

ENGINEERING ANALYSIS
YAMAHA MOTOR CORPORATION, USA
705-0062

On March 21, 2025, the Department received an Air Permit application from Yamaha Motor Corporation, USA (Yamaha) in Bridgeport, Alabama. The facility will test marine engines. Yamaha has an existing facility and will construct a greenfield marine testing facility near the Tennessee River. Construction is scheduled to begin in May 2025 and be completed by May 2026. A greenfield site inspection was performed on April 3, 2025, with no problems noted. Further information was received through April 10, 2025.

OPERATION

The facility's operations will consist of permitted and unpermitted processes. The permitted operations include four marine engine test cells Nos. 1-4 that will run various tests in enclosed test pools, and emissions from these cells will be collected and controlled by a catalytic thermal oxidizer (CTO).

There will be several gasoline storage tanks. These are proposed to be one 20,000 gallons, one 10,000 gallons, one 1,000 gallons, and one 500 gallons tanks.

There will be unpermitted natural gas fired units at the facility which will include hot water and space heaters. There will also be three cooling towers.

There will also be one existing diesel fired emergency generator which is rated at 100 KW and has a diesel storage tank.

MANUFACTURING PROCESS OVERVIEW

ENGINE TEST CELLS:

There will be two enclosed test pools and each pool will have two test cells for a total of four. The test cells will operate under negative pressure and the emissions will vent to a common header connected to a catalytic thermal oxidizer (CTO) that will be used to control carbon monoxide (CO), volatile organic compounds (VOCs), and hazardous air pollutants (HAPs). All potential emissions are based on the highest possible power engines running 8760 hours/year. Emission factors for CO, nitrogen oxides (NOx), and VOCs are based on the applicable standards for marine engines in 40 CFR Part 1045.103. The CTO will be assumed to achieve 98% destruction efficiency until an initial performance test is completed. The manufacturer suggests a set point of 600 deg F.

CTO SHUTDOWN:

The facility plans on operating 3120 hours per year, but all emissions are based on 8760 hours of operation. The normal operation of the test cells would vent to the CTO. However, during short term or other low emission generating engine tests, the engine test cell emissions may bypass the CTO. Yamaha will be required to keep a logbook of these occurrences. Yamaha will be required to calculate emissions for the bypass periods of the CTO as having no destruction efficiency credit.

EMISSIONS

Below are the expected potential emissions (assuming 8760 hours/year except the generator at 500 hours/year):

Equipment Description	CO	NO _x	PM	PM ₁₀	PM _{2.5} ^[1]	SO ₂	VOC	CO ₂ -e	Total HAP
Engine Test Cell No. 1/2	2011.9	84.4	0.5	0.5	0.5	0.05	84.4	7747	3.23
Engine Test Cell No. 3/4	2011.9	84.4	0.5	0.5	0.5	0.05	84.4	7747	3.23
Thermal Oxidizer	1.10	1.31	0.1	0.01	0.01	0.01	0.07	1539	0.09
Facility Support Operations - Facility Wide Space & Water Heaters < 5MMBTU	2.85	3.38	0.25	0.02	0.01	0.02	0.19	3970	
Emergency Generator	0.25	1.16	0.08	0.08	0.08	0.01	0.09	43	0.01
Storage Tanks							7.27		
Cooling Towers			1.26	0.63	0.01				
Total Uncontrolled	4028.1	175.4	2.8	1.8	1.2	0.1	176.6	21046	6.55
Total Controlled	95.0	95.0	2.8	1.8	1.2	0.1	95.0	21046	0.22
Prevention of Significant Deterioration (PSD)	250	250	250	250	250	250	250	N/A	N/A
Are the Emissions Equal to or Exceed the PSD Threshold?	No	No	No	No	No	No	No	No	No
Major Source (Title V and/or HAP) Threshold (tpy)	100	100	100	100	100	100	100	N/A	25
Are the Emissions Equal to or Exceed the Title V Major Source Threshold?	No	No	No	No	No	No	No	No	No

APPLICABLE REGULATIONS

Title V:

Yamaha has submitted applications requesting a Synthetic Minor Operating Permit (SMOP) to construct on the greenfield site and operate their facility. The calculations above show that the potential VOC emissions would exceed the 100 tons/year (TPY) threshold without the operation of the control device. Yamaha has requested that a SMOP be issued to the company to restrict the

VOC, CO, and NOx potential emissions below 100 TPY with a 95 TPY restriction respectively per rolling 12-month period.

PSD:

The potential emissions from the facility are above the 250 TPY threshold for criteria pollutants and below 100,000 TPY of CO_{2e} for the Prevention of Significant Deterioration (PSD) applicability. However, with the CTO control device and actual operating hours, the VOC, CO, and NOx potential emissions will be below 250 TPY with a 95 TPY restriction respectively per rolling 12-month period. Therefore, Yamaha will be considered a minor source for PSD applicability.

NSPS/NESHAP:

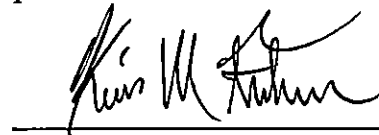
Yamaha is not subject to the National Emission Standards for HAPs (NESHAP) Engine Test Cells/Stands Part 40 CFR 63 Subpart (PPPPP) because the source's potential emissions do not exceed the major source thresholds of 10 TPY and 25 TPY for a single hazardous air pollutant (HAP) and total HAPs, respectively. There are no New Source Performance Standards (NSPS) regulations that apply to the test cell operation because this category is not regulated.

The diesel fired emergency generator is not subject to the New Source Performance Standards (NSPS) Subpart IIII because the installation date of 1996 predates the applicability date range of 2005-2007. The unit is subject to the National Emission Standards for HAPs (NESHAP) Subpart ZZZZ, and the unit will comply with NESHAP Subpart ZZZZ by good work practices.

There are no other NSPS or NESHAP regulations that apply to the facility. There are no Control Techniques Guidelines (CTG) regulations from Chapter 6 of the ADEM regulations that apply because this category is not regulated.

RECOMMENDATIONS

Based on the above information, I recommend that the attached Synthetic Minor Operating Permit (705-0062-X001) to be issued to Yamaha, pending public comment.



Kevin M. Fulmer
Chemical Branch
Air Division
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KMF/kmf