

Commonwealth of Kentucky
Division for Air Quality
STATEMENT OF BASIS / SUMMARY

Conditional Major, Construction/Operating
Permit: F-26-035

Valvoline Engine Test Laboratory
121 22nd Street
Ashland, KY 41101

8/06/2026
Dylan Buckingham, Reviewer

SOURCE ID:	21-019-00110
AGENCY INTEREST:	40443
ACTIVITY:	APE20260002

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SECTION 1 – SOURCE DESCRIPTION

SIC Code and description: 8734, Testing Laboratories

Single Source Det. ☐ Yes ☒ No If Yes, Affiliated Source AI:

Source-wide Limit ☒ Yes ☐ No If Yes, See Section 4, Table A

28 Source Category ☐ Yes ☒ No If Yes, Category:

County: Boyd

Nonattainment Area ☒ N/A ☐ PM₁₀ ☐ PM_{2.5} ☐ CO ☐ NO_x ☐ SO₂ ☐ Ozone ☐ Lead

If yes, list Classification:

PTE* greater than 100 tpy for any criteria air pollutant ☒ Yes ☐ No

If yes, for what pollutant(s)?

☐ PM₁₀ ☐ PM_{2.5} ☒ CO ☐ NO_x ☐ SO₂ ☐ VOC

PTE* greater than 250 tpy for any criteria air pollutant ☐ Yes ☒ No

If yes, for what pollutant(s)?

☐ PM₁₀ ☐ PM_{2.5} ☒ CO ☐ NO_x ☐ SO₂ ☐ VOC

PTE* greater than 10 tpy for any single hazardous air pollutant (HAP) ☐ Yes ☒ No

If yes, list which pollutant(s):

PTE* greater than 25 tpy for combined HAP ☐ Yes ☒ No

*PTE does not include self-imposed emission limitations.

Description of Facility:

Valvoline Inc. operates an Automotive Products Application Laboratory (APAL) in Boyd County, Kentucky, with the primary purpose of running automotive engine tests to evaluate how engine fluids perform under operating conditions. The facility was established in 1953.

None of the engines are operated with a catalytic converter attached because a converter would interfere with the testing process by affecting the backpressure experienced by the engine. As a result of the lack of a catalytic converter, pre-1975 emission factors from AP-42, Volume II, Appendix H and for marine engine (non-road) EPA420-R-05-019 (NR-010e) were used to ensure conservative estimates from the engines.

The automotive engines in the test facility are operated for varying time periods in order to test the performance of lubricants and similar materials. The engines are then rebuilt for the next test.

SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM

Permit Number: F-26-035

Activity: APE20260002

Application Received: April 3, 2026

Application Complete Date(s): August 6, 2026

Permit Action: ☐ Initial ☒ Renewal ☐ Significant Rev ☐ Minor Rev ☐ Administrative

Construction/Modification Requested? ☐ Yes ☒ No

Previous 502(b)(10) or Off-Permit Changes incorporated with this permit action ☒ Yes ☐ No

Description of Action:

- APE20260001: On March 25, 2026, the Division received a 502(b)(10) Change to replace Test Engine 10 with a like for like model.
- APE20260002: On April 3, 2026, the Division received an application for the Renewal application for the operating permit for Valvoline Engine Test Laboratory. The application included updated engine descriptions and associated tests to reflect current operations at the facility.

F-26-035 Emission Summary		
Pollutant	2025 Actual (tpy)	F-26-035 (tpy)
CO	6.64	1089.91*
NOx	1.92	74.83
PT	4.68	4.78
PM10	4.68	4.78
PM2.5	4.68	4.78
SO2	0.033	1.197
VOC	0.69	57.45
Lead	0.0000004	4.53E-6
Greenhouse Gases (GHGs)		
Carbon Dioxide	137.81	1926.34
Methane	0.00214	0.029
Nitrous Oxide	0.0022	0.029
CO ₂ Equivalent (CO ₂ e)	138.45	1935.03
Hazardous Air Pollutants (HAPs)*		
2,2,4-Trimethylpentane	0.018	2.08
Benzene	0.017	1.88
Ethyl Benzene	0.004	0.67
Formaldehyde	0.023	0.81
Hexane; N-Hexane	0.0038	0.34
o-Xylene	----	0.70
Styrene	0.011	1.37
Toluene	0.043	5.02
Xylenes (Total)	0.024	4.1E-6
Combined HAPs:	0.12	15.75

*Federally-Enforceable Limitations on CO, HAP, and total HAP.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

Emission Units 01, 02, 03 Gasoline Test Engines III, VPS, VIII; Emission Unit 04 Gasoline Test Engine X; Emission Units 05, 06, 07 Gasoline Test Engines V, BL-2, VI; Emission Unit 08 HD-I Engine Stand; Emission Unit 08b HD Gasoline; Emission Unit 10 HD Gasoline; Emission Unit 13, 14 Gasoline Test Marine Engines ME1 and ME2; Emission Unit 15 Heavy Duty II Engine Test Stand

Initial Construction Date: various, see below

Process Description:

Internal Combustion Reciprocating Test Engines for Light Duty Gasoline Powered Vehicles.

01 Gasoline Test Engine III:

Make: General Motors

Fuel: Unleaded gasoline only

Horsepower / Displacement: 200 / 3.8L

Construction Date: 1999

02 Gasoline Test Engine VPS:

Make: Nissan

Fuel: Unleaded gasoline only

Horsepower / Displacement: 375 / 3.5L

Construction Date: 1999

03 Gasoline Test Engine VIII:

Make: Cooperative Lubrication Research
(Oil Test Engine)

Fuel: Unleaded gasoline only

Horsepower / Displacement: 25 / 1L

Construction Date: 1999

Internal Combustion Reciprocating Test Engine for Gasoline Powered Vehicles

04 Gasoline Test Engine X:

Make: Not Listed

Fuel: Unleaded gasoline only

For DB Gasoline:

Horsepower / Displacement: 260/ 4.6L

Construction Date: 2010

Internal Combustion Reciprocating Test Engines for Light Duty Gasoline Powered Trucks.

05 Gasoline Test Engine V:

Make: Ford

Fuel: Unleaded gasoline only

Horsepower / Displacement: 190 / 4.6L

Construction Date: 1999

06 Gasoline Test Engine BL-2:

Make: Not Listed

Fuel: Unleaded gasoline only

Horsepower / Displacement: 190 / Not Listed

Construction Date: 1999

07 Gasoline Test Engine VI:

Make: Ford

Fuel: Unleaded gasoline only.

Horsepower / Displacement: 190 / 4.6L (Horsepower limited to less than 50)

Construction Date: 1999

Internal Combustion Reciprocating Test Engine for Heavy Duty Diesel Powered Vehicles

08 HD-I Engine Stand:

Make: Not Listed

Fuel: Diesel fuel only

Horsepower / Displacement: 175 / 5.9L

Construction Date: 1999

Emission Units 01, 02, 03 Gasoline Test Engines III, VPS, VIII; Emission Unit 04 Gasoline Test Engine X; Emission Units 05, 06, 07 Gasoline Test Engines V, BL-2, VI; Emission Unit 08 HD-I Engine Stand; Emission Unit 08b HD Gasoline; Emission Unit 10 HD Gasoline; Emission Unit 13, 14 Gasoline Test Marine Engines ME1 and ME2; Emission Unit 15 Heavy Duty II Engine Test Stand

08b HD Gasoline:

Make: Not Listed

Horsepower / Displacement: 250 / 9.0L

Fuel: Unleaded gasoline only

Construction Date: 2015

Internal Combustion Reciprocating Test Engine for Heavy Duty Gasoline Powered Vehicles

10 HD Gasoline:

Make: Not Listed (NASCAR Racing Engine)

Horsepower / Displacement: 1000 / Not Listed

Fuel: Unleaded racing gasoline only

Construction Date: 1999

Internal Combustion Reciprocating Test Engine for Non-road Gasoline Powered Marine

13 Gasoline Test Marine Engine ME1:

Make: Defender/Honda BF225

Horsepower / Displacement: 225-30/ 3.5L

Fuel: Unleaded gasoline only

Construction Date: 2006

14 Gasoline Test Marine Engine ME2:

Make: Defender/Honda BF225

Horsepower / Displacement: 225-30/ 3.5L

Fuel: Unleaded gasoline only

Construction Date: 2006

Internal Combustion Reciprocating Test Engine for two engines (4LB)

15 Heavy Duty II Engine Test Stand:

Make: Cummins Diesel

Horsepower / Displacement: 450/ 15L

Fuel: Natural Gas and Diesel.

Construction Date: 2014

Applicable Regulation:

401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies to the engine test cells due to the fact they emit potentially hazardous matter or toxic substances as defined in Section 2 of this administrative regulation.

Comments:

To preclude 401 KAR 52:020, test engines shall be disassembled, inspected, and rebuilt prior to performing a subsequent test in order to support use of the "50,000 Mile Emission Level" emission factors from AP-42, Volume II, Appendix H for NO_x, CO and HC (Table 1.1A.1 for Light Duty Gasoline Powered Vehicles was used for Engines III, VPS, VIII, and X; Table 3.1A.1 for Light Duty Gasoline Powered Trucks was used for Engines V, BL-2, and VI; Table 4.1A.1 for Heavy Duty Gasoline Powered Vehicles was used for the NASCAR Engine; and Table 7.1.1 for Heavy Duty Diesel Powered Vehicles was used for Engines ISB, and 1). SO₂ emissions are based on sulfur content in the fuel. To calculate HAP emissions, the VOC emission factor was multiplied by the vapor weight percent of each HAP vapor present in the fuel combusted as reported by U.S. EPA's Speciate 3.2 program. The output from this program was provided.

Change out of engines on engine test stands with different engines before or at the end of the standard testing run of 50,000 miles is possible as long as unit is changed out with engines that use the same type of fuel and that would produce emissions equal to or less than the current engines on the test stands.

Emission Units 01, 02, 03 Gasoline Test Engines III, VPS, VIII; Emission Unit 04 Gasoline Test Engine X; Emission Units 05, 06, 07 Gasoline Test Engines V, BL-2, VI; Emission Unit 08 HD-I Engine Stand; Emission Unit 08b HD Gasoline; Emission Unit 10 HD Gasoline; Emission Unit 13, 14 Gasoline Test Marine Engines ME1 and ME2; Emission Unit 15 Heavy Duty II Engine Test Stand

401 KAR 59:010, New Process Operations is not applicable because the testing of engine fluids is not a process operation.

401 KAR 63:002, Section 2(4)(tttt) 40 C.F.R. 63.9280 through 63.9375, Tables 1 through 7 (**Subpart PPPPP**), *National Emission Standards for Hazardous Air Pollutants for Engine Test Cells/Stands* is not applicable because the source has accepted federally enforceable emission limits on individual and combined HAP emissions.

401 KAR 63:002, Section 2(4)(eeee), 40 C.F.R. 63.6580 through 63.6675, Tables 1a through 8, and Appendix A (**Subpart ZZZZ**), *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* is not applicable as the engine at engine test cell/stands are not affected source per 40 CFR 63.6590(a).

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS (CONTINUED)

Testing Requirements\Results

N/A

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:

Emission and Operating Limit	Regulation	Emission Unit
90 tpy of CO emissions	401 KAR 52:030, Federally-enforceable permits for nonmajor sources to preclude 401 KAR 52:020 and 401 KAR 51:017	Source-wide
9.0 tpy of individual HAP emissions	401 KAR 52:030, Federally-enforceable permits for nonmajor sources to preclude 401 KAR 52:020	Source-wide
22.5 tpy of combined HAP emissions	401 KAR 52:030, Federally-enforceable permits for nonmajor sources to preclude 401 KAR 52:020	Source-wide

Table B - Summary of Applicable Regulations:

Applicable Regulations	Emission Unit
401 KAR 63:020, <i>Potentially hazardous matter or toxic substances</i>	01, 02, 03, 04, 05, 06, 07, 08, 10, 13, 14, 15

Table C - Summary of Precluded Regulations:

N/A

Table D - Summary of Non Applicable Regulations:

N/A

Air Toxic Analysis

401 KAR 63:020, *Potentially Hazardous Matter or Toxic Substances*

The Division for Air Quality (Division) has performed AERMOD on September 21, 2015, of potentially hazardous matter or toxic substances (1,3-Butadiene, Acetaldehyde, Acrolein, Benzene, Ethyl Benzene, Formaldehyde, Hexane, Methyl Ethyl Ketone, Naphthalene, Propionaldehyde, Styrene, Toluene and Xylenes) that may be emitted by the facility based upon the process rates, material formulations, stack heights and other pertinent information provided by the applicant. Based upon this information, the Division has determined that the conditions outlined in this permit will assure compliance with the requirements of 401 KAR 63:020.

Single Source Determination

N/A

SECTION 5 – PERMITTING HISTORY

Permit	Permit Type	Activity #	Complete Date	Issuance Date	Summary of Action	PSD/Syn Minor
F-05-021	Initial Issuance	APE20040001	4/9/2002	8/5/2005	Initial Construction Permit	N/A
F-05-021 R1	Revision	APE20060002	10/15/2006	11/15/2006	Permit Revision	N/A
F-10-019	Renewal	APE2010001	4/9/2010	11/5/2010	Renewal Operating Permit	N/A
F-10-019 R1	Revision	APE20140001	10/24/2014	2/25/2015	Adding Engine Test Stand (EP15); Removed Remediation System (EP11); and Updated Insignificant List	N/A
F-15-039	Renewal	APE20150001	9/3/2015	11/16/2015	Renewal Operating Permit. Removal of Gasoline Test Engine IVD	N/A
F-15-039 R1	Admin Amend	APE20160001	8/15/2016	8/22/2016	Name and ownership change	N/A
F-21-021	Renewal	APE20200001	7/28/2021	10/3/2021	Renewal Permit Removal of EP009; update to insignificant activity list, removal of portable generators	N/A

SECTION 6 – PERMIT APPLICATION HISTORY
N/A

APPENDIX A – ABBREVIATIONS AND ACRONYMS

AAQS	– Ambient Air Quality Standards
BACT	– Best Available Control Technology
Btu	– British thermal unit
CAM	– Compliance Assurance Monitoring
CO	– Carbon Monoxide
Division	– Kentucky Division for Air Quality
ESP	– Electrostatic Precipitator
GHG	– Greenhouse Gas
HAP	– Hazardous Air Pollutant
HF	– Hydrogen Fluoride (Gaseous)
MSDS	– Material Safety Data Sheets
mmHg	– Millimeter of mercury column height
NAAQS	– National Ambient Air Quality Standards
NESHAP	– National Emissions Standards for Hazardous Air Pollutants
NO _x	– Nitrogen Oxides
NSR	– New Source Review
PM	– Particulate Matter
PM ₁₀	– Particulate Matter equal to or smaller than 10 micrometers
PM _{2.5}	– Particulate Matter equal to or smaller than 2.5 micrometers
PSD	– Prevention of Significant Deterioration
PTE	– Potential to Emit
SO ₂	– Sulfur Dioxide
TF	– Total Fluoride (Particulate & Gaseous)
VOC	– Volatile Organic Compounds