September 12, 2024

Nick Tonsich, President
Clean Air Engineering - Maritime
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Dear Nick Tonsich:

Thank you for providing the continuous emissions monitoring system (CEMS) data, including levels of oxides of nitrogen (NOx), particulate matter (PM), and ammonia slip (NH_3) for the Marine Exhaust Treatment System-1 (METS-1) as part of the annual performance requirement of Executive Order (EO) AB-15-01 for January 2022 through December 2022. The METS-1 is a California Air Resources Board (CARB) Approved Emission Control Strategy (CAECS) and is used as an alternative compliance strategy for the At Berth Regulation.

The data provided allows CARB staff to evaluate how well METS-1 met the established parameters stated in the EO under actual operating conditions, as well as to identify any potential operational issues that may warrant further investigation in the event that the EO parameters are exceeded.

CARB recognizes Clean Air Engineering – Maritime's (CAEM) efforts in servicing 68 vessel visits from January 2022 through December 2022. However, staff identified potential concerns regarding 33 visits that required follow-up:

- Ammonia slip CEMS data was found to exceed the 5 parts per million (ppm) limit, specified in the 2020 At-Berth Regulation, for several hours during 1 visit on 1/4/2022. Ammonia slip occurs when ammonia passes unreacted through a Selective Catalytic Reduction (SCR) system.
- NOx control efficiency data showed issues with NOx control for 1 visit on January 5, 2022. NOx control fluctuated up and down with no discernable trend in the data. Data showed NOx control fluctuation between 0% and 95 to 100% for multiple periods throughout the visit.
- Ammonia slip CEMS data was found to be missing or not recorded for several hours over 26 consecutive visits from January 18, 2022, to May 1, 2022.
- CEMS data for PM control for 1 visit on February 6, 2022 exceeded 100% for the entire visit. Since control efficiencies are a ratio of measured inlet and outlet emissions, it is impossible to exceed 100 percent efficiency.
- Ammonia slip CEMS data was found to be above the limit, missing, not recorded, or below zero (0) for 5 consecutive visits from November 23, 2022 to December 8, 2022.

Following CARB staff and CAEM discussion regarding the 33 visits outlined above, CAEM provided staff with a follow-up report. CAEM provided explanations and solutions to satisfy CARB's concerns for all 33 visits:

- CAEM reported that for the vessel call on January 4, 2022, the inlet burner temperature was increased and the ammonia injection was decreased to remedy the issue. Ammonia injection was high to meet the required NOx control efficiency.
- CAEM reported that for the visit on January 5, 2022 the ammonia injection system was under repair and the ammonia injection flow was set to the minimum during the repair. The system had to be disconnected temporarily leading to a drop in NOx control efficiency.
- CAEM reported that for the vessel calls from January 18, 2022 through February 23, 2022, the ammonia slip analyzer intermittently lost connection to the Programmable Logic Controller (PLC) and data was not recorded automatically. The operator aboard the METS-1 recorded data manually from the ammonia slip analyzer every hour for these visits. Prior to the vessel call on February 28, 2022, the ammonia slip analyzer was taken out of service and sent to the manufacturer for repair. The repaired analyzer was reinstalled during the visit on May 1, 2022.
- CAEM reported that for the vessel call on February 6, 2022 the PM data was improperly logged in the wrong data column in the CEMS database. There is no issue with PM control for this vessel call.
- CAEM reported that for the vessel calls from November 23, 2022 to December 2, 2022 the ammonia slip analyzer intermittently lost connection to the PLC and data was not recorded automatically. The operator aboard the METS-1 recorded data manually from the ammonia slip analyzer every hour for these visits.
- CAEM reported that for the vessel call on December 8, 2022, the outlet NOx analyzers were out of calibration and caused excess ammonia to be injected. CAEM stated that the NOx analyzers are calibrated prior to every call and were recalibrated following the discovery of the issue.

CARB staff believes all concerns regarding NOx, PM, and NH_3 control have been addressed, and the METS-1 is operating within the established parameters outlined in the EO. Per section 93130.12 (3)(c), CAEM must report information regarding any malfunction that is expected to create emissions in excess of any applicable emissions limit for a period greater than one hour. In addition, even in instances where there are no expected excess emissions, CARB staff advises CAEM to inform CARB of any CEMS issues or malfunctions in a timely manner. Prompt notification of malfunctions that will impact CEMS data helps CARB and CAEM streamline the review process by providing justification for issues that will appear during CARB's annual review. It is CARB's intent to ensure that the METS-1 continues to operate in accordance with the EO. Henceforth, CARB advises CAEM to report to CARB staff within 24 hours, any malfunction or issue with their CEMS system, including analyzers and monitors.

In conclusion, CARB staff values CAEM and their proven success in implementing capture and control technologies used at berth as an alternative to shore power for compliance with the At Berth Regulation.

If you have any questions, please contact Angela Csondes, Section Manager, Marine Strategies Section at *angela.csondes@arb.ca.gov,* or Sam Bailey, Air Pollution Specialist at *samuel.bailey@arb.ca.gov*.

Sincerely,

Bonnie Soriano, Chief, Freight Activity Branch, Transportation and Toxics Division

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