas firing rate at 2,262 MMBtu per hour and an operation schedule of 24 hours a day and 350 days per year and in COC **AQ-34**.

Air Quality Table 3
Maximum Estimated Pass-Through
Hourly and Annual Emissions (TACs)

Toxic Air Contaminant	Max. Hourly Emissions, lbs/hr.	Max. Annual Emissions, lbs/yr
Acetaldehyde	6.06E-05	5.09E-01
Acrolein	8.37E-06	7.03E-02
Ammonia	4.07E-03	3.42E+01
Arsenic	2.00E-08	1.68E-04
Benzene	4.03E-05	3.39E-01
Beryllium	4.35E-08	3.66E-04
1,3-Butadiene	2.75E-08	2.31E-04
Cadmium	1.70E-07	1.43E-03
Chromium (hexavalent)	1.66E-08	1.40E-04
Copper	1.59E-06	1.34E-02
Ethylbenzene	7.96E-06	6.69E-02
Formaldehyde	3.05E-03	2.56E+01
Hexane	1.15E-04	9.65E-01
Lead	4.77E-07	4.01E-03
Manganese	1.33E-06	1.12E-02
Mercury	1.33E-06	1.12E-02
Naphthalene	1.47E-06	1.24E-02
Nickel	1.70E-07	1.43E-03
PAH (As B(a)P-EQUIV)	1.92E-08	1.61E-04
Propylene	3.42E-04	2.87E+00
Propylene Oxide	8.82E-06	7.41E-02
Selenium	3.37E-07	2.83E-03
Toluene	3.15E-05	2.64E-01
Xylene (mixed isomers)	1.16E-05	9.73E-02
Sulfuric Acid Mist	1.29E-03	1.08E+01

Source: BAAQMD 2022 and CEC staff analysis

All VOC emissions are assumed to be POC emissions. The maximum hourly POC emissions from the use of ION solvents are estimated to be no more than 0.25 lbs per hour (lbs/hr). Assuming the operation would be 24 hours per day, the maximum daily POC emissions from the use of ION solvents would be no more than 6 pounds per day (lbs/day).

As shown in **Air Quality Table 4**, the POC emissions in year one would be approximately 2,100 pounds per year (lbs/yr) or 1.05 tons per year (tpy). POC emissions during year two of operation are estimated to be 0.25 lbs/hr, 6 lbs/day, and 450 lbs/yr or0.225 tpy.

Air Quality Table 4
Estimated Daily and Annual Emissions
Compared to BACT Determination Thresholds

Criteria Pollutant	Estimated Daily Emissions (lbs/day)	Estimated Annual Emissions (tpy)	BACT Threshold (lbs/day)	Above Threshold?
Year 1				
POCs	6	1.05	10	No
Year 2				
POCs	6	0.225	10	No

Year 1 is estimated to be 350 days, Year 2 is estimated to be 75 days
Source: LMEC 2022, BAQMD 2022, Staff calculation

Secondary pollutants from new sources are limitedly exempt from the requirements of Best Available Control Technology (BACT) pursuant to Regulation 2-2-102. However, the carbon capture system does not qualify for this exemption because it is not installed to comply with any BACT requirements. Therefore, the new permitted source, **S-8** is subject to all applicable requirements in Regulation 2-2. Based on the emission calculations as shown in **Air Quality Table 4** below, BACT is not triggered for POC since the maximum daily emissions of POC from **S-8** due to the use of ION solvents is less than 10 lbs/day.

Air Quality Table 5
PTE of POCs at LMEC

Source	Source Description	POCs (tpy)	Basis
S-1 thru S-5	Turbines, HRSGs, Auxiliary Boiler	33.9	AQ-33
S-6	Diesel Fire Pump	0.013	Maximum fuel rate at 2.1 MMBtu/hr, 34 hrs/yr limit for reliability-testing, 0.36 lbs/MMBtu (TOC emission factor) from EPA AP-42 Table 3.3-1 for Diesel Engine
S-7	Natural Gas Generator	0.063	Maximum fuel rate at 7.1 MMBtu/hr, 50hrs/yr limit for reliability-testing, 100 hours/yr for emergency operation,0.118lbs/MMBtu (VOC emission factor) from EPA AP-42 Table 3.2-2 for 4-stroke, lean-burn, natural gas engine.
	Existing Total PTE	33.976	
S-8 (New)	Carbon Capture System using ION solvents	1.050	Applicant proposed permit condition limit.
	New Total PTE	35.026	

Source: BAAQMD 2022, CEC current conditions of certification

According to **Air Quality Table 5**, the LMEC has an existing potential to emit of 33.976 tpy from the existing sources of the CTs, HRSG, Auxiliary Boiler, diesel fire pump, and natural gas standby generator. With the added carbon capture system and the ION pilot project solvents, in Year 1, the project would add 1.05 tpy of POCs and would therefore be greater than 35 tons per year of POC, offsets must be provided by the applicant at a ratio of 1.15 to 1.

LMEC will provide the offsets using a Banking Certificate to the BAAQMD. Since the facility would have the potential to emit more than 35 tons per year of POC, the applicant would need to provide 1.208[1] tons per year of POC credit.

Public Health

Construction

Staff expects the public health impacts during construction would be less than significant due to limited construction activities.

Operation

The ION pilot project would consist of two (2) operations years, segmented as follows: Year 1 – would have emissions generated by three (3) separate campaigns. Each campaign would evaluate a specific solvent as follows:

- Solvent MEA - 20-day evaluation period
- Solvent ICE-21 - 30-day evaluation period
- Solvent ICE-31 - 300-day evaluation period

Year 2 – would have emissions generated by only a single solvent (Solvent ICE-31) for a maximum of 75 days.

Based on the design characteristics of the proposed ION process, emissions would be comprised of the following: ammonia and POCs including acetaldehyde and formaldehyde. **Air Quality Table 6** shows the estimated emissions data for the first and second years of the proposed pilot project. Based on **Air Quality Table 6**, only formaldehyde is expected to exceed the annual significance thresholds, also called the Chronic Level, under BAAQMD Regulation 2, Rule 5 (Toxics New Source Review).

Air Quality Table 6
Estimated Hourly and Annual TAC Emissions

TAC[1]	Estimated Hourly Emissions (lb/hr)	Acute Trigger Level[2] (lb/hr)	Above Acute Trigger Level (lb/hr)?	Estimated Annual Emissions (lb/year)	Chronic Level[2] (lb/year)	Above Chronic Level (lb/year)?
Year 1						
Acetaldeyde	1.6E-02	1	No	13.50	29	No
Ammonia	3.4E-01	7.1	No	1,127.6	7,700	No
Formaldehyde	4.6E-02	0.12	No	**136.4**	**14**	**Yes**
Year 2						
Acetaldeyde	4.7E-04	1	No	0.80	29	No
Ammonia	1.4E-01	7.1	No	257	7,700	No
Formaldehyde	1.6E-02	0.12	No	**28.6**	**14**	**Yes**

1 Cumulative value of MEA, ICE-21, ICE-31
2 BAAQMD Regulation 2 Rule 5, Table 2-5-1 TAC Trigger Levels
Bold indicated above the threshold
Source: BAAQMD 2022, LMEC 2021, Staff calculations

The petition states the estimated increase in formaldehyde emissions would likely "not cause the existing annual limit to be exceeded as source test data has demonstrated that the existing LMEC formaldehyde emissions are less than the currently permitted limit of 3,817 lbs/year" (LMEC 2022).

The project's emission rate for formaldehyde exceeds the TAC Chronic Trigger Levels in Year 1 and Year 2 as shown in **Air Quality Table 6** (14 lbs./year) and therefore a health risk assessment (HRA) was required to determine a level of significance.
The District performed a HRA according to Regulation 2-5-302 for the ION pilot project. The project risk limits are a cancer risk of 10 in million, a chronic hazard index of 1.0 and an acute hazard index of 1.0. The HRA indicated that the ION pilot project's cancer

risk is estimated at 0.051 in a million, with a chronic hazard index estimated at 0.0088, and an acute hazard index estimated at 0.044 (BAAQMD 2022). According to the results, the ION pilot project would not trigger BACT for Toxics because the estimated source risk is a cancer risk less than 1.0 in a million, and/or a chronic hazard index less than 0.20. The ION pilot project, therefore, complies with all of the project risk requirements and would have a less than significant impact to public health. The application and health risk assessment for this project were completed before June 2022, so the application is not subject to the amended project risk requirements in Regulation 2-5-302 which took effect on July 1, 2022.

Greenhouse Gases

Construction

Staff expects the greenhouse gas (GHG) emissions and impacts during construction would be less than significant due to limited construction activities.

Operation

The proposed change should be approved as the CO2 Capture Pilot Project supports California's greenhouse gas emissions reductions goals. The CO2 Capture Pilot Project is anticipated to capture 11 tons of CO2 per day (tpd). Experience gained from this pilot could potentially further the maturation of technologies for the beneficial use of sequestered carbon. This CO2 Capture ION Pilot Project would provide a first-hand opportunity to learn about the implications of integrating post combustion carbon capture ("PCC") with powerplant operations prior to progressing into a commercial-scale path for use at other natural gas fueled powerplants (LMEC 2022).

Assuming 365 days a year, the project could potentially capture 4,015 tons of CO2 per year, with this small-scale ION Pilot Project on the LMEC and supply 0.04 percent of its stack gas from a single turbine, **S-1**.

Proposed Changes to the Conditions of Certification

The BAAQMD has issued a draft ATC for the proposed ION pilot project. To incorporate the new District ATC conditions, staff proposes to add Conditions of Certification **AQ-ION 1** through **AQ-ION 7**.

CONCLUSIONS AND RECOMMENDATIONS

Staff has reviewed the material contained in the petition for the proposed ION pilot project and has made a determination that the project is expected to comply with all applicable requirements of District, state, and federal air quality-related regulations. Staff recommends approval of the proposed ION pilot project. With the addition of Air Quality Conditions of Certification **AQ-ION** 1 through **AQ-ION 7**, the project would

continue to comply with all applicable LORS. The proposed project modification would have a less than significant impacts to ambient air quality, public health, or greenhouse gases.

AMENDED CONDITIONS OF CERTIFICATION

The modifications to the Air Quality conditions of certification are included below. **Bold underline** indicates new language. ~~Strikethrough~~ indicates deleted language.

NEW EQUIPMENT DESCRIPTION/NEW SOURCE:

S-8 Carbon Capture System: ION Solvents with Absorber and Stripper
NEW AIR QUALITY CONDITIONS OF CERTIFICATION FOR NEW SOURCE S-8:

AQ-ION 1 The owner/operator of S-8 shall ensure that the POC emissions resulting from the use of ION solvents at S-8, Carbon Capture System, do not exceed 1.050 tons during any consecutive twelve-month period. [Cumulative Increase; Offsets].

Verification: A summary of POC emissions resulting from the use of ION solvents at S-8, with a statement of compliance is required and shall be included in the semi-annual Air Quality Reports specified in Condition AQ-14.

AQ-ION 2 The owner/operator of S-8 shall ensure that formaldehyde emissions at the stack of S-8 do not exceed 162 pounds during any consecutive twelve-month period. [Regulation 2, Rule 5].

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the semi-annual Air Quality Reports specified in Condition AQ-14.

AQ-ION 3 The owner/operator of S-8 shall calculate the POC and formaldehyde emissions at the stack of S-8, the POC emissions from the slip steam withdrawn from the exhaust of S-1, and the POC emissions from the use of ION solvents at S-8 using emission rates derived from the most recent source test data and flow rate from the inlet of the absorber. [Cumulative Increase; Offsets, Regulation 2, Rule 5].
Verification: The project owner shall make the site available for inspection by representatives of the District, CARB, and the CEC upon request.

AQ-ION 4 Within 90 days from the commencement of operation of S-8, the owner/operator shall conduct source test(s) at the stack of S-8 to measure the emissions of POC and formaldehyde to demonstrate compliance with the emission limits in AQ-ION 1 and AQ-ION 2 of this condition. The owner/operator shall ensure the source test

data can be used to determine emission rates for each of the ION solvents (MEA, ICE-21, and ICE-31). [Regulation 2-1-403].

Verification: The project owner shall submit the results of the source test to the District and CEC within 30 days from the date of the source test.

AQ-ION 5 **The owner/operator shall comply with all applicable testing requirements as specified in Volume IV of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section, in writing, of the source test protocols and projected test dates required by AQ-ION4 at least 14 days prior to testing. [Regulation 2-1-403].**

Verification: The project owner shall submit the source test protocols and projected test dates at least 14 days prior to testing to the District and CEC.

AQ-ION 6 **The owner/operator shall maintain the following records:**

a. **The type and amount of each solvent used on a daily basis;**
b. **The POC and formaldehyde emissions at the stack of S-8, the POC emissions from the slip steam withdrawn from the exhaust of S-1, and the POC emissions from the use of ION solvents at S-8 on a monthly basis;**
c. **Monthly emission calculations shall be totaled for each consecutive twelve-month period;**
d. **Source test reports and emission rates derived from source test data.**
e. **The owner/operator shall maintain all records for at least five years and shall make them available for inspection upon request.**

[Recordkeeping; Regulation 2-6-501].

Verification: The project owner shall make the site available for inspection by representatives of the District, CARB, and the CEC upon request.

AQ-ION 7 **In the event that total POC emissions from the use of ION solvents at S-8, Carbon Capture System, exceed 1.050 tons of POC during any twelve-month period, the owner/operator shall submit additional offset credits for the excess emissions according to the procedures set forth in District Regulation 2-2-302.1 through 302.4. [Regulation 2-2-302]**

Verification: A summary of total POC emissions from the use of the ION solvents at S-8, with a statement of compliance is required and shall be included in the semi-annual Air Quality Reports specified in Condition AQ-14.

REFERENCES

BAAQMD 2022 – Bay Area Air Quality Management District (BAAQMD). Draft Decision - Authority to Construct and Engineering Evaluation Application No. 30974. Public notice location available online at: [http://www.baaqmd.gov/permits/public-notices]

LMEC 2022 – Los Medanos Energy Center, LLC (LMEC). Los Medanos Energy Center - Petition for Modification regarding CO2 Capture Pilot Project (TN 237531), docketed April 23, 2021. Available online at: https://efiling.energy.ca.gov/GetDocument.aspx?tn=237531&DocumentContentId=70739

[1]New PTE amount of (1.050tpy)*(1.15) = 1.208 tpy