State of California
AIR RESOURCES BOARD

Executive Order G-25-098-002

CARB Approval of the METS systems used to control emissions from tanker vessels for compliance with the Control Measure for Ocean-Going Vessels At Berth

Clean Air Engineering Maritime (CAEM)

METS

WHEREAS, August 27, 2020, the California Air Resource Board (CARB) adopted the Control Measure for Ocean-Going Vessels (OGV) At Berth, California Code of Regulations, title 17, sections 93130 - 93130.22 (2020 At Berth Regulation), which establishes requirements for ocean-going vessels at berth in a California port to reduce oxides of nitrogen (NOx), diesel particulate matter (PM), and reactive organic gases (ROG) emissions from auxiliary engines;

WHEREAS, section 93130.5 of the 2020 At Berth Regulation establishes requirements for an emission control strategy to qualify as a CARB Approved Emission Control Strategy (CAECS) that can be used to reduce emissions from ocean-going vessel auxiliary engines and applicable tanker auxiliary boilers while at berth in a California port;

WHEREAS, no emission control strategy may be used to comply with the requirements of the 2020 At Berth Regulation unless CARB approves it as a CAECS;

WHEREAS, the 2020 At Berth Regulation requires that the emission control strategy, if applicable for auxiliary engines, achieves emission rates of less than 2.8 grams per kilowatt hour (g/kW-hr) for NOx, 0.03 g/kW-hr for PM 2.5, and 0.1 g/kW-hr for ROG demonstrated through testing conducted under a CARB approved Test Plan as specified in section 93130.5(d) of the 2020 At Berth Regulation;

WHEREAS, for strategies approved after 2020, greenhouse gas (GHG) emissions from the strategy must be grid-neutral using the grid emission rate for the year that the technology is granted an Executive Order, as specified under section 93130.5(d) of the 2020 At Berth Regulation;

WHEREAS, the 2020 At Berth Regulation requires that the emission control strategy, if applicable for tanker auxiliary boilers, achieves emission rates less than 0.4 g/kW-hr for NOx, 0.03 g/kW-hr for PM 2.5, and 0.02 g/kW-hr for ROG demonstrated through testing conducted under a CARB approved Test Plan as specified in section 93130.5(d) of the 2020 At Berth Regulation;

WHEREAS, CAEM is subject to the 2020 At Berth Regulation as a CAECS operator;

WHEREAS, CAEM developed METS-3, a barge-based capture and control system to reduce emissions from the auxiliary engines on ocean-going tanker vessels while at berth;

WHEREAS, METS-3 consists of the following components and subcomponents as specified in the Description of Control Strategy in "METS Emission Test Protocol (Tanker Vessel) Version 3" (Test Plan dated August 27, 2024) including: an exhaust capture system using a bonnet style, multi-source expandable capture hood stack adapter, transfer ducting, and a single emission control system comprising of a ceramic particulate filter and catalyst-embedded filter elements to reduce NOx, PM, and ROG;

WHEREAS, CAEM submitted their final Test Plan on August 27, 2024 for the METS-3, and CARB issued CAEM a Test Plan approval letter on September 3, 2024;

WHEREAS, CAEM submitted to CARB the "METS Test Report (3-5-2025)" (Test Report and request for Executive Order) dated March 5, 2025, and supplemental data on March 7, 2025, and March 24, 2025;

WHEREAS, CARB reviewed and evaluated the Test Report and request for Executive Order for the METS-3 based on the requirements specified in the 2020 At Berth Regulation;

WHEREAS, CARB found the submitted documents indicate METS-3 achieves the emission reductions and has GHG emissions that are grid neutral as of approval as stated in the Test Report and required by the 2020 At Berth Regulation under section 93130.5(d);

WHEREAS, CARB issued EO G-25-098 on June 18, 2025, approving the METS-3 to control three auxiliary engines for compliance with the 2020 At Berth Regulation for tanker vessels;

WHEREAS, CAEM manufactured additional equipment that is a duplicate of METS-3 to be operated under the same approved operating conditions, and requested the duplicate be added to the Executive Order;

WHEREAS, duplicate equipment can be added to an Executive Order after the equipment has been verified to be a duplicate, with the condition the required in-use compliance testing is conducted with the in-use compliance test (including emissions) data submitted to CARB within 6 months or 30 vessel visits, whichever comes first;

WHEREAS, duplicate equipment must be identical to the equipment described in CAEM's Test Plan submitted on August 27, 2024;

WHEREAS, the following in-use compliance tests must be conducted on duplicate equipment within 6 months or 30 vessel visits, whichever comes first, after the date that the duplicate equipment is approved and added to the Executive Order: 1) Third-party source testing at one load point following the requirements of section 93130.5(g) of the 2020 At Berth Regulation with Relative Accuracy Test Audit (RATA) testing; 2) Third-party capture efficiency testing at one load point; 3) Durability testing on a minimum of five vessels and a minimum of 200 hours;

WHEREAS for systems approved to use similar operating conditions for use on multiple vessel types (such as container, ro-ro, and/or tanker vessels) for auxiliary engines, the in-use compliance testing requirements outlined above shall only be conducted on one selected

vessel type, based on the earliest applicable in-use compliance deadline, to avoid duplicative testing across vessel types;

WHEREAS, in-use compliance third-party source testing must be conducted for all pollutants listed in section 93130.5 (g) of the 2020 At Berth Regulation, and all testing must follow the test methods specified in section 93130.5 (g) and in CAEM's Test Plan submitted on August 27, 2024;

WHEREAS, duplicate equipment may require additional testing or be removed from the Executive Order if the required testing is not submitted to CARB within 6 months or 30 vessel visits, whichever comes first, after the date that the duplicate equipment is approved and added to the Executive Order;

WHEREAS, duplicate equipment will be removed from the Executive Order if, after CARB evaluates the test data, CARB determines that the in-use compliance test data demonstrates the system achieves emission rates greater than those specified in section 93130.5(d) of the 2020 At Berth Regulation;

WHEREAS, during the in-use compliance period, all requirements of the Executive Order must be followed, including all malfunction reporting and recordkeeping requirements. Failure to comply with the requirements of the Executive Order, including section 93130.12 of the 2020 At Berth Regulation, may cause the equipment to be removed from the Executive Order and the approved equipment list;

WHEREAS, CAEM requested the METS-4 system listed in Attachment 1 to be approved as duplicate equipment under this Executive Order, which CARB verified is a duplicate of METS-3;

WHEREAS, EO G-25-098-001 approved METS-4 as a duplicate of METS-3 to control three auxiliary engines;

WHEREAS, CAEM submitted "METS Emission Test Protocol (Tanker Vessels 5 Stacks and Boilers) Version 6" (Design Change Test Plan) on September 8, 2025, seeking to expand operating conditions for both the METS-3 and METS-4 (METS Systems) to capture emissions from two, four, or five auxiliary engines and up to two boilers, and CARB issued CAEM a Test Plan approval letter on October 13, 2025, for the Design Change Test Plan;

WHEREAS, CAEM submitted "METS-4 Tanker Test Report for Control Efficiency and RATA Verification" (Design Change Test Report) on July 8, 2026, and additional information on July 17, 2026, and July 23, 2026;

WHEREAS, CARB found the Design Change Test Report and additional information demonstrate the design change of the METS Systems achieves emission rates greater than those specified in section 93130.5(d) of the 2020 At Berth Regulation;

WHEREAS, the Executive Officer finds it is appropriate to issue this Executive Order that identifies the operating conditions, recordkeeping, and monitoring requirements for

CAEM's use of the METS systems listed as Approved Equipment in Attachment 1 (METS) to allow their use as a CAECS for compliance with the 2020 At Berth Regulation;

WHEREAS, this approval does not constitute an air pollution or land use permit, nor does it relieve the responsibility of CAEM or the end user to comply with all Federal, State, and local laws, rules, and regulations;

NOW, THEREFORE, IT IS ORDERED that the METS-3 system is approved for use in demonstrating compliance with the 2020 At Berth Regulation as CAECS, when used by CAEM as intended and in accordance with the following terms and conditions, and in accordance with all other applicable requirements in the 2020 At Berth Regulation.

APPROVAL OF DUPLICATE EQUIPMENT

BE IT FURTHER ORDERED, the duplicate METS system(s) of this Executive Order are approved as verified duplicates of the approved METS-3 described in CAEM's Test Plan submitted on August 27, 2024, as amended by CAEM's Design Change Test Plan submitted on September 8, 2025, and may be used pursuant to the terms and conditions of this Executive Order on the vessels and engine types as provided in Attachment 1.

BE IT FURTHER ORDERED, CAEM will conduct the required in-use compliance testing to verify compliance of duplicate equipment listed in Attachment 1 within six months or 30 vessel visits, whichever comes first, for every new piece of equipment added to this Executive Order.

BE IT FURTHER ORDERED, CAEM may only use the METS equipment identified as Approved Equipment in Attachment 1 to demonstrate compliance with the 2020 At Berth Regulation pursuant to this Executive Order, and any additional duplicates must receive CARB approval prior to use pursuant to this Executive Order.

APPROVED OPERATING CONDITIONS

Parameter	Value
Ocean-going vessel engine type	Two, three, four, or five auxiliary engines
Ocean-going vessel type	Tanker vessel
Ocean-going vessel fuel composition limitation	Marine distillate fuel meeting 0.1% sulfur content limit (0.1% sulfur marine gas oil (MGO) or marine diesel oil (MDO))
Capture system hood	Multi-source expandable capture hood
SCR inlet operating temperature range in degrees Fahrenheit (ºF)	350 – 700ºF

Parameter	Value
Ocean-going vessel engine maximum continuous rating (MCR) in kilowatts (kW) per engine	1,225 kW
Ocean-going vessel allowable operating range per engine (kW)	51kW to 588 kW
Ocean-going vessel total combined allowable operating range for all auxiliary engines (kW)	838 kW to 2,272 kW
Allowable exhaust flow rate for the stacks combined at the system inlet in standard cubic feet per minute (scfm)	6,200 to 8,478 scfm of engine exhaust
Maximum engine exhaust temperature requirements	1,000ºF
Differential pressure across each filter ("H2O)	-2 to -20
Static Pressure at the capture system inlet ("H2O)	Minimum of -0.2
Other parameters that affect performance	Filter face velocity less than 0.03 m/s
GRID Neutral Target – CA CO2e state output emission rate from eGRID2023 in pounds per megawatt hour (lb/MWh)	394.8 lb/MWh
Maximum CAECS auxiliary generator operating load (kW)	200 kW
CAECS auxiliary generator renewable diesel carbon intensity limit in grams of carbon dioxide equivalent per megajoule of fuel (g CO2e/MJ)	45 g CO2e/MJ fuel
Maximum ammonia slip emissions in parts per million by volume, dry basis (ppmdv)	5 ppmdv averaged over 60 minutes

OPERATIONAL REQUIREMENTS

BE IT FURTHER ORDERED, CAEM will operate the METS following the notification and operational requirements per sections 93130.12(b)(1) and 93130.12(b)(2) of the 2020 At Berth Regulation:

1. At least seven calendar days before a vessel's arrival, the operator of the CAECS must coordinate in writing with the vessel operator and terminal operator for the use of the

strategy and supply the vessel operator with information about the compatibility with the vessel and terminal of the CAECS.

2. During each visit, the operator of the CAECS shall:
    a. Begin controlling emissions within two hours of vessel "Ready to Work";
    b. Record inlet and outlet levels of emissions during the visit;
    c. Continue controlling emissions until at least one hour before "Pilot on Board"; and
    d. Ensure vessels are operating on CARB compliant distillate marine fuel.

MONITORING REQUIREMENTS

BE IT FURTHER ORDERED, for every 1,000 hours of operation (and at a minimum annually), CAEM shall submit data to the Executive Officer from the continuous emission monitoring system (CEMS) for each visit the CAECS is operated, to verify that the emission reduction levels are maintained, paying the applicable Certification Fee for the 2020 At Berth Regulation (California Code of Regulations, Title 13, Division 3, Chapter 16, Article 7, sections 2913 and 2914) for each visit.

BE IT FURTHER ORDERED, the CEMS parameters submitted to the Executive Officer must follow the parameters and measurement methods listed in CAEM's Test Plan submitted on August 27, 2024.

BE IT FURTHER ORDERED, within 30 days of a vessel departure, for every visit where METS-3 is used as a CAECS, CAEM shall report to CARB visit information as required by section 93130.12(b)(3) of the 2020 At Berth Regulation.

BE IT FURTHER ORDERED, within seven days of a vessel departure, CAEM shall report to their vessel operator customers the information necessary for vessel operators to submit their visit information to CARB as required by section 93130.7(e)(4) of the 2020 At Berth Regulation, including the following:

1) Emissions control start date and time
2) Emission control end date and time
3) Details on any delays or interruptions while controlling emissions and the times that emission reductions were uncontrolled during the visit.

BE IT FURTHER ORDERED, when vessel operators submit visit information to CARB as required by section 93130.7(e)(4) of the 2020 At Berth Regulation, the vessel operator must also report the following information per the compliance instructions for section 93130.7(e)(4)(Q):

1) Total power generated by vessel's auxiliary engines while at berth in kW-h. Data must be recorded at a minimum once an hour.

BE IT FURTHER ORDERED, within seven days of a vessel departure, CAEM shall report to their terminal operator customers the information necessary for terminal operators to submit their visit information to CARB as required by section 93130.9(d)(5) of the 2020 At Berth Regulation, including the following:

1) Emissions control start date and time;
2) Emission control end date and time;
3) Details on any delays or interruptions while controlling emissions and the times that emission reductions were uncontrolled during the visit.

BE IT FURTHER ORDERED, CAEM shall maintain the METS in accordance with the section "5. Maintenance" of CAEM's Test Plan.

BE IT FURTHER ORDERED, the Executive Officer may request that the METS be tested annually using the test methods specified in the 2020 At Berth Regulation to demonstrate the overall percentage of the emission reduction being achieved, and the results of such testing shall be provided to the Executive Officer within 30 days of testing per section 93130.5(j) of the 2020 At Berth Regulation.

MALFUNCTION REPORTING AND RECORDKEEPING REQUIREMENTS

BE IT FURTHER ORDERED, CAEM shall report within 24 hours to CARB, by electronic means, any malfunction that is expected to create emissions in excess of any applicable emissions limitation for a period greater than one hour and shall retain for five years all records pertaining to the malfunction pursuant to section 93130.12 of the 2020 At Berth Regulation.

BE IT FURTHER ORDERED, CAEM shall report within 24 hours to CARB, by electronic means, any malfunction with the CEMS system for a period greater than one hour which makes the emission control unverifiable and shall retain for five years all records pertaining to the malfunction pursuant to section 93130.12 of the 2020 At Berth Regulation.

BE IT FURTHER ORDERED, a delay or interruption in emissions control caused by a malfunction is eligible for remediation for the hours of uncontrolled emissions only when CARB is notified by CAEM according to the provisions of section 93130.12(c) of the 2020 At Berth Regulation.

BE IT FURTHER ORDERED, CAEM shall submit a corrective action report within seven calendar days after a malfunction has been corrected as pursuant to section 93130.12(d) of the 2020 At Berth Regulation.

BE IT FURTHER ORDERED, records made pursuant to section 93130.12 of the 2020 At Berth Regulation shall be kept for a minimum of five years and CAEM shall submit information to CARB according to section 93130.19 of the 2020 At Berth Regulation.

BE IT FURTHER ORDERED, this approval is subject to the following conditions:

- CAEM must submit documentation, within 30 days upon request, to CARB showing METS is being maintained and the maintenance schedule in section "5. Maintenance" of CAEM's Test Plan is being adhered to.
- CAEM must keep records, including purchase receipts, for a minimum of five years, for renewable diesel purchases demonstrating the fuel used on the METS complies with the Approved Operating Conditions in this Executive Order.
- CAEM must inform the vessel operator of the METS operating conditions and ensure the vessel is only operating two, three, four, or five auxiliary engine(s) while the METS is controlling emissions.
- Delays or interruptions in emissions control caused by a malfunction, or when the operational requirements in section 93130.12(b)(2) of the 2020 At Berth Regulation are not met may result in enforcement actions and ultimately revocation of the EO unless the visits are made compliant through use of the Remediation Fund or with a Vessel Incident Event (VIE) or Terminal Incident Event (TIE).

DESIGN CHANGES AND EXTENSIONS

BE IT FURTHER ORDERED, no changes are permitted to METS design or approved operating parameters set forth in CAEM's application, test plan, and this Executive Order and its appendices, unless CARB is notified and approves in advance per section 93130.5(i)(2) of the 2020 At Berth Regulation. Design changes include changes to any part of the METS system including the exhaust capture hood, ducting, control equipment, and deployment platform. The changes must be approved in writing by the Executive Officer and any applicable Certification Fees for the At Berth Regulation (California Code of Regulations, Title 13, Division 3, Chapter 16, Article 7, sections 2913 and 2914) must be paid before the modifications may be used for compliance with the 2020 At Berth Regulation. The Executive Officer may revoke this Executive Order, or approval of any or all METS system(s) listed as Approved Equipment in Attachment 1 of this Executive Order, if the system fails to demonstrate that the expected emissions reductions are being achieved or if the METS design or approved operating parameters are changed without prior notification and approval by the Executive Officer. If a METS system malfunctions and fails to achieve emissions reductions required by the 2020 At Berth Regulation while performing with the same design, conditions, and requirements approved for the original approved system, the Executive Officer may revoke its approval of the duplicate system, remove it from the Executive Order, and/or require additional testing requirements if necessary.

BE IT FURTHER ORDERED, this Executive Order shall have a duration of five years from the date it was executed, unless it is revoked by CARB as set forth in section 93130.5(l) of the 2020 At Berth Regulation. As specified in section 93130.5(i)(1), at least six months prior to the expiration of this Executive Order, CAEM may apply for an extension by submitting an

extension application to the Executive Officer asserting that the strategy has not changed and is still effective, following the requirements specified in section 93130.5(d) as provided in section 93130.5(i)(1) of the 2020 At Berth Regulation, after paying any applicable Certification Fees for the 2020 At Berth Regulation (California Code of Regulations, Title 13, Division 3, Chapter 16, Article 7, sections 2913 and 2914).

BE IT FURTHER ORDERED, marketing of the METS using any identification other than that shown in this Executive Order or marketing of the METS for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from CARB.

BE IT FURTHER ORDERED, this Executive Order does not relieve CAEM from complying with all other applicable regulations.

Executive Order G-25-098-001 is hereby superseded and is of no further force and effect.

BE IT FURTHER ORDERED, this Executive Order may be revoked if the Executive Officer determines that METS does not comply with any of the requirements in this Executive Order.

Executed at Sacramento, California, this 2nd day of October 2026.



Tracy Haynes, Branch Chief
Freight Activity Branch
Transportation and Toxics Division

Attachment 1: Approved Equipment List

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METS	Oceangoing Vessel Type	Oceangoing Vessel Engine Type	Capture Hood Type	In-Use Compliance Testing*
METS-3	Tanker vessel	Two, three, four, or five auxiliary engines	Multi-source expandable capture hood	Original METS system approved, and not a duplicate. No requirement.
METS-4	Tanker vessel	Two, three, four, or five auxiliary engines	Multi-source expandable capture hood	In-use compliance testing completed. CARB has verified this unit as a duplicate and confirmed compliance with section 93130.5(j).

*Consistent with the terms and conditions of the Executive Order, duplicate equipment listed in Attachment 1 may be used for compliance with the At Berth Regulation. Duplicate equipment remains eligible for use under this Executive Order unless or until removed from Attachment 1.