December 4, 2023

Mr. Blaine Gilles
AERAS Technologies, LLC
192 North Marina Drive
Long Beach, California 90803
blaine@aeras-technologies.com

Dear Mr. Gilles:

California Air Resources Board (CARB) staff has reviewed AERAS Technologies, LLC's (AERAS) Test Report and Request for Executive Order (EO), dated August 15, 2023, and supplemental information submitted on October 16, 2023, October 17, 2023, November 2, 2023, November 13, 2023, and November 20, 2023, for the AERAS-1 barge-based capture and control system. The purpose of the Test Report and Request for EO was to provide emission measurements and associated information to support the development of approved operating conditions for the AERAS-1 for use as a CARB Approved Emission Control Strategy (CAECS) by container vessels in accordance with CARB's Control Measure for Ocean-Going Vessels At Berth (2020 At Berth Regulation). CARB staff's review of the AERAS Test Report and Request for EO was based on the requirements in the 2020 At Berth Regulation, the guidelines provided in CARB's "Revised Performance and Testing Guidelines for Emissions Control Strategies on Ocean-Going Vessels," and the AERAS Test Plan dated April 25, 2023, and approved on June 27, 2023.

We are pleased to inform you that we have approved the results of the emissions measurements and are issuing the attached Executive Order G-23-293.
Executive Order G-23-293 identifies the monitoring, reporting, and recordkeeping requirements for the AERAS-1, and stipulates the approved operating conditions for the use of the AERAS-1 as a CAECS which are identified in the table below.

AERAS-1 Approved Operating Conditions

Parameter	Value
Ocean-going vessel engine type	One auxiliary engine
Ocean-going vessel type	Container vessel
Ocean-going vessel fuel composition limitation	Marine distillate fuel meeting 0.1% sulfur content limit marine gas oil (MGO), marine diesel oil (MDO), or R99/R100 renewable diesel fuels that meet the specifications of MGO/MDO
Selective catalytic reduction (SCR) inlet operating temperature range in degrees Fahrenheit (ºF)	400-600ºF

Parameter	Value
Ocean-going vessel engine maximum continuous rating (MCR) in kilowatts (kW)	2,195 kW
Ocean-going vessel allowable operating range (kW)	420-1,100 kW
Allowable exhaust flow rate in standard cubic feet per minute (scfm)	1,690-4,700 scfm of engine exhaust
Other parameters that affect performance	A vacuum of less than -0.2 inches of water column (WC) at the AERAS-1 inlet pressure transducer
Grid neutral target – CA CO2e State Output Emission Rate from eGRID2021	480.5 lb/MWh
Average CAECS auxiliary engine operating load (kW)	62.5 kW
AERAS-1 carbon intensity limit in grams of carbon dioxide equivalent per megajoule of fuel (g CO2e/MJ)	38 g CO2e/MJ fuel
Maximum ammonia slip limit in parts per million by volume, dry basis (ppmdv)	5 ppmdv, averaged over 60 minutes

The AERAS-1 has been granted Executive Order G-23-293 under the 2020 At Berth Regulation, California Code of Regulations, title 17, section 93130.5(e)(3) and may operate under the terms specified in the EO for five years as a CAECS before needing to apply for an extension, as specified in section 93130.5(i)(1). Additional vessel source testing and an extension application would be necessary to extend the range of approved operating conditions or the inclusion of additional vessel types.

In closing, we appreciate the opportunity to work with AERAS in its efforts to implement a barge-based capture and control system to treat container vessel auxiliary engine emissions while at berth. If you have any questions, please contact Angela Csondes, Manager, Marine Strategies Section at *angela.csondes@arb.ca.gov*. In addition, please feel free to contact Nick Storelli, Air Resources Engineer, Marine Strategies Section at *nicholas.storelli@arb.ca.gov*.

Sincerely,

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

Enclosure: Executive Order G-23-293

cc: Angela Csondes, Section Manager, Marine Strategies Section