Date: November 24, 2021

Clerk of the Board
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: Public Availability of Additional Documents and Information for the Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions

Dear Chair Randolph and Members of the California Air Resources Board,

Westerbeke Corporation appreciates the opportunity to comment on the California Air Resources Board's (CARB's) Proposed Amendments to the *Off-Road Engine Regulations: Transition to Zero Emissions.*

Westerbeke Corporation is an 84-year-old, family-owned manufacturer located in Massachusetts with 60 employees. For over 80 years, Westerbeke has been offering durable and reliable power solutions to meet the challenges of commercial and recreational marine applications. We manufacture gasoline and diesel fueled generators, diesel propulsion engines, climate control systems and specialized sound enclosures. Since July 2018, Westerbeke is the only manufacturer/supplier of SORE Gasoline Marine Generators in the US.

Westerbeke prides ourselves on being among the cleanest and safest possible solutions for the Gasoline Marine Generator market. Westerbeke has taken it upon ourselves to push the technological boundaries for Gasoline Marine Generators for over 15 years now, producing generators over that time that had emission levels far, far below the requirements. Carbon monoxide (CO) emissions are of particular concern to the marine industry because of the risk of CO poisoning in the marine environment. Westerbeke brought the first low-CO gasoline generators to the market. As a result of the potential reduction of CO-related fatalities, in 2004 Westerbeke was awarded the NMMA Innovation Award for our Low-CO Gas Generators. With all our experience, Westerbeke is intimately familiar with what is technologically feasible and cost-effective with regards to the emissions control of Gasoline Marine Generators.

The technology simply does not exist to replace a Gasoline Marine Generator with any currently available Zero Emissions Equipment (ZEE).

EO N-79-20, section 1 states, "It shall be further a goal of the State to transition to 100 percent zero-emission off-road vehicles and equipment by 2035 *where feasible.*" Section 2 states "In implementing this Paragraph, *the State Air Resources Board shall act consistently with technological feasibility and cost-effectiveness.*" The EO clearly and specifically accommodates off-road equipment like generators that do not have a technologically feasible replacement and allows sufficient time for the potential development of technology that does not yet exist within the framework of the EO's stated goals and 2035 timeline.

There are no suitable replacements available, or even realistically projected to be available in the next 10 years that would be a feasible and cost-effective ZEE replacement for a Gasoline Generator. In the event of a power outage (whether unplanned power outage or PSPS) it is essential to have access to electrical power. Operating lifesaving home medical equipment and having heat and/or air conditioning are not mere conveniences, they are lifesaving necessities to vulnerable populations. Having the ability to refrigerate food, cook food, have running water, have lights for safety are all necessities, not luxuries. This is even more true in the case of Gasoline Marine Generators. When a boat is underway, or out at anchor, there is no access to shore power, often for extended periods of time.

The extremely high power density requirements make even the best ZEE option currently available completely useless for replacing a Gasoline Marine Generator, or really any Gasoline Generator. Consider the case of replacing even the smallest Gasoline Marine Generator currently on the market with a ZEE battery-inverter system. Even the tiny output of 3.5 kW operating for just 2 days with a battery powered inverter would require almost 8 tons worth of batteries alone at a cost of almost $100,000. What happens when replacing a much bigger 7.5 kW, 10 kW or even a 15 kW generator, all of which fall under SORE regulations? $428,000 and 32 tons worth of batteries? No reasonable person would consider that either technologically feasible or cost-effective. And keep in mind that will only cover a 2-day outage.

The general idea of replacing power from the grid by using a device that relies on the grid to recharge is fundamentally flawed logic. Using solar panels to recharge batteries during a storm or outage is highly unreliable and even in the best conditions is much too slow to keep up with the demand. There is no ZEE option available to replace generators, either now or in the foreseeable future. Until such a time as a suitable, cost-effective solution is *actually* commercially available, Gasoline Generators should be allowed to continue to be available in the marketplace.

Dramatically lowering the emissions standards, while simultaneously increasing the durability hours, and then further restricting CO emissions for Marine Gasoline Generators is not acting "consistently with technological feasibility and cost effectiveness" as N-79-20 requires.

There is a fundamental balance in gasoline engine emissions between NOx production and CO production. As CO production is reduced (running the engine leaner) NOx production is increased. As NOx is reduced (running the engine richer) CO production is increased. While Westerbeke appreciates and supports the long-term goal of reducing NOx in California, we strive to not do so at the expense of elevated CO levels when CO poisoning is IMMEDIATELY dangerous to life and health. The EPA and CARB regulations both recognize this chemical balance in the rulemaking.

In the EPA's regulation 40 CFR 1048.101(a)(3) for example, the EPA offers a formula that describes the technical relationship between HC+NOx and CO when considering alternate emission standards. In this example, the standard is 2.7 g/kW-hr for HC+NOx

and 4.4 g/kW-hr for CO. Application of the formula to favor a lower NOx standard necessarily results in an elevated CO standard. The extreme case for NOx reduction is 0.8 g/kW-hr for HC+NOx, which when applying the formula results in a standard of 20.6 g/kW-hr for CO. These are clearly the same standards that CARB uses in the 2024-2027 generator exhaust emission standard for engines >825cc. However, in the proposed CARB regulations, because of the danger of CO in the marine environment, Gasoline Marine Generators are additionally capped to 4.5 g/kW-hr of CO. This is done without consideration of the governing formula which shows that an increase in the NOx standard is necessary to maintain the balance with the additionally lowered CO standard. While Westerbeke understands and supports the goal of lowering NOx emissions levels for all generators, Gasoline Marine Generators are being uniquely and unfairly penalized with the unilateral capping of CO to 4.5 g/kW-hr without the corresponding and required increase to NOx. This contradicts the physics inherent to the function of a gasoline powered engine's emission control system.

Arbitrarily increasing the durability period standard to 1000 hours for engines larger than 225cc without regard to the engine's actual in-use life effectively further reduces the emissions standard that has already been dramatically reduced. The reduction in the basic emissions standards alone while maintaining durability is nearly unattainable. Halving or quartering that already barely attainable standard by doubling or quadrupling the durability period makes it technologically unfeasible.

Currently in California, stationary Gasoline Generators with engine power <19kW are not regulated beyond EPA regulations. Gasoline Marine Generators are operated similarly to these home standby generators. Boats preferably operate on shore power except when reliable shore power is not available, then the generators are used to provide secondary power to the vessel.

SORE Gasoline Marine generators represent a miniscule fraction at approximately 0.12% of the total US Portable Generator Market. Westerbeke's direct SORE Gasoline Marine Generator shipments into CA represent less than 0.07% of the total US Portable Generator Market. Given this de minimus percentage of Gasoline Marine Generators in California, we respectfully request that SORE Gasoline Marine Generators be separated from other generators and be allowed to maintain the current emissions standards of 8.0 g/kW-hr HC+NOx and 4.5 g/kW-hr CO, and maintain Westerbeke's current durability period as is.

Given all of the factors above, Westerbeke respectfully requests that for the period of 2024-2027 and beyond, SORE Gasoline Marine Generators be separated from other SORE engines and SORE generators and be allowed to continue with the current emissions standards and durability periods until such a time as the emissions control technologies demonstrate that a lower standard is technologically feasible and cost-effective for a marine generator and/or until a practical ZEE solution to effectively and cost-effectively replace a Gasoline Marine Generator application is readily available in the marketplace.

Conclusion

Generators as a whole, and marine generators specifically, have no technologically feasible and cost-effective alternatives, period. Banning generators without any suitable alternatives would be irresponsible governance. In the case of land-based generators, it would be putting the citizens of California at substantial risk of harm during California's frequent power outages. In the even more specialized case of Gasoline Marine generators, it would render the boats requiring anything more than minimum levels of electrical power essentially unusable.

Westerbeke respectfully requests that Gasoline Marine Generators be exempted from ZEE transition regulations and be allowed to continue to be sold in California at the emission levels and durability period as currently regulated by the EPA. We further request that Gasoline Marine Generators should be allowed to be sold in California until such a time as a practical ZEE solution to replace a Gasoline Marine Generator is readily available in the marketplace.

Thank you for the opportunity to provide comments on the Proposed Amendments to the Small Off-Road Engine Regulations. If you have any questions or would like to discuss supporting information, please feel free to contact me at 508-823-7677 or gamber@westerbeke.com.

Sincerely,

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