

TECHNICAL FACT SHEET

April 28, 2021

Purpose and Summary

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD), is proposing to act on Permit to Install (PTI) application No. 13-19B from FCA US LLC (FCA). The permit application is for proposed modifications to a previously permitted project involving a new automotive paint shop and changes to the existing automotive assembly line at the Warren Truck Assembly Plant (Warren Truck). Construction of the project is underway, as allowed under PTI No. 13-19A. The proposed modifications are subject to permitting requirements of the Department's Rules for Air Pollution Control and state and federal Nonattainment New Source Review (NNSR) regulations.

Prior to acting on this application, the AQD is holding a public comment period and a public hearing, if requested in writing, to allow all interested parties the opportunity to comment on the proposed PTI. All relevant information received during the comment period and hearing, if held, will be considered by the decision maker prior to taking final action on the application.

Background Information

FCA owns and operates the existing Warren Truck Assembly Plant (Warren Truck), which consists of a body shop, a paint shop (with an additional paint shop currently under construction), and a final assembly operation, located at 21500 Mound Road, Warren, Macomb County, Michigan. Warren Truck operates under Renewable Operating Permit (ROP) No. MI-ROP-B2767-2016.

Proposed Project

FCA is proposing to modify an already approved, but not completely installed, project on an existing automotive assembly line at Warren Truck. The project also includes the installation of a new paint shop and was approved to proceed under PTI No. 13-19A.

The proposed modifications to the previously approved PTI include:

- New Paint Shop
 - Reduce the number of hot water generators (HWGs) from 10 to 8 (5 MMBtu/hr each)
 - Updates to the number and size of various pieces of natural gas combustion equipment
 - Update to PM emissions for certain combustion equipment
 - Changes to the location and exhaust parameters of the HWGs
 - Changes to the location of the Regenerative Thermal Oxidizers (RTOs)
 - Changes to the nameplate capacity of one natural gas-fired emergency generator engine and the removal of two natural gas-fired emergency generator
- Existing Operations
 - Change the date associated with the permanent shut-down of Color Line #2
 - Update stack parameters for certain sources
 - Installation of a new 37 MMBtu/hr trim boiler at the powerhouse
 - Changes to the number and size of various pieces of natural gas combustion equipment
 - Updates to limits in EU-PURGECLEAN EAST

- o Delay the permanent shutdown of EU-COLOR-TWO from June 30, 2021 until September 30, 2021 due to construction delays.

Present Air Quality

Warren Truck is located in Macomb County, which is currently meeting all of the National Ambient Air Quality Standards (NAAQS) set by the United States Environmental Protection Agency (USEPA), except for ozone. The other air quality standards are for particulate matter equal to or less than 10 microns in diameter (PM10), particulate matter equal to or less than 2.5 microns in diameter (PM2.5), carbon monoxide (CO), oxides of nitrogen (NO_x), sulfur dioxide (SO₂), and lead. All NAAQS are set at levels designed to protect the health of the general public.

The proposed modifications will result in this project having potential emissions of volatile organic compounds (VOCs) of 206.3 tons per 12-month rolling time period, as indicated in Table 1 below. Macomb County is designated as marginal nonattainment for ozone, which means that the emissions must be offset at a ratio of 1.1 to 1. The emissions increase of 206.3 tons per 12-month rolling time period requires at least 226.7 tons of reductions, or offsets, as required in the NNSR regulations.

Pollutant Emissions

FCA Warren Truck is considered to be both an existing major stationary source under the Prevention of Significant Deterioration (PSD) Regulations in Part 18 of the Michigan Air Pollution Control Rules and 40 CFR 52.21, and an existing major nonattainment source under Part 19 of the Michigan Air Pollution Control Rules. Since the facility is located in a nonattainment area for ozone, and VOCs are a precursor for ozone, VOCs are evaluated under NNSR and not PSD.

Table 1 provides a summary of the expected emissions on a plant-wide basis from Warren Truck, taking into account historical baseline actual emissions and emission limits established for the entire facility after installation of the proposed project.

Table 1: Total Warren Truck Project Potential Emissions Increase

Pollutant	Plant-Wide Baseline Actual Emissions (BAE) (Tons per Year, tpy)	Estimated Emissions Increase (tpy)	Estimated Emissions after Project Completion (tpy)	Subject to PSD Review?	Subject to Nonattainment New Source Review*?
NO _x	111.65	39.0	150.65	No	No
CO	87.1	74.6	161.7	No	NA
PM	4.95	24.9	29.85	No	NA
PM10	10.6	9.95	20.55	No	NA
PM2.5	8.1	9.95	18.05	No	NA
SO ₂	0.65	0.51	1.16	No	NA
Lead	5.27 x 10 ⁻⁴	4.36 x 10 ⁻⁴	9.63 x 10 ⁻⁴	No	NA
VOCs	NA***	206.32	708.6	No	Yes
	55,271	169,970	225,241	No	NA

Pollutant	Plant-Wide Baseline Actual Emissions (BAE) (Tons per Year, tpy)	Estimated Emissions Increase (tpy)	Estimated Emissions after Project Completion (tpy)	Subject to PSD Review?	Subject to Nonattainment New Source Review*?
Green House Gases expressed as Carbon Dioxide Equivalent (GHGs as CO _{2e})*					
<p>* A recent decision by the Supreme Court (<i>Utility Air Regulatory Group v. U.S. EPA</i>), No. 12-1146 (June 23, 2014) determined that PSD review for GHGs is only required if one or more of the other regulated new source review pollutants exceeds a PSD threshold. VOCs are subject to NNSR review, not PSD; therefore, GHGs are not required to go through PSD review.</p> <p>** Macomb County, where FCA Warren Truck is located, is designated as nonattainment for ozone; therefore, NO_x and VOCs (because they are precursors for ozone) are the only pollutants that could be subject to NNSR.</p> <p>*** BAE was not calculated for VOCs, as this project was known to be subject to NNSR.</p>					

Total estimated emissions after project completion for NO_x, CO, PM, PM₁₀, and PM_{2.5} in Table 1 are based on an Actual-to-Potential (A2P) applicability analysis and facility-wide emission limits established by the proposed PTI. The total estimated emissions after the project for SO₂, lead, and GHGs as CO_{2e} are based on the facility-wide natural gas usage limit established in the proposed PTI.

Total estimated emissions of VOCs after project completion (708.6 tpy) combines emissions from the installation of new equipment, as well as post-project emissions from the existing assembly line. Since VOCs are subject to NNSR, any VOC increase must have an associated VOC decrease, referred to as an “offset”. To obtain the necessary offsets, the proposed Warren Truck project includes the installation of control equipment to reduce emissions from the existing paint shop. Therefore, although the total VOC emissions from equipment being modified in this project totals 708.6 tpy, only the amount resulting from the installation of new equipment requires offsets, 206.32 tpy as shown in Table 2 below.

Table 2 presents the breakdown of VOC emissions requiring offsets, including emissions from the new paint shop (203.6 tpy) and from new equipment installed at existing operations (2.72 tpy).

Table 2: Potential VOC Emissions Increase Requiring Offsets

Pollutant	New Paint Shop (tpy)	Existing Operations (tpy)	Total VOCs Requiring Offsets (tpy)	Required Offsets (tpy)
VOCs	203.6	2.72	206.32	226.95

Please see Appendix 3 for detailed offset information.

Key Permit Review Issues

Staff evaluated the proposed project to identify all state rules and federal regulations which are, or may be, applicable. The tables in Appendix 1 summarize these rules and regulations.

- **Nonattainment New Source Review (NNSR) Regulations**

Based on the potential emissions, the project is subject to NNSR review for VOCs. The NNSR major source threshold is 100 tpy for the nonattainment pollutants, or, in the case of ozone, its precursors, VOCs and NO_x. For a source to be subject to NNSR, it must first be greater than 100 tpy for either VOCs or NO_x. The project can be major itself or a major modification at the significance level if the facility is an existing major NNSR source. Once a source is major for a single criteria pollutant, it is major for other criteria pollutants subject to NNSR at their significant level.

- **Minor/Major Modification Determination for Attainment Pollutants**

FCA Warren Truck is an existing Prevention of Significant Deterioration (PSD) major stationary source. A modification at the facility where the emissions of any regulated NSR pollutant will have an increase, or a net increase, of more than the significant level for that pollutant results in the modification being subject to PSD requirements for that pollutant. FCA Warren Truck is located in Macomb County which is currently in attainment for all pollutants except ozone. The proposed project is not subject to PSD because the emission increase for each PSD regulated pollutant is less than the significant level for that pollutant.

- **Minor/Major Modification Determination for Nonattainment Pollutants**

FCA Warren Truck is located in Macomb County which is currently nonattainment for ozone. For ozone, both NO_x and VOCs are considered precursors and are evaluated to determine NNSR applicability. Since the facility is an existing major nonattainment source for NO_x and VOCs, an increase in emissions of NO_x or VOC above their respective significant levels of 40 tpy will result in the change being subject to NNSR. The proposed emission increase of VOC is 206.32 tpy and the proposed emission increase for NO_x is 39.0 tpy. As such, the proposed Warren Truck project is subject to NNSR for VOCs and not subject to NNSR for NO_x.

- **Federal NSPS Regulations**

New Source Performance Standards (NSPS) were established under Title 40 of the Code of Federal Regulations (40 CFR) Part 60. The electrodeposition coating (E-coat), primer (guidecoat), and topcoat operations for the new paint shop would be subject to the NSPS for Standards of Performance for Automobile and Light Duty Truck Surface Coating Operations, 40 CFR Part 60 Subpart MM based on the installation date after October 5, 1979. In addition, the existing E-coat, primer (guidecoat), and topcoat operations are also subject to 40 CFR Part 60 Subpart MM.

The proposed natural gas-fired emergency engine is subject to the NSPS for Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, 40 CFR Part 60 Subpart JJJJ based on their installation dates after January 1, 2009.

- **Federal NESHAP Regulations**

National Emission Standards for Hazardous Air Pollutants (NESHAP) were established under 40 CFR Part 61 or Part 63. The proposed new paint shop would be subject to the NESHAP for Surface Coating of Automobiles and Light-Duty Trucks, 40 CFR Part 63 Subpart IIII based on the facility being a major source of Hazardous Air Pollutants (HAPs) and performing automotive surface coating as defined in the Subpart. Similarly, the existing paint shop is also subject to 40 CFR Part 63 Subpart IIII.

The eleven proposed natural gas-fired hot water generators (HWG) and trim boiler would be subject to the NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters, 40 CFR Part 63 Subpart DDDDD, also known as the Boiler MACT, based on the construction date beginning after June 4, 2010.

The existing windshield wiper fluid storage tank is subject to the NESHAP for Organic Liquids Distribution, (Non-Gasoline), 40 CFR 63 Subpart EEEE, based on windshield wiper fluid's primary component (methanol) and the size of the storage tank (8,000 gallons).

The emergency generator is subject to the NESHAP for Stationary Reciprocating Internal Combustion Engines, 40 CFR 63 Subpart ZZZZ based on the date of commencing construction.

- **Rule 224 TBACT Analysis**

State Rule 336.1224 (Rule 224) applies to any proposed new or modified process or process equipment for which a PTI application is required and which emits a toxic air contaminant (TAC).

Rule 224 requires that emissions of TACs do not exceed the maximum allowable emission rate that results from the application of Best Available Control Technology for Toxicants (T-BACT).

Acetone is a component of some coatings that will be used in both the new and existing paint shop. Since acetone is a non-VOC TAC, it is subject to the Rule 224 TBACT requirements. The proposed project is subject to Lowest Achievable Emission Rate (LAER) for VOCs and part of that LAER analysis determined that the use of control equipment in the form of a concentrator and RTO would be required for assembly line coating operations and a portion of the cleaning operations. Since acetone is used in the coating operations that will be controlled by the proposed concentrators and RTOs, the use of the RTOs meets the requirements of TBACT for acetone.

There are also particulate TACs from the proposed project that are subject to Rule 224. The proposed project contains multiple levels of particulate control. The incoming natural gas exhaust must be filtered prior to being introduced to the surface coating process. There are waterwash and/or particulate filters on all coating spray booths, flash-off areas, and observation zones. In addition, all exhaust from the coating spray booths, flash-off areas, and ovens go through a filter bank system to further control PM emissions before entering the concentrators and/or RTOs. The proposed permit requirements, to apply PM control equipment, satisfies TBACT for PM TACs.

- **Rule 225 Toxics Analysis**

EGLR Rules for Air Pollution Control require the ambient air concentration of toxic air contaminants (TACs) be compared against health-based screening levels. FCA submitted an AMS/EPA Regulatory Model (AERMOD) modeling analysis for the toxics review. The AQD staff reviewed FCA's air quality modeling and evaluation of TAC impacts. The review found that all TACs showed impacts less than their respective established health-based screening levels and will comply with the requirements of Rule 225.

- **Rule 702 VOC Emissions**

This rule requires an evaluation of the following four items to determine what will result in the lowest maximum allowable emission rate of VOCs:

- a. BACT or a limit listed by the department on its own initiative
- b. New Source Performance Standards (NSPS)
- c. VOC emission rate specified in another permit

d. VOC emission rate specified in the Part 6 rules for existing sources

Although not always, the development of a LAER analysis for VOCs in a nonattainment area can also provide the basis for a demonstration of BACT. FCA has proposed that the LAER analyses for both the new paint shop and the modifications to the existing paint shop also demonstrate BACT for each. See Appendix 2 for further discussion of the LAER analysis which will also demonstrate compliance with Rule 702 and be equivalent to Rule 702(a) specifically.

• **Criteria Pollutants Analysis**

Ozone

FCA provided an ozone impact analysis for this project via Tier I Modeled Emission Rates for Precursors (MERP) analysis. Based on updated USEPA guidance, the AQD found that emissions of VOC and NOx would not significantly contribute to a violation of the ozone NAAQS.

The guidance calculates MERP values using the following methodology:

$$Impact = Critical\ Threshold\ (1\ ppb) * \left(\frac{Modeled\ Emission\ Rate\ from\ hypothetical\ source}{MERP} \right)$$

$$VOC\ MERP\ Ratio = \frac{ER}{1,560tpy} = \frac{206.3}{1,560} = 0.13$$

$$NOx\ MERP\ Ratio = \frac{ER}{125tpy} = \frac{39.0}{125} = 0.31$$

When adding the updated ratios together, the combined MERP ratio is 0.44. A combined MERP ratio of less than 1.0 indicates that the combined emissions would not cause or contribute to a violation of the ozone NAAQS.

SO₂ and CO

FCA evaluated the AQD's Policy and Procedure document, AQD-022, with respect to Dispersion Modeling for Federally Regulated Pollutants. With respect to SO₂, the emissions are less than 25 percent of the SER and therefore, no demonstration is required per the guidance. Emissions of CO are less than its SER and per Table 2 of the guidance document, no further analysis is required.

NO_x, PM10, and PM2.5

FCA submitted dispersion modeling analyses to demonstrate that the emissions of NO_x, PM10 and PM2.5 will comply with the applicable NAAQS and PSD Increment. The AQD reviewed and verified the modeling submitted by FCA and confirmed that the emissions of each pollutant are less than their applicable NAAQS and PSD Increment. Tables 3 and 4 contain the modeling results.

Table 3: PSD Increment

Pollutant	Averaging Time	PSD Increment (µg/m ³)	Predicted Impact (µg/m ³)	Percent of Increment (%)
PM10	Annual	17	3	17.6%
PM10	24-hr	30	19	63.3%
PM2.5	Annual	4	2	50.0%
PM2.5	24-hr	9	8	88.8%
NO ₂	Annual	25	16.7	66.8%

Table 4: National Ambient Air Quality Standards (NAAQS)

Pollutant	Averaging Time	NAAQS (µg/m³)	Predicted Impact (µg/m³)	Percent of NAAQS (%)
PM10	24-hr	150	80.6	53.7%
PM2.5	Annual	12	10.9	90.6%
PM2.5	24-hr	35	32.7	93.3%
NO ₂	Annual	100	55.3	55.0%
NO ₂	1-hr	188	187.1	99.5%

- **Emission Offsets**

One of the requirements of NNSR permitting is emissions offsets. Offsets are one way of allowing new growth in a nonattainment area, while working to bring the area back into attainment. The amount of offsets required depends upon the severity of the nonattainment area. Macomb County is located in the seven-county southeast Michigan marginal nonattainment area. In marginal nonattainment areas, the required offset ratio is 1.1 to 1.

FCA is providing VOC emission offsets for the new paint shop at a ratio of 1.1 to 1. This would require 226.95 tons of offsets for the proposed VOC emission increase of 206.32 tpy from new equipment at the new paint shop and on existing operations.

When FCA obtained a PTI for the Detroit Assembly Complex Mack Plant (Mack Plant), the offsets required for that project were realized from emission reductions at the Warren Truck Assembly Plant. These reductions were made enforceable at Warren Truck through PTIs 13-19 and 13-19A. With those permitted reductions, FCA still has enough offsets remaining after the Mack Plant begins operation to offset increases from this project at Warren Truck. Please see the offset demonstration in Appendix 3.

The request to delay the shutdown date for EU-COLOR-TWO is acceptable because the required offsets for both the Mack Plant and Warren Truck projects are obtained from reductions at the Warren Truck Plant prior to the permanent shutdown of EU-COLOR-TWO. Therefore, delaying the shutdown of EU-COLOR-TWO from June 30, 2021, until September 30, 2021, does not affect compliance with NNSR regulations.

- **Compliance Certification**

A second requirement of NNSR permitting is that all existing sources owned and operated by the permit applicant in Michigan, and with a potential to emit of 100 tpy or more of any air contaminant regulated under the Clean Air Act, must be in compliance with legally enforceable permit conditions or an order of the Department specifying a plan and timetable for compliance. FCA owns and operates the following facilities that have the potential to emit of more than 100 tpy of air contaminants regulated under the Clean Air Act:

Table 5: Title V Major Sources in the State of Michigan Operated by FCA USA LLC

Facility	SRN	ROP/PTI #
Chrysler Technology Center	N1436	MI-ROP-N1436-2018
Jefferson North Assembly Plant	N2155	MI-ROP-N2155-2017
Sterling Heights Assembly Plant	B7248	MI-ROP-B7248-2014a
Warren Stamping Plant	B2757	MI-ROP-B2757-2013
Warren Truck Assembly Plant	B2767	MI-ROP-B2767-2016
Trenton Engine Complex	B3350	MI-ROP-B3350-2014b
Dundee Engine Plant	N7228	MI-ROP-N7228-2018

All facilities are in compliance with these permits.

• **Alternative Sites Analysis**

Another requirement of NNSR permitting is an analysis of alternative sites, sizes, production process, and environmental control techniques to demonstrate that the benefits of the proposed source outweigh the environmental and social costs imposed as a result of its location and construction.

When evaluating locations for a new automotive assembly plant, FCA considered various sites and locations for construction and/or development. They considered the following key elements that impact the decision for site location:

- Acquisition of property needed for development of the plant
- Property infrastructure, including deep-water ports, freight rail access, trucking and highway connections, international airports, expediting and transshipment services, as well as internet, communication, power, and reliable water utilities able to meet specified needs
- Proximity to other FCA or supplier facilities that may provide support or parts (i.e., efficient, end-to-end supply chain)
- Impact of local, state, and national taxes and tariffs, including property-based taxes
- Labor force, wages, population density, employment statistics, and union requirements/negotiations
- Commitments (existing and new) to community development

The Warren Truck Assembly Plant is an existing assembly plant that includes a body shop, an existing paint shop and a general assembly operation which FCA owns and maintains. This existing plant has the space and infrastructure that will accommodate the new paint shop production as well as the existing plant production. The current location is in close proximity to other FCA facilities and supplier facilities which will allow for maximum efficiency. FCA also considered whether other company locations were better suited for the new paint shop and determined that no other locations were as acceptable as Warren Truck due to the proximity to resources, the workforce, transportation, supply chain needs and the existing infrastructure.

Key Aspects of Draft Permit Conditions

• **Emission Limits (By Pollutant)**

The proposed permit includes the following emission limits:

- New and Existing Paint Shop, Each Include – VOC, PM, PM10, PM2.5, NO_x
- New/Reconstructed Automotive coating operations – Organic HAPs
- Natural gas-fired Emergency Generators – NO_x, CO, and VOC
- Boilers – NO_x, PM10, PM2.5

- **Usage Limits**

The proposed permit includes the following usage limits:

- The total use of natural gas per 12-month rolling time period at the facility will be limited to 3,850 million standard cubic feet per year
- The use of natural gas in the boilers is limited to 1,305 million standard cubic feet per 12-month rolling time period
- The use of purge solvent in the existing paint shop is limited to 131,600 gallons per 12-month rolling time period
- The total use of natural gas per 12-month rolling time period for the new paint shop will be limited to 1,197 million standard cubic feet

- **Process/Operational Restrictions**

The proposed permit includes the following restrictions:

- A Malfunction Abatement Plan (MAP) must be implemented and maintained for the concentrators, RTOs, waterwash, and dry filter particulate system(s). The MAP would include procedures for maintaining and operating the concentrators, RTOs, waterwash systems, and dry filter particulate control systems in a satisfactory manner
- The proposed permit restricts the fuel that may be burned in all natural gas sources to pipeline quality natural gas
- An Onboard Re-fueling Vapor Recovery system is required to be used when gasoline is added to any vehicle

- **Federal Regulations**

The proposed new paint shop would be subject to the NSPS for Automobile and Light Duty Truck Surface Coating Operations, 40 CFR Part 60 Subpart MM. The E-coat process for the new paint shop would be subject to a limit of 1.34 pounds of VOC per gallon of applied coating solids (lbs. VOC/GACS), the primer process would be subject to a limit of 12.0 lbs. VOC/GACS, and the topcoat would be subject to a limit of 12.27 lbs. VOC/GACS. FCA has proposed performance levels of 0.04 lbs. VOC/GACS for the E-Coat process, 2.92 lbs. VOC/GACS for the primer process, and 3.53 lbs. VOC/GACS for the topcoat process. The permit specifies that compliance with these limits will constitute compliance with the NSPS.

The proposed 770 horsepower (HP) natural gas-fired emergency generator would be subject to 40 CFR Part 60 Subpart JJJJ for Spark Ignition Internal Combustion Engines. For engines utilized in an emergency capacity, the NSPS limits the hours of operation to 100 hours or less per year for non-emergency readiness testing. In addition, if the engine is a non-certified engine or if a certified engine is not operated and maintained according to the manufacturer's emission-related written instructions, the NSPS considers the engine non-certified and requires testing to demonstrate compliance with both NO_x and CO emission standards. These requirements have been included in the proposed permit.

The proposed new paint shop will be subject to the NESHAP for Surface Coating of Automobiles and Light Duty Trucks, 40 CFR Part 63 Subpart IIII. Subpart IIII includes Hazardous Air Pollutant (HAP) emission limits in lbs/GACS as well as work standard practices for subject facilities. The proposed surface coating operations will comply with the standards for new or reconstructed sources without the use of add-on control devices.

The proposed hot water generators (boilers) and new trim boiler will be subject to the NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters, 40 CFR Part 63 Subpart DDDDD; however, there are no emission standards for small, natural gas-fired units, only work practice standards that are included in the proposed permit.

The proposed natural gas-fired emergency generator will be subject to the NESHAP for Stationary Reciprocating Internal Combustion Engines, 40 CFR 63 Subpart ZZZZ. Compliance with Subpart ZZZZ for the emergency generators is submittal of the initial notification requirements per 63.6640(f)(2)(ii) & (iii).

- **Emission Control Device Requirements**

The proposed permit includes the following emission control device requirements:

- Separate RTOs will control VOC emissions from the proposed new and existing E-coat tanks and ovens.
- The primer booth, flash off area and oven associated with the new primer coating operation of the new paint shop, identified as EUPRIMERWEST, will be controlled by a new concentrator and RTO (referred as the west concentrator and west RTO).
- The coating booth, flash off area and oven associated with the new topcoat portion of the new paint shop, identified as EUTOPCOATWEST, will be controlled by the west concentrator and west RTO.
- The primer and clearcoat purge solvents that are not captured in the purge collection system will be controlled by the west concentrator and west RTO.
- The VOC emissions from the solvent based purge materials used within the basecoat and clearcoat booths in the east paint shop will be controlled after installation of the east concentrator and east RTO, except when collected in the purge collection system.
- Thermal oxidizers control the VOC emissions from the bake ovens associated with the coating lines identified as EU-COLOR-ONE, EU-COLOR-TWO and EU-REPROCESS. The east concentrator and east RTO will control the spray booth portions of EU-COLOR-ONE after they are installed.
- Low NO_x burners must be installed on all natural gas-fired units associated with the new paint shop, including the RTOs, to minimize NO_x emissions.
- Waterwash and/or dry filter particulate control systems to control PM, PM10, and PM2.5 emissions from:
 - Primer, basecoat, and clearcoat spray booths controlled by a waterwash system and an additional dry filter abatement filter house before the concentrator.
 - Dry filter particulate control system on the E-coat primer prep booth, the primer prep and reprocess heavy sand booths, the rapid reprocess small repair booths, and the final repair booths. In addition, exhaust from the primer prep, reprocess heavy sand booths and the final repair booths are recirculated.
 - Direct-fired natural gas units, including all air supply houses (ASH), air housing units (AHU), and all curing ovens are required to have filtration control units.

- **Testing & Monitoring Requirements**

The proposed permit includes the following requirements for the proposed project:

- Verify VOC, PM, PM10, PM2.5, and NO_x emission rates through performance testing from emission units associated with the proposed new paint shop.
- Verify the capture efficiency of the dip tank and oven associated with the new E-coat line.
- Verify the capture efficiency of the dip tank and oven associated with the existing E-coat line, after beginning control of both.
- Verify the capture efficiency of the spray booth, flash-off area, observation zone, and oven portions of specific coating operations associated with both the new and existing paint shops.
- Verify the removal efficiency of the west concentrator and the destruction efficiency of the west RTO.
- Verify the removal efficiency of the east concentrator and destruction efficiency of the east RTO.

- Verify transfer efficiency of primer and topcoat coating applicators through testing.
- Monitor paint coating solvent usage on a monthly basis.
- Monitor natural gas usage on a monthly and 12-month rolling basis.
- Monitor the operating temperature of the RTOs on a continuous basis.
- Monitor the inlet and outlet temperatures of the concentrators on a continuous basis.
- Weekly inspections of all particulate control systems.

- **Key Aspects of Draft Permit Conditions**

This proposed permit brings forward the reductions in allowable VOC emissions from five emission units (EUs) at the Warren Truck Assembly Plant that were previously accepted (in PTI 13-19) as part of the Mack Plant project. These enforceable emission reductions offset the emissions increases associated with both the Mack Plant project, as well as the project at Warren Truck. The VOC emission limits that were previously accepted are below the actual emissions from 2016 and 2017 in those five EUs.

Please see Appendix 3 for additional details regarding the offset determination.

As part of the application review for PTI No. 13-19A, EU-TUTONE was required to be permanently shutdown upon startup of any emission unit associated with the Warren Truck West Paint Shop. During a January 2020 inspection, the AQD District Inspector noted that EU-TUTONE had been shutdown and removed from service. Therefore, EU-TUTONE is considered to be permanently shutdown and the requirements for EU-TUTONE are considered met. EU-TUTONE, as well as all references to it, were removed from the proposed draft permit.

Conclusion

Based on the analyses conducted to date, AQD staff concludes that the proposed project would comply with all applicable state and federal air quality requirements. The AQD staff also concludes that this project, as proposed, would not violate the federal NAAQS or the state and federal PSD Increments, and would satisfy the requirements of the State of Michigan Nonattainment New Source Review regulations.

Based on these conclusions, AQD staff has developed proposed permit terms and conditions which would ensure that the proposed new paint shop and modifications to the existing paint shop are enforceable, and that sufficient monitoring, recordkeeping, and reporting would be performed by the applicant to determine compliance with these terms and conditions. If the proposed permit is deemed approvable, the delegated decision maker may determine a need for additional or revised conditions to address issues raised during the public participation process.

If you would like additional information about this proposal, please contact Mr. David Thompson, AQD, at 517-582-5095 regarding either application.

**Appendix 1
STATE AIR REGULATIONS**

State Rule	Description of State Air Regulations
R 336.1201	Requires an Air Use Permit for new or modified equipment that emits, or could emit, an air pollutant or contaminant. However, there are other rules that allow smaller emission sources to be installed without a permit (see Rules 336.1279 through 336.1290 below). Rule 336.1201 also states that the Department can add conditions to a permit to assure the air laws are met.
R 336.1205	Outlines the permit conditions that are required by the federal Prevention of Significant Deterioration (PSD) Regulations and/or Section 112 of the Clean Air Act. Also, the same types of conditions are added to their permit when a plant is limiting their air emissions to legally avoid these federal requirements. (See the Federal Regulations table for more details on PSD.)
R 336.1224	New or modified equipment that emits toxic air contaminants must use the Best Available Control Technology for Toxics (T-BACT). The T-BACT review determines what control technology must be applied to the equipment. A T-BACT review considers energy needs, environmental and economic impacts, and other costs. T-BACT may include a change in the raw materials used, the design of the process, or add-on air pollution control equipment. This rule also includes a list of instances where other regulations apply and T-BACT is not required.
R 336.1225 to R 336.1232	The ambient air concentration of each toxic air contaminant emitted from the project must not exceed health-based screening levels. Initial Risk Screening Levels (IRSL) apply to cancer-causing effects of air contaminants and Initial Threshold Screening Levels (ITSL) apply to non-cancer effects of air contaminants. These screening levels, designed to protect public health and the environment, are developed by Air Quality Division toxicologists following methods in the rules and U.S. EPA risk assessment guidance.
R 336.1279 to R 336.1291	These rules list equipment to processes that have very low emissions and do not need to get an Air Use permit. However, these sources must meet all requirements identified in the specific rule and other rules that apply.
R 336.1301	Limits how air emissions are allowed to look at the end of a stack. The color and intensity of the color of the emissions is called opacity.
R 336.1331	The particulate emission limits for certain sources are listed. These limits apply to both new and existing equipment.
R 336.1370	Material collected by air pollution control equipment, such as dust, must be disposed of in a manner, which does not cause more air emissions.
R 336.1401 and R 336.1402	Limit the sulfur dioxide emissions from power plants and other fuel burning equipment.
R 336.1601 to R 336.1651	Volatile organic compounds (VOCs) are a group of chemicals found in such things as paint solvents, degreasing materials, and gasoline. VOCs contribute to the formation of smog. The rules set VOC limits or work practice standards for existing equipment. The limits are based upon Reasonably Available Control Technology (RACT). RACT is required for all equipment listed in Rules 336.1601 through 336.1651.
R 336.1702	New equipment that emits VOCs is required to install the Best Available Control Technology (BACT). The technology is reviewed on a case-by-case basis. The VOC limits and/or work practice standards set for a particular piece of new equipment cannot be less restrictive than the Reasonably Available Control Technology limits for existing equipment outlined in Rules 336.1601 through 336.1651.
R 336.1801	Nitrogen oxide emission limits for larger boilers and stationary internal combustion engines are listed.
R 336.1910	Air pollution control equipment must be installed, maintained, and operated properly.
R 336.1911	When requested by the Department, a facility must develop and submit a malfunction abatement plan (MAP). This plan is to prevent, detect, and correct malfunctions and equipment failures.
R 336.1912	A facility is required to notify the Department if a condition arises which causes emissions that exceed the allowable emission rate in a rule and/or permit.

State Rule	Description of State Air Regulations
R 336.2001 to R 336.2060	Allow the Department to request that a facility test its emissions and to approve the protocol used for these tests.
R 336.2801 to R 336.2804 Prevention of Significant Deterioration (PSD) Regulations Best Available Control Technology (BACT)	<p>The PSD rules allow the installation and operation of large, new sources and the modification of existing large sources in areas that are meeting the National Ambient Air Quality Standards (NAAQS). The regulations define what is considered a large or significant source, or modification.</p> <p>In order to assure that the area will continue to meet the NAAQS, the permit applicant must demonstrate that it is installing the BACT. By law, BACT must consider the economic, environmental, and energy impacts of each installation on a case-by-case basis. As a result, BACT can be different for similar facilities.</p> <p>In its permit application, the applicant identifies all air pollution control options available, the feasibility of these options, the effectiveness of each option, and why the option proposed represents BACT. As part of its evaluation, the Air Quality Division verifies the applicant's determination and reviews BACT determinations made for similar facilities in Michigan and throughout the nation.</p>
R 336.2901 to R 336.2903 and R 336.2908	<p>Applies to new "major stationary sources" and "major modifications" as defined in R 336.2901. These rules contain the permitting requirements for sources located in nonattainment areas that have the potential to emit large amounts of air pollutants. To help the area meet the NAAQS, the applicant must install equipment that achieves the Lowest Achievable Emission Rate (LAER). LAER is the lowest emission rate required by a federal rule, state rule, or by a previously issued construction permit. The applicant must also provide emission offsets, which means the applicant must remove more pollutants from the air than the proposed equipment will emit. This can be done by reducing emissions at other existing facilities.</p> <p>As part of its evaluation, the AQD verifies that no other similar equipment throughout the nation is required to meet a lower emission rate and verifies that proposed emission offsets are permanent and enforceable.</p>

FEDERAL AIR REGULATIONS

Citation	Description of Federal Air Regulations or Requirements
Section 109 of the Clean Air Act – National Ambient Air Quality Standards (NAAQS)	The United States Environmental Protection Agency has set maximum permissible levels for seven pollutants. These NAAQS are designed to protect the public health of everyone, including the most susceptible individuals, children, the elderly, and those with chronic respiratory ailments. The seven pollutants, called the criteria pollutants, are carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter less than 10 microns (PM10), particulate matter less than 2.5 microns (PM2.5), and sulfur dioxide (SO ₂). Portions of Michigan are currently non-attainment for either ozone or SO ₂ . Further, in Michigan, State Rules 336.1225 to 336.1232 are used to ensure the public health is protected from other compounds.
40 CFR 51 Appendix S Emission Offset Interpretive Ruling	Appendix S applies during the interim period between nonattainment designation and EPA approval of a SIP that satisfies nonattainment requirements specified in Part D of the Clean Air Act. Appendix S would apply in nonattainment areas where either no nonattainment permit rules apply or where the existing state rules are less stringent than Appendix S.

Citation	Description of Federal Air Regulations or Requirements
<p>40 CFR 52.21 – Prevention of Significant Deterioration (PSD) Regulations</p> <p>Best Available Control Technology (BACT)</p>	<p>The PSD regulations allow the installation and operation of large, new sources and the modification of existing large sources in areas that are meeting the NAAQS. The regulations define what is considered a large or significant source, or modification.</p> <p>In order to assure that the area will continue to meet the NAAQS, the permit applicant must demonstrate that it is installing BACT. By law, BACT must consider the economic, environmental, and energy impacts of each installation on a case-by-case basis. As a result, BACT can be different for similar facilities.</p> <p>In its permit application, the applicant identifies all air pollution control options available, the feasibility of these options, the effectiveness of each option, and why the option proposed represents BACT. As part of its evaluation, the Air Quality Division verifies the applicant’s determination and reviews BACT determinations made for similar facilities in Michigan and throughout the nation.</p>
<p>40 CFR 60 – New Source Performance Standards (NSPS)</p>	<p>The United States Environmental Protection Agency has set national standards for specific sources of pollutants. These New Source Performance Standards (NSPS) apply to new or modified equipment in a particular industrial category. These NSPS set emission limits or work practice standards for over 60 categories of sources.</p>
<p>40 CFR 63— National Emissions Standards for Hazardous Air Pollutants (NESHAP)</p>	<p>The United States Environmental Protection Agency has set national standards for specific sources of pollutants. The National Emissions Standards for Hazardous Air Pollutants (NESHAP) (a.k.a. Maximum Achievable Control Technology (MACT) standards) apply to new or modified equipment in a particular industrial category. These NESHAPs set emission limits or work practice standards for over 100 categories of sources.</p>
<p>Section 112 of the Clean Air Act</p> <p>Maximum Achievable Control Technology (MACT)</p> <p>Section 112g</p>	<p>In the Clean Air Act, Congress listed 189 compounds as Hazardous Air Pollutants (HAPS). For facilities which emit, or could emit, HAPS above a certain level, one of the following two requirements must be met:</p> <ol style="list-style-type: none"> 1) The United States Environmental Protection Agency has established standards for specific types of sources. These Maximum Achievable Control Technology (MACT) standards are based upon the best-demonstrated control technology or practices found in similar sources. 2) For sources where a MACT standard has not been established, the level of control technology required is determined on a case-by-case basis.

Notes: An “Air Use Permit,” sometimes called a “Permit to Install,” provides permission to emit air contaminants up to certain specified levels. These levels are set by state and federal law, and are set to protect health and welfare. By staying within the levels set by the permit, a facility is operating lawfully, and public health and air quality are protected.

The Air Quality Division does not have the authority to regulate noise, local zoning, property values, off-site truck traffic, or lighting.

These tables list the most frequently applied state and federal regulations. Not all regulations listed may be applicable in each case. Please refer to the draft permit conditions provided to determine which regulations apply.

Appendix 2
Lowest Achievable Emission Rate (LAER) Analysis
(Michigan Rule 336.2908(3))

A requirement of Major Source Nonattainment New Source Review (NNSR) is a LAER analysis. LAER is normally expressed as an emission limit. The limit is arrived at through an evaluation of materials used, operating practices, and potential add-on air pollution control equipment. Unlike a BACT review, a LAER analysis does not typically include an energy and economic evaluation component. LAER is defined as the most stringent emission limit either achieved in practice by a similar source or contained in a State Implementation Plan (SIP) for a similar source category.

The proposed new paint shop and modifications to the existing paint shop are subject to a LAER analysis for VOCs and the following is a summary of the analysis provided by FCA.

FCA completed a review of all 50 states' State Implementation Plans (SIPs), State Permits issued for similar sources, and the USEPA's RACT/BACT/LAER Clearinghouse (RBLC).

FCA addressed the main coating operations in a similar manner to previous LAER analyses, with the emphasis on emission rates from the same type of coating operation and less emphasis on the specific emission reduction technologies used. Below is the LAER demonstration for the various VOC sources planned for the new paint shop and the modifications to the existing paint shop.

The AQD has reviewed and concurs with the LAER determinations for new and modified emission units.

Proposed New Paint Shop:

- **E-Coat**

The proposed E-coat coatings are low VOC waterborne materials, which are industry standards. FCA is not aware of any coating materials that would provide additional VOC reductions beyond those which are currently used in the industry. Powder coatings applied via spray technology would be lower emitting, but this type of application doesn't provide overall coverage of recessed areas that is needed for the protective, corrosion resistant initial coating of the vehicle body. Based on this analysis, no other types of coatings are available that would reduce VOC emissions further than what FCA is proposing to use in the E-coat process associated with the new paint shop.

FCA reviewed the various SIPs and state regulations and did not find any limit more stringent than were included in the various permits reviewed. Based on those permits, FCA has determined that LAER for E-coat processes is the use of thermal oxidation to control VOCs from the E-coat tank and oven with a resultant emission rate of 0.04 lbs. VOC/GACS. This emission rate has been established in multiple previous automotive assembly line permits, as listed in the following table:

Table Ap. 2-1: Historical RBLC and Permit Limits for E-Coat Operations

Source	Tank Control	Oven Control	Date of Permit Issuance	Lbs. VOC/GACS
GM Delta Assembly	Oxidation	Oxidation	9-26-01	0.04
GM Lansing Craft Center	Oxidation	Oxidation	4-2-02	0.04
Honda Manufacturing Alabama	NA	Oxidation	10-18-02	0.13
GM Lansing Craft	Oxidation	Oxidation	2-11-03	0.04
Ford Michigan Truck	Oxidation	Oxidation	4-3-98 (9-8-03)	0.04
Ford Wixom Assembly	Oxidation	Oxidation	2-26-04	0.25
Toledo Supplier Park	Oxidation	Oxidation	9-7-04	0.04
Toyota Texas	N/A	Oxidation	6-16-04	0.13
Nissan Canton MS	Waterbased Coating	Oxidation	12-1-05	0.13
Kia Motors Georgia	N/A	Oxidation	6-20-07	0.19
Volkswagen, Tennessee	N/A	Oxidation	10-10-18	0.26
Hyundai Alabama	N/A	Oxidation	6-12-12	0.13
Ford Kentucky Truck	Oxidation	Oxidation	2-19-14	0.04
Subaru of Indiana	N/A	Oxidation	5-19-14	1.15 lb./gal
Tesla, Fremont California	Oxidation	Oxidation	7-9-15	1.42
Ford Chicago Assembly	N/A	Oxidation	6-30-17	1.34
FCA SHAP	Oxidation	Oxidation	4-6-18	0.04
Ford Michigan Assembly	N/A	Oxidation	8-15-18	FPI Limit
N/A – Indicates no controls on tank				

The two typical types of categories of add-on control devices used by the automotive and light-duty truck assembly coating operations are combustion (thermal and catalytic oxidation) and recovery (adsorption) to control VOC emissions. FCA has elected thermal oxidation, which is typically considered the most effective control option for VOCs.

FCA is proposing to use waterborne, low-VOC materials and an emission rate for the E-coat process of 0.04 lb. VOC/GACS, with VOC emissions from both the tank and oven portions of the E-coat process being controlled by a RTO. FCA has developed the proposed annual emission rate of 1.1 tpy based on 0.04 lbs. VOC/GACS for new E-coat operations. This emission rate is LAER for the E-coat process and is incorporated into the proposed permit.

- **Primer**

FCA recognized that powder coatings are available for use as primers and have been used with success in the automotive manufacturing industry resulting in essentially zero VOC emissions from this operation. However, based upon extensive experience and various compatibility/quality concerns with the proposed coating system (water and solvent based topcoats) and a lack of compatibility with the proposed coating system, FCA has determined that powder coatings are not feasible for use in this new paint shop. FCA did evaluate the use of powder coatings for use in the new paint shop, however, the planned vehicle is considered a higher-end, luxury version of the vehicle produced at Warren Truck and it requires a higher quality coating than the sport version produced in the existing facility. FCA has concluded that the quality coating required is an impediment to the use of powder coatings for this operation.

FCA reviewed the various SIPs and state regulations and did not find any limit more stringent than the limits in the RBLC and other permits reviewed. Based on those permits, including those listed in the RBLC, FCA tabulated the following limits established in automotive assembly line permits:

Table Ap. 2-2: Historical RBLC and Permit Limits for Primer (Guidecoat) Operations

Source & Location	Date of Permit Issuance	Material(s)	Booth/Oven Control Technology	Permit Limits (lbs. VOC/GACS)
Nissan North America (BACT)-Mississippi	4-4-01 (revised 12-1-05)	Solventborne Primer	Oven only – Oxidation	4.1
GM Delta Assembly (BACT) – Michigan	9-26-01	Powder	None	0.10 (converted to a FPI)
GM Grand River Michigan	April 2002	Solventborne Primer	Oven only – Oxidation	4.1 (converted to a flex permit in 2004)
GM-Lansing Craft Center-Michigan	4-2-02	Solventborne Primer	Oven only – Oxidation	5.29
Honda Manufacturing Alabama	10-18-02	Solventborne Primer	Oven only – Oxidation	4.1
Ford Michigan Truck	9-8-03 (1-8-09)	Solventborne Primer	Oxidation booth and oven	FPI Limit
GM Lordstown Ohio	2-12-04	Powder	None	0.13
Ford Wixom Assembly – Michigan	2-26-04	Solventborne Primer	Oven only – Oxidation	7.5
Toyota – San Antonio Texas	6-21-04	Solventborne Primer	Oven only – Oxidation	4.1
FCA Supplier Park – Toledo, Ohio	9-3-04	Powder	None	0.05
GM Flint Assembly	8-29-05	Solventborne Primer	Booth control by carbon and oven controls by oxidation	3.46
Nissan – Canton Mississippi	12-1-05	Waterborne Primer	Oven only – Oxidation	4.1
Kia Motors Georgia	6-20-07	Waterborne Primer	Oven only – Oxidation	2.92
Volkswagen, Tennessee	10-10-08	Solventborne Primer	Included in basecoat as part of 3-wet process	NA
Hyundai, Alabama	6-12-12	Solventborne Primer	Oxidation on automatics and oven	4.1
Subaru of Indiana	5-19-14	Waterborne Primer	Waterborne Materials – no controls	4.8 lbs./gal

Ford Kentucky Truck	2-19-14	Solventborne Primer	Oxidation on Booth and Oven	4.9
Tesla Fremont California	7-9-15	Solventborne Primer	Oxidation on Booth and Oven	4.8 (combined guidecoat and topcoat)
Ford Chicago Assembly	6-30-17	Solventborne Primer	Booth exterior automatic and oven oxidation	12.0
FCA SHAP	4-6-18	Powder	No controls	NA

FCA has proposed to meet the emission limit of 2.92 lbs. VOC/GACS established by Kia Motors Georgia. This will be achieved through the use of high solids solvent borne materials, robotic electrostatic and bell application technology coupled with RTO control on the spray booth, flash-off area, and curing oven portions of the primer application process. FCA has developed a proposed annual emission rate of 21.4 tpy for primer application based on 2.92 lbs. VOC/GACS. This emission rate is LAER for the primer operations.

- **Topcoat**

FCA tabulated the following limits established in automotive assembly line permits for the topcoat application process:

Table Ap. 2-3: Historical RBLC and Permit Limits for Topcoat Operations

Source & Location	Date of Permit Issuance	Booth Control Technology	Oven Controls	Permit Limits (lbs. VOC/GACS)
Nissan North America - Mississippi (new topcoat booth in 2015)	4-4-01 (revised 1-14-15)	Concentrator & Oxidation on Clearcoat automatic sections	Oxidation	5.2
GM Delta Assembly – Michigan	9-26-01	Oxidation on Clearcoat automatic sections	Oxidation	5.42
GM Grand River – Michigan	4-02	Concentrator & Oxidation on Clearcoat automatic sections	Oxidation	5.2
GM-Lansing Craft Center-Michigan	4-2-02	Concentrator & Oxidation on Clearcoat automatic sections	Oxidation	6.6
Honda Manufacturing -- Alabama	10-18-02	Oxidation on Clearcoat automatic sections	Oxidation	5.2
GM Lordstown – Ohio	2-12-04	Concentrator & Oxidation on Clearcoat automatic sections	Oxidation	6.07
Honda of America – Marysville, Ohio	2-26-04	Oxidation on Clearcoat automatic sections	Oxidation	8.00

Source & Location	Date of Permit Issuance	Booth Control Technology	Oven Controls	Permit Limits (lbs. VOC/GACS)
Ford Wixom Assembly – Michigan	2-26-04	Oxidation on Clearcoat automatics	Oxidation	5.29
Hyundai Motor-Alabama	3-23-04	Oxidation on Clearcoat automatics	Oxidation	5.2
Toyota-San Antonio Texas	6-21-04	Carbon followed by Oxidation on Clearcoat automatics	Oxidation	5.2
FCA Supplier Park – Toledo, Ohio	9-3-04	Oxidation on Basecoat Flash Zones and Clearcoat automatics	Oxidation	5.42
GM Flint Assembly -- Michigan	8-29-05	Waterborne Basecoat/Oxidation on Clearcoat automatics	Oxidation	5.5
Nissan – Canton Mississippi	12-1-05	Waterborne Basecoat/Oxidation on Clearcoat automatics	Oxidation	5.2
Volkswagen, Tennessee	10-10-08	Waterborne Basecoat/Oxidation on Clearcoat automatics	Oxidation	5.2
Kia Motors Georgia	6-20-07	Waterborne Basecoat/Oxidation on Clearcoat automatics	Oxidation	5.2
Hyundai Alabama	6-12-12	Waterborne Basecoat/Oxidation on Clearcoat automatics	Oxidation	5.2
Ford Michigan Truck	1-8-09 / revised 2018	Solvent Basecoat and Clearcoat/Oxidation on Booths/Ovens	Oxidation	FPI Limit
Ford Kentucky Truck	2-19-14	3-Wet – Oxidation on Booths and Ovens	Oxidation	3.53
Subaru Indiana	5-19-14	Oven Oxidation Only	Oxidation	10.96 lbs/gal
Tesla Fremont California	7-9-15	Solvent Basecoat & Clearcoat / Oxidation on booths and ovens	Oxidation	4.8 (combined primer and topcoat)

Source & Location	Date of Permit Issuance	Booth Control Technology	Oven Controls	Permit Limits (lbs. VOC/GACS)
Ford Chicago Assembly	6-30-17	Exterior automatics routed to oxidizer	Oxidation	12.0
FCA SHAP*	4-6-18	Waterborne Basecoat / Solvent Clearcoat / Oxidation on Booths and Ovens	Oxidation	2.32
<i>*Lbs. VOC/GACS value applies only to coating a truck bed, not the entire vehicle.</i>				

Based on these values, FCA continued the LAER analysis by reviewing the two lowest values from Table Ap. 2-3. The Ford Kentucky Truck facility was issued a permit for a new paint shop which included a limit of 3.53 lbs. VOC/GACS for topcoat and the FCA SHAP facility was issued a permit for a new truck bed with a limit of 2.32 lbs. VOC/GACS.

The 2.32 lbs. VOC/GACS limit in the FCA SHAP permit was for a new truck bed coating line. Note that this limit applies only to the coating operation for the truck bed, which allows for the use of more efficient application technology in a simpler substrate configuration. It is not a direct comparison to the proposed new paint shop, which will require a more complicated configuration for coating operations due to the application of coatings to the entire vehicle.

Based on the lowest value of the most comparable operation, FCA is proposing the new topcoat operation to meet the value of 3.53 lbs. VOC/GACS. This value will be achieved by the use of waterborne basecoats and solvent borne clearcoats, the use of robotic electrostatic and bell application technology coupled with RTO control on the spray booth, flash-off, and curing oven portions of the topcoat application process. FCA has developed a proposed annual emission rate of 75.3 tpy for topcoat application based on 3.53 lbs. VOC/GACS. This emission rate is LAER for the topcoat operations and is incorporated into the proposed permit.

- **Sealers and Adhesives**

Sealer and adhesive materials are generally very low VOC containing materials that are hand applied or pumped from a robotic nozzle applicator to specific locations on the vehicle body. For sealers, low VOC and waterborne materials are an industry standard and have been widely used across the United States.

FCA reviewed the various SIPs and also the Control Techniques Guideline (CTG) for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs and the CTG did not identify any more stringent limitations for sealers than those identified in the RBLC or issued permits with specific limits for sealers.

The proposed sealers and adhesives for the new paint shop are low VOC materials. FCA has not identified other available sealers with lower VOC contents that would substantially reduce VOC emissions from this operation and believes this to be the case due to the need for sealers to be viscous enough to be pump-able or hand applied to the vehicle body.

The following table is a summary of the recent RBLC entries, permit limits, and related determinations applicable to sealers:

Table Ap. 2-4: Historical RBLC Entries and Permit Limits for Sealers

Source & Location	Date	Permit Limits (lbs. VOC/Gallon (minus water))
GM Shreveport Assembly – Louisiana	3-24-00	0.5
GM Lansing GR Assembly – Michigan	2-27-00	0.3
Nissan North America - Mississippi	4-4-01	0.3
GM Delta Assembly – Michigan	9-26-01	0.3
FCA Jefferson North – Michigan	12-17-01	0.3
GM-Lansing Craft Center – Michigan	4-2-02	0.3
Honda Manufacturing – Alabama	10-18-02	0.3
Ford Michigan Truck	9-8-03 (1-8-09)	FPI Limit
GM Lordstown Ohio	2-12-04	0.3
Toledo Supplier Park	9-3-04	0.3
Toyota Texas*	6-16-04	0.3
Kia Motors Georgia	6-20-07	0.45
Volkswagen, Tennessee	10-10-08	N/A
FCA Belvidere Assembly (body shop only) Illinois	9-16-11	0.16 automatic application and 0.25 manual (weighted avg)
Hyundai Motor Alabama	6-12-12	0.3
Ford Kentucky Truck	2-19-14	0.3
Subaru of Indiana	5-19-14	0.38 lbs./gal
GM Delta Township – Michigan	5-9-14	0.3
Tesla Fremont California	7-9-15	Included in guidecoat limits for ovens
FCA SHAP (truck bed only) - Michigan	4-16-18	0.25 (monthly weighted avg)
*Combined sealers, adhesives and undercoat		

Based on the above determinations, FCA has determined that LAER for the sealers and adhesives associated with the new paint shop is a monthly weighted average VOC content of 0.25 lbs. per gallon, minus water. Further, due to the fact that sealers are low VOC materials and are applied at various stations on the plant floor and/or a variety of areas in the other locations of the facility, emissions tend to be fugitive in nature, and it is not technically feasible to control them; thus, there are no add-on VOC controls in previous reviews for this emission source. FCA has developed a proposed annual emission rate of 11.1 tpy for sealer and adhesive operations associated with the new (west) paint shop based on 0.25 lbs. VOC/gal, minus water. This emission rate is LAER for the sealer and adhesive operations and is incorporated into the proposed permit.

- **Purge/Clean Materials**

After review of the various SIPs and state regulations with VOC emission limits for purge and cleaning operations, FCA did not identify a SIP limit that was more stringent than the limits contained within the various permits reviewed. The following table provides a summary of RBLC determinations and permit VOC emission limits and control technologies for purge/clean operations.

Table Ap. 2-5: Historical RBLC and Permit Limits for Purge/Clean Materials

Source & Location	Date of Permit Issuance	Tons VOC per 1000 Vehicles	Basecoat Chemistry (where available)	VOC Emission Limit in Permit (tpy)
GM Lansing GR Assembly	2-27-00	NA	-	127 tpy
GM Delta Assembly	9-26-01	0.55	Waterborne	161.9 tpy
Honda Manufacturing Alabama	10-18-02	NA	-	100 tpy
Toyota-Princeton, Indiana	6-27-03	1.85	Waterborne	836.3 tpy
GM Lordstown Ohio	2-12-04	0.53	Waterborne	266.7 tpy
Toyota San Antonio Texas	6-21-04	1.74	Waterborne	348.4 tpy
FCA Toledo Supplier Park	9-3-04	1.18	Waterborne	237.6 tpy
Nissan North America	12-1-05	0.75	Waterborne	372.57 tpy
Kia Motors Georgia	6-20-07	0.6	Waterborne	NA
VW Tennessee	10-10-08	NA	-	391 tpy
Hyundai Alabama	6-12-12	NA	-	150 tpy
Ford Kentucky Truck	2-19-14	NA	Solventborne	NA
FCA SHAP*	4-6-18	0.2	Waterborne	82.6 tpy
Ford Michigan Truck	8-15-18	NA	Solventborne	FPI Limit
* The SHAP facility was a truck bed only paint shop				

The tons of VOC emitted per 1,000 vehicles are calculated values of expected performance. Some have been evaluated as part of a facility’s BACT review, but none are included as permit limits except for the FCA SHAP facility.

Due to the uniqueness of each facility and the associated cleaning operations, FCA has concluded that pollution prevention measures, such as in the following list, are more indicative of the approach to lowering emissions from purge/cleaning materials.

- The use of low VOC materials (where applicable)
- Implementation of appropriate work practices (including waste management practices)
- Capture of solvent based purge in a purge collection system
- RTO control on solvent based purge materials not captured in the purge collection system

The recently issued PTI for FCA SHAP does include an emission limit of 0.2 tons of VOC per 1000 vehicles; however, this value is not a direct comparison due to the use of a solvent borne primer system in the new paint shop which will require additional purging and cleaning and the fact that this limit only addresses the truck bed paint portion of the vehicle.

FCA has determined that LAER for purge and solvent cleaning is best defined as using waterborne materials in the basecoat operations, which will be controlled by the waterwash controls, as well as reclaiming solvent borne purge materials, where appropriate, and implementing work practice standards to minimize VOC emissions from solvent cleaning operations. Solvent-based purge materials will be captured and any of these materials not captured will be controlled by the RTO control equipment. FCA is not aware of any recycling or collection systems that are more effective at reducing emissions from purge operations.

FCA has developed a proposed annual emission rate of 69.3 tpy based on these pollution prevention measures. This emission rate is LAER for the purge and cleaning operations associated with the new paint; shop and is incorporated into the proposed permit.

- **Repair Operations**

FCA reviewed the various SIPs and also the CTG for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs reviewed and the CTG did not identify any more stringent limitations for repair than those identified in the RBLC or issued permits with specific limits for repair.

Primer repair is a unique process in repair operations. Coating issues after spray primer application involve those that go all the way to the metal frame; therefore, the west spot primer repair process uses a material specifically designed to repair the surface coating area that could potentially reveal the raw metal surface. Its formulation is designed specifically to address that circumstance and is typically used in small volumes per each repair. The primer repair material is unique in its purpose and formulation and is not readily interchangeable with other materials due to quality concerns and metal preservation. There has been no specific BACT or LAER determination for primer repair operations found in the RBLC; previous determinations have involved averaging VOC contents throughout various repair operations that use multiple coatings. FCA has developed a proposed annual emission rate of 1.36 tpy for west primer repair operations based on the coating used in this process and an emission limit of 1.0 ton per calendar month of VOC from each spot repair process, in conjunction with the State of Michigan Air Pollution Control Rule 610(7). These emission rates are LAER for the west primer repair operation and are incorporated into the proposed permit.

Outside of primer repair, repair operations are directly impacted by process quality assurance and quality control programs within the industry. Nevertheless, VOC emissions from repair operations are dictated by the type of repair required (i.e., E-coat repair vs topcoat), the size of repair required and the VOC content and usage rates of the repair materials. FCA did not identify any new technologies for repair operations that would lower VOC emissions beyond what is used in the current process operations. Accordingly, the repairs to the vehicle must be identical in order to produce a quality coating on the vehicle planned for production. As repairs are a non-value added activity, it is inherent that FCA will take efforts to minimize the number of repairs. LAER for repair operations is somewhat undefined, but the use of coatings containing no more than 4.8 lbs VOC/gal (minus water) has been established as BACT in many recent permits. Nothing more stringent has been identified that would establish LAER beyond this level. FCA has developed a proposed annual emission rate of 0.5 tpy for west spot repair, 0.5 tpy for east spot repair, and 1.2 tpy for final repair operations based on 4.8 lbs VOC/gal (minus water). These emission rates are LAER for repair operations (excluding primer repair) and are incorporated into the proposed permit.

- **Body Solvent Wipe**

FCA reviewed the various SIPs and also the CTG for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs reviewed and the CTG did not identify any more stringent limitations for solvent wiping than those identified in the RBLC or issued permits with specific limits for these operations.

The body solvent wiping process involves wipes which are containerized and provide for a single use method that minimizes evaporative losses of VOCs. These containers can be closed when not in use. Typically, body wiping occurs in uncontrolled booths or areas of the facility and, as a result, essentially all VOCs are assumed to evaporate. LAER for these operations are essentially the same across the industry and nearly all plants use containerized, single use wipes. FCA

estimated wipe emissions based upon a facility producing a similar vehicle which resulted in roughly 0.162 pounds of VOC per vehicle for solvent wipe. This factor was adjusted to account for primer booth wiping operations and results in 17.1 tpy of VOC emissions from solvent wiping based upon projected production rates. This emission rate is LAER for the body solvent wiping process and is incorporated into the proposed permit.

- **Glass Installation**

FCA reviewed the various SIPs and also the CTG for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs reviewed and the CTG did not identify any more stringent limitations for glass installation than those identified in the RBLC or issued permits with specific limits for these operations.

Glass installation involves the use of primer and wiping materials prior to installation with adhesives. Note that, due to safety requirements, these materials are standardized across the industry. Due to the safety requirements for glass in vehicles, the use of alternative materials is generally considered difficult and not advisable per manufacturers.

A recent permit issued for Toyota Motors in Texas established a window install limit of 0.065 lb/gal. However, the assembly line associated with this limit has not been constructed. Therefore, the limit has not been achieved in practice and is not considered a value that must be met in a LAER analysis.

FCA has calculated VOC emissions of 1.3 tpy that was included as part of the sealer and adhesive emissions stated earlier. This emission rate is LAER for the glass installation operations and is incorporated into the proposed permit.

- **VOCs from Natural Gas Combustion Sources**

The natural gas combustion sources that are proposed to support the new paint shop and consist of:

- Hot Water Generators
- Direct-Fire and Indirect-Fire Ovens
- Air Housing Units (AHU) and Air Supply Houses (ASH)
- Space Heaters
- Concentrator Heater
- Regenerative Thermal Oxidizer
- 37 MMBtu/hr Trim Boiler

VOCs generated from combustion sources are limited to the products of combustion of natural gas. FCA did not identify any lower emitting fuels or burner configuration technologies that would reduce VOC emissions from the proposed natural gas combustion sources. Due to the multiple locations of emission sources and a maximum potential for VOC emissions of 5.56 tpy, FCA did not pursue consideration of add-on control technologies as part of this LAER analysis. FCA has determined that the use of natural gas as fuel in these units constitutes LAER at an emission rate of 5.5 pounds of VOC per million standard cubic feet of natural gas consumed based upon the USEPA's AP-42 Compilation of Air Emission Factors, which is considered a widely accepted emission rate for VOCs from natural gas combustion.

- **VOCs from natural gas emergency engine**

FCA reviewed the RBLC for emergency engines utilizing natural gas as fuel. The following table summarizes the findings from that search.

Table Ap. 2-6: Historical RBLC Permit Limits for Natural Gas Emergency Engines

Source & Location	Size (Hp)	Date of Permit Issuance	Control Technology	VOC Emission Limit
Holland Board of Public Works (Michigan)	1,462	12-5-16	Oxidation Catalyst and GCP*	0.5 g/HP-hr
Mid Kansas Electric (Kansas)	604	3-31-16	None	1.0 g/HP-hr
SEMGAS LP-Rose Valley (Oklahoma)	2,889	3-1-13	Oxidation Catalyst	0.44 g/HP-hr over a 3-hr average
Consumers Energy -- Michigan	1,818	10-14-10	None	0.81 g/HP-hr
*GCP – Good combustion practices				

Based on the above information, there are natural gas-fired emergency engines that rely on oxidation catalysts to control VOCs. Those units relying on oxidation catalysts all have a much larger Hp rating/capacity than the 770 Hp engines proposed for use by FCA in the Warren Truck Plant project. Holland Board of Public Works has the lowest emission limit based on an hourly value and FCA is proposing to meet 0.5 gm/HP-hr on their proposed emergency engines. This is acceptable as the SEMGAS limit is a 3-hour average, and an hourly average is typically the reviewed time period for these types of units and a shorter averaging time is considered more stringent than a longer one. This emission rate is LAER for the natural gas emergency engine.

Existing Paint Shop:

As with the new paint shop LAER analysis above, FCA addressed the main coating operations for the existing paint shop LAER analysis as well.

- **Existing E-Coat**

FCA reviewed the various SIPs and state regulations and did not find any limit more stringent than were included in the various permits reviewed. Based on those permits, FCA has determined that LAER for E-coat processes is the use of thermal oxidation to control VOCs from the E-coat tank and oven with a resultant emission rate of 0.04 lbs VOC/GACS. This emission rate has been established in multiple previous automotive assembly line permits, as listed in the following table:

Table Ap. 2-7: Historical RBLC and Permit Limits for E-Coat Operations

Source & Location	Tank	Oven	Date	Lbs VOC/GACS
GM Delta Assembly – Michigan	Oxidation	Oxidation	9-26-01	0.04
GM – Lansing Craft Ctr (Michigan)	Oxidation	Oxidation	4-2-02	0.04
Honda Manufacturing Alabama	NA	Oxidation	10-18-02	0.13
GM Lansing Craft	Oxidation	Oxidation	2-11-03	0.04
Ford Michigan Truck	Oxidation	Oxidation	4-3-98 (9-8-03)	0.04
Ford Wixom Assembly	Oxidation	Oxidation	2-26-04	0.25

Toledo Supplier Park	Oxidation	Oxidation	9-7-04	0.04
Toyota Texas	N/A	Oxidation	6-16-04	0.13
Nissan Canton MS	WB Coating	Oxidation	12-1-05	0.13
Kia Motors Georgia	N/A	Oxidation	6-20-07	0.19
Volkswagen, Tennessee	N/A	Oxidation	10-10-08	0.26
Hyundai, Alabama	N/A	Oxidation	6-12-12	0.13
Ford Kentucky Truck	Oxidation	Oxidation	2-19-14	0.04
Subaru of Indiana	N/A	Oxidation	5-19-14	1.15 lbs/gal
Tesla, Fremont California	Oxidation	Oxidation	7-9-15	1.42
Ford Chicago Assembly	NA	Oxidation	6-30-17	1.34
Ford Michigan Assembly	NA	Oxidation	8-15-18	FPI Limit
FCA SHAP	Oxidation	Oxidation	4-6-18	0.04
NA – Indicates no controls on tank				

Based on this information, FCA identified that LAER for the existing E-coat process is the use of thermal oxidation to control the VOCs from the E-coat tank and oven with a resultant emission rate of 0.04 lbs VOC/GACS. FCA will retro-fit the existing E-coat system to route the tank exhaust into the existing oven therefore controlling the tank emissions. The annual VOC emissions from the newly controlled E-coat operation are 2.01 tpy which is based upon the coating technology and the add-on control strategy. This emission rate is LAER for the E-coat operations associated with the existing paint shop.

- **Existing Sealers**

FCA reviewed the various SIPs and also the Control Techniques Guideline (CTG) for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs and the CTG did not identify any more stringent limitations for sealers than those identified in the RBLC or issued permits with specific limits for sealers.

The proposed sealers and adhesives for the existing facility are low VOC materials. FCA has not identified other available sealers with lower VOC contents that would substantially reduce VOC emissions from this operation and believes this to be the case due to the need for sealers to be viscous enough to be pump-able or hand applied to the vehicle body.

The following table is a summary of the recent RBLC entries, permit limits, and related determinations applicable to sealers:

Table Ap. 2-8: Historical RBLC Entries and Permit Limits for Sealers

Source & Location	Date	Permit Limits (lbs VOC/Gallon (minus water))
GM Shreveport Assembly – Louisiana	3-24-00	0.5
GM Lansing GR Assembly – Michigan	2-27-00	0.3
Nissan North America - Mississippi	4-4-01	0.3
GM Delta Assembly – Michigan	9-26-01	0.3

FCA Jefferson North – Michigan	12-17-01	0.3
GM-Lansing Craft Center – Michigan	4-2-02	0.3
Honda Manufacturing – Alabama	10-18-02	0.3
Ford Michigan Truck	9-8-03/1-8-09	FPI Limit
GM Lordstown Ohio	2-12-04	0.3
Toledo Supplier Park	9-3-04	0.3
Toyota Texas*	6-16-04	0.3
Kia Motors Georgia	6-20-07	0.45
Volkswagen, Tennessee	10-10-08	N/A
FCA Belvidere Assembly Illinois	9-16-11	0.16 automatic application and 0.25 manual (weighted avg)
Hyundai Motor Alabama	6-12-12	0.3
Ford Kentucky Truck	2-19-14	0.3
Subaru of Indiana	5-19-14	0.38 lbs/gal
GM Delta Township – Michigan	5-9-14	0.3
Tesla Fremont California	7-9-15	Included in guidecoat limits for ovens
FCA SHAP (truck bed only) - Michigan	4-16-18	0.25 lb/gal weighted average
*Combined sealers, adhesives and undercoat		

Based on the above determinations, FCA has determined that LAER for the sealers and adhesives is a monthly weighted average VOC content of 0.25 lbs per gallon, minus water. Further, due to the fact that sealers are low VOC materials and are applied at various stations on the plant floor and/or a variety of areas in the other locations of the facility, emissions tend to be fugitive in nature, and it is not technically feasible to control them; thus, there are no add-on VOC controls in previous reviews for this emission source. FCA noted that if sealer VOCs are released in the E-coat or Topcoat ovens, they will be routed to the thermal oxidizer along with the other emissions released in the ovens. FCA has developed a proposed emission rate of 0.25 lbs VOC/gal, minus water on a monthly weighted average basis. This emission rate is LAER for the sealer and adhesive operations associated with the existing sealer process and is incorporated into the proposed permit.

- **Existing Primer (Guidecoat)**

FCA reviewed the various SIPs and state regulations with VOC emission limits for the primer (guidecoat) operations and did not find any limit more stringent than the limits in the RBLC and other permits reviewed. Based on those permits, including those listed in the RBLC, FCA tabulated the following limits established in automotive assembly line permits:

Table Ap. 2-9: Historical RBLC and Permit Limits for Primer (Guidecoat) Operations

Source & Location	Date of Permit Issuance	Material(s)	Booth/Oven Control Technology	Permit Limits (lbs VOC/GACS)
Nissan North America (BACT)- Mississippi	4-4-01 (revised 12/1/05)	Solventborne Primer	Oven only – Oxidation	4.1
GM Delta Assembly (BACT) – Michigan	9-26-01	Powder	None	0.10 (converted to FPI)
GM Grand River Michigan	4-02	Solventborne Primer	Oven only – Oxidation	4.1 (converted to 5.2 in 2004)

GM-Lansing Craft Center-Michigan	4-2-02	Solventborne Primer	Oven only – Oxidation	5.29
Honda Manufacturing Alabama	10-18-02	Solventborne Primer	Oven only – Oxidation	4.1
Ford Michigan Truck	9-8-03 (1-8-09)	Solventborne Primer	Oxidation booth and oven	FPI Limit
GM Lordstown Ohio	2-12-04	Powder	None	0.13
Ford Wixom Assembly – Michigan	2-26-04	Solventborne Primer	Oven only – Oxidation	7.5
Toyota – San Antonio Texas	6-21-04	Solventborne Primer	Oven only – Oxidation	4.1
FCA Supplier Park – Toledo, Ohio	9-3-04	Powder	None	0.05
GM Flint Assembly Michigan	8-29-05	Solventborne Primer	Booth control by Carbon and Oven Controls by Oxidation	3.46
Nissan – Canton Mississippi	12-1-05	Waterborne Primer	Oven only – Oxidation	4.1
Kia Motors Georgia	6-20-07	Waterborne Primer	Oven only – Oxidation	2.92
Volkswagen, Tennessee	10-10-08	Solventborne Primer	Included in Basecoat as part of 3-wet process	NA
Hyundai, Alabama	6-12-12	Solventborne Primer	Oxidation on automatics and oven	4.1
Subaru of Indiana	5-19-14	Waterborne Primer	Waterborne Materials – no controls	4.8 lbs./gal
Ford Kentucky Truck	2-19-14	Solventborne Primer	Oxidation on Booth and Oven	4.9
Tesla Fremont California	7-9-15	Solventborne Primer	Oxidation on Booth and Oven	4.8 (combined guidecoat and topcoat)
Ford Chicago Assembly	6-30-17	Solventborne Primer	Booth exterior automatic and oven oxidation	12.0
FCA SHAP	4-6-18	Powder	No controls	NA

Based on the above analysis, FCA has determined that LAER for the primer application in the existing paint shop is the use of powder primer materials. Although FCA does not believe the layering technology with powder materials provides the best finish in terms of quality, it would be technically infeasible to reconfigure the booth and exhaust systems associated with the existing powder operation due to space limitations. The use of a liquid primer for enhanced coating quality would require significantly longer booths and oven retention time which is not currently available due to the space limitations at the existing facility. FCA has determined that LAER for the existing primer operations is 0.05 lbs. VOC/GACS and is incorporated into the proposed permit.

- **Existing Topcoat**
FCA tabulated the following limits established in automotive assembly line permits for the topcoat application process:

Table Ap. 2-10: Historical RBLC and Permit Limits for Topcoat Operations

Source & Location	Date of Permit Issuance	Booth Control Technology	Oven Controls	Permit Limits (lbs. VOC/GACS)
Nissan North America - Mississippi (new topcoat booth in 2015)	4-4-01 (revised 1/14/15)	Concentrator & Oxidation on Clearcoat automatic sections	Oxidation	5.2
GM Delta Assembly – Michigan	9-26-01	Oxidation on Clearcoat automatic sections	Oxidation	5.42
GM Grand River – Michigan	4-02	Concentrator & Oxidation on Clearcoat automatic sections	Oxidation	5.2
GM-Lansing Craft Center-Michigan	4-2-02	Concentrator & Oxidation on Clearcoat automatic sections	Oxidation	6.6
Honda Manufacturing -- Alabama	10-18-02	Oxidation on Clearcoat automatic sections	Oxidation	5.2
GM Lordstown – Ohio	2-12-04	Concentrator & Oxidation on Clearcoat automatic sections	Oxidation	6.07
Honda of America – Marysville, Ohio	2-26-04	Oxidation on Clearcoat automatic sections	Oxidation	8.00
Ford Wixom Assembly – Michigan	2-26-04	Oxidation on Clearcoat automatics	Oxidation	5.29
Hyundai Motor-Alabama	3-23-04	Oxidation on Clearcoat automatics	Oxidation	5.2
Toyota-San Antonio Texas	6-21-04	Carbon followed by Oxidation on Clearcoat automatics	Oxidation	5.2
FCA Supplier Park – Toledo, Ohio	9-3-04	Oxidation on Basecoat Flash Zones and Clearcoat automatics	Oxidation	5.42
GM Flint Assembly -- Michigan	8-29-05	Waterborne Basecoat/Oxidation on Clearcoat automatics	Oxidation	5.5
Nissan – Canton Mississippi	12-1-05	Waterborne Basecoat/Oxidation	Oxidation	5.2

Source & Location	Date of Permit Issuance	Booth Control Technology	Oven Controls	Permit Limits (lbs. VOC/GACS)
		on Clearcoat automatics		
Volkswagon, Tennessee	10-10-08	Waterborne Basecoat/Oxidation on Clearcoat automatics	Oxidation	5.2
Kia Motors Georgia	6-20-07	Waterborne Basecoat/Oxidation on Clearcoat automatics	Oxidation	5.2
Hyundai Alabama	6-12-12	Waterborne Basecoat/Oxidation on Clearcoat automatics	Oxidation	5.2
Ford Michigan Truck	1-8-09/Revised 2018	Solvent Basecoat and Clearcoat/Oxidation on Booths/Ovens	Oxidation	FPI Limit
Ford Kentucky Truck	2-19-14	3-Wet – Oxidation on Booths and Ovens	Oxidation	3.53
Subaru Indiana	5-19-14	Oven Oxidation Only	Oxidation	10.96 lbs./gal
Tesla Fremont California	7-9-15	Solvent Basecoat & Clearcoat/Oxidation on booths and ovens	Oxidation	4.8 (combined primer and topcoat)
Ford Chicago Assembly	6-30-17	Exterior automatics routed to oxidizer	Oxidation	12.0
FCA SHAP*	4-6-18	Waterborne Basecoat / Solvent Clearcoat / Oxidation on Booths and Ovens	Oxidation	2.32
FCA Detroit Assembly Complex Mack	4-26-19	Waterborne Basecoat/Solvent Clearcoat Concentrators and Oxidation on Booths	Oxidation	FPI Limit – Based upon 3.53
*Lbs. VOC/GACS value applies only to coating a truck bed, not the entire vehicle.				

Based on these values, FCA continued the LAER analysis by reviewing the two lowest values from Table Ap. 2-10. The Ford Kentucky Truck facility was issued a permit for a new paint shop which included a limit of 3.53 lbs. VOC/GACS for topcoat and the FCA SHAP facility was issued a permit for a new truck bed with a limit of 2.32 lbs. VOC/GACS.

The 2.32 lbs. VOC/GACS limit in the FCA SHAP permit was for a new truck bed coating line. Note that this limit applies only to the coating operation for the truck bed, which allows for the use of more efficient application technology in a simpler substrate configuration. It is not a direct comparison to

the proposed changes in the existing topcoat line, which has a more complicated configuration for coating operations due to the application of coatings to the entire vehicle.

FCA is proposing the LAER limit for the refurbished topcoat operation to be 3.53 lbs. VOC/GACS and an annual emission rate of 193 tpy from the spray booth portion of EU-COLOR-ONE and 201.6 tpy from all equipment in EU-COLOR-ONE. These emission rates are LAER for the refurbished topcoat operations and are incorporated into the proposed permit.

• **Existing Purge/Clean Materials**

FCA reviewed the various SIPs and state regulations with VOC emission limits for purge and cleaning operations and did not identify a SIP limit that was more stringent than the limits contained within the various permits reviewed. The following table provides a summary of RBLC determinations and permit VOC emission limits and control technologies for purge/clean operations.

Table Ap. 2-11: Historical RBLC and Permit Limits for Purge/Clean Materials

Source & Location	Date of Permit Issuance	Tons VOC per 1000 Vehicles	Basecoat Chemistry (where available)	VOC Emission Limit in Permit (tpy)
GM Lansing GR Assembly	2-27-00	NA	-	127 tpy
GM Delta Assembly	9-26-01	0.55	Waterborne	161.9 tpy
Honda Manufacturing Alabama	10-18-02	NA	-	100 tpy
Toyota-Princeton, Indiana	6-27-03	1.85	Waterborne	836.3 tpy
GM Lordstown Ohio	2-12-04	0.53	Waterborne	266.7 tpy
Toyota San Antonio Texas	6-21-04	1.74	Waterborne	348.4 tpy
FCA Toledo Supplier Park	9-3-04	1.18	Waterborne	237.6 tpy
Nissan North America	12-1-05	0.75	Waterborne	372.57 tpy
Kia Motors Georgia	6-20-07	0.6	Waterborne	NA
VW Tennessee	10-10-08	NA	-	391 tpy
Hyundai Alabama	6-12-12	NA	-	150 tpy
Ford Kentucky Truck	2-19-14	NA	Solventborne	NA
FCA SHAP*	4-6-18	0.2	Waterborne	82.6 tpy
Ford Michigan Truck	8-15-18	NA	Solventborne	FPI Limit

* The SHAP facility was a truck bed only paint shop

The tons of VOC emitted per 1,000 vehicles are calculated values of expected performance. Some have been evaluated as part of a facility’s BACT review, but none are included as permit limits except for the FCA SHAP facility.

Due to the uniqueness of each facility and the associated cleaning operations, FCA has concluded that pollution prevention measures, such as in the following list, are more indicative of the approach to lowering emissions from purge/cleaning materials.

- The use of low VOC materials (where applicable)
- Implementation of appropriate work practices (including waste management practices)
- Capture of solvent based purge in a purge collection system
- RTO control on solvent based purge materials not captured in the purge collection system

The recently issued PTI for FCA SHAP does include an emission limit of 0.2 tons of VOC per 1,000 vehicles; however, this value is not a direct comparison due to the use of a solvent borne primer system in the new paint shop which will require additional purging and cleaning and the fact that this limit only addresses the truck bed paint portion of the vehicle.

FCA has determined that LAER for the existing purge and solvent cleaning is best defined as reclaiming solvent based purge materials (where appropriate), and implementing work practice standards to minimize VOC emissions from solvent cleaning operations. FCA proposes work practice provisions for VOCs that are identical to those found in the auto and light duty vehicle new source MACT rule (40 CFR 63 Subpart IIII).

- **Existing Body Solvent Wipe**

FCA reviewed the various SIPs and also the CTG for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs reviewed and the CTG did not identify any more stringent limitations for solvent wiping than those identified in the RBLC or issued permits with specific limits for these operations.

The body solvent wiping process involves wipes which are containerized and provide for a single use method that minimizes evaporative losses of VOCs. These containers can be closed when not in use. Typically, body wiping occurs in uncontrolled booths or areas of the facility and, as a result, essentially all VOCs are assumed to evaporate. LAER for these operations are essentially the same across the industry and nearly all plants use containerized, single use wipes. The emissions from the existing body solvent wipe process are included in the purge/clean process for the existing paint shop and are incorporated into the proposed permit for the existing purge and cleaning operations.

- **Existing Repair Operations (Spot Repair/Hi Bake/Reprocess)**

FCA reviewed the various SIPs and also the CTG for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs reviewed and the CTG did not identify any more stringent limitations for repair than those identified in the RBLC or issued permits with specific limits for repair.

Repair operations, including reprocess and high bake repair operations, are directly impacted by process quality assurance and quality control programs within the industry. FCA strives to minimize repairs and recognizes that VOC emissions from repair operations are determined by the type of repair required (i.e. E-coat repair vs topcoat), the size of the repair and the VOC content and usage rates of the repair materials. FCA did not identify any new technologies for repair operations that would lower VOC emissions beyond what is used in the current repair operations. Accordingly, the repairs to the vehicle must be identical in order to produce a quality coating on the vehicle planned for production. As repairs are a non-value-added activity, it is inherent that FCA will take efforts to minimize the number of repairs. LAER for repair operations is somewhat undefined, but the use of coatings containing no more than 4.8 lbs. VOC/gal (minus water) has been established as BACT in many recent permits. Nothing more stringent has been identified that would establish LAER beyond this level. This emission rate is LAER for existing repair operations and is incorporated into the proposed permit.

- **Fuel Fill Operations**

FCA reviewed the various SIPs and also the CTG for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs reviewed and the CTG did not identify any more stringent limitations for fuel fill operations than those identified in the RBLC or issued permits with specific limits for these operations.

LAER for fuel filling operations is based upon the production levels for each facility since introduction of gasoline into fuel storage tanks followed by dispensing into vehicles are a function of stage I (storage tank filling) and stage II (vehicle dispensing) VOC emission controls. The majority of permits reviewed for gasoline fill operations did not contain specific limits since the majority of these operations are similar and emissions are dependent upon production levels. All of the most recent permits noted that Stage II emission controls have been replaced by the use of on-board recycling and vapor recovery (ORVR) systems. ORVR systems typically provide 95 percent or greater control of VOCs and are employed in nearly 100 percent of vehicles produced in the US. FCA utilized standard emission factors for the vehicle filling operations and has estimated that roughly 0.002 lbs VOC per vehicle will be emitted, based upon historic fill rates at the existing JNAP facility resulting in 0.3 tons per year (including antifreeze). This value is consistent with one of the more recent permits issued in Michigan for the GM Delta Township facility which includes an emission limit for VOCs of 0.5 tpy. FCA has proposed the requirement of ORVR systems on any vehicle fueled at the proposed assembly line. The proposed annual emission rate is incorporated in the emission unit EUFLUIDFILL which covers various fluids such as gasoline, antifreeze, transmission fluid, power steering fluid and windshield washer fluid.

- **Fluid fill operations**

FCA reviewed the various SIPs and also the CTG for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs reviewed and the CTG did not identify any more stringent limitations for fluid fill operations than those identified in the RBLC or issued permits with specific limits for these operations.

Similar to gasoline fill, VOC emissions from the use of windshield washer fluid fill are a function of the vehicle production level. These operations are typically not controlled but will employ submerged fill for tank filling operations. A review of the various permits suggests that VOC emission limits are typically not included in permits, and that BACT or LAER for fluid fill operations is essentially the same across the industry since the fluid is typically methanol and must meet certain physical parameters. FCA utilized standard emission factors and has estimated emissions of VOCs accordingly. The emission rate from fluid fill operations is also incorporated into the emission limit for EUFLUIDFILL, as described above. This limit is LAER and is incorporated into the proposed permit.

- **Tanks**

Emissions of VOCs from storage tanks for fluids used in vehicles are dependent upon the physical characteristics of the tank, the location of the tank (i.e., which part of the country), and the proposed throughput. Accordingly, emissions from storage tanks are not typically included as part of a LAER demonstration other than for the proposed vapor balance/control systems and the Reid Vapor Pressure (RVP) of the gasoline. FCA completed an emissions estimate using the USEPA's TANKS program. The proposed storage tanks will rely upon submerged fill and vapor balance in accordance with EGLE, AQD Rule 706 requirements.

Other storage tanks will also be used for windshield washer fluid (methanol or ethanol), brake fluid, engine coolant and refrigerants. For the methanol/ethanol storage, submerged fill and a vapor balance system will be used, similar to gasoline. For the materials with low volatility (brake fluid and engine coolant), only submerged fill will be relied on since the emissions will be minimal.

Refrigerants are stored in pressurized vessels which do not result in emissions. FCA requires all delivery/shipments to be completed with tankers that are equipped with Stage I vapor controls.

- **Existing Glass Installation**

FCA reviewed the various SIPs and also the CTG for Automobile and Light Duty Trucks issued by the USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs reviewed and the CTG did not identify any more stringent limitations for glass installation than those identified in the RBLC or issued permits with specific limits for these operations.

Glass installation involves the use of primer and wiping materials prior to installation with adhesives. Note that, due to safety requirements, these materials are standardized across the industry. Due to the safety requirements for glass in vehicles, the use of alternative materials is generally considered difficult and not advisable per manufacturers. Therefore, FCA has determined that glass installation will not change and the existing VOC emissions will be included in the sealer emissions.

- **VOCs from Existing Natural Gas Combustion Sources**

VOCs generated from combustion sources are limited to the products of combustion of natural gas. FCA did not identify any lower emitting fuels or burner configuration technologies that would reduce VOC emissions from the proposed natural gas combustion sources. Due to the multiple locations of emission sources and the low level of VOC emissions from planned combustion sources, FCA did not pursue consideration of add-on control technologies as part of this LAER analysis. FCA has determined that the use of natural gas as fuel in these units constitutes LAER at an emission rate of 5.5 pounds of VOC per million standard cubic feet of natural gas consumed based upon the USEPA's AP-42 Compilation of Air Emission Factors, which is considered a widely accepted emission rate for VOCs from natural gas combustion.

- **LAER Conclusion**

As shown in the above review, FCA has proposed values that are equal to or less than what has been achieved in practice for other similar sources and incorporated those values, into the proposed permit. The AQD concurs with FCA's determination of LAER for the proposed new paint shop and modifications to the existing paint shop. Compliance with the LAER limits will be demonstrated via recordkeeping and emissions testing.

**Appendix 3
 Emissions Offsets Summary
 (Michigan Rule 336.2908(4))**

A second requirement of NNSR is emission offsets. In order to be used, offsets must be surplus, permanent, quantifiable, and federally enforceable. Offsets must also be generated (made permanent and federally enforceable) after the baseline date established by the State for the nonattainment area. This is referred to as being post baseline date. For Macomb County, the baseline date has been set as January 1, 2017. For ozone precursors, VOC offsets must be provided for a major source or major modification of VOC, while, if applicable, NO_x offsets must be provided for a major source or major modification of NO_x. In a marginal nonattainment area such as Macomb county, the offset ratio is 1.1 to 1.

Surplus means that the offsets cannot have been used for another purpose, such as emissions netting or taken into account as a part of the State’s SIP to bring the area back into attainment. Permanent means that the offsets will remain in place throughout the lifetime of the proposed project. Quantifiable means that there is actual documentation (via CEMS data, test data, and/or emissions records) of the emissions used as the offsets. Typically, offsets are based upon a two-year average. Federally enforceable means that measures (via permit condition, a consent order, and/or a shutdown and removal of equipment) have been put in place to ensure that the offsets are indeed surplus, permanent, and quantifiable. The term baseline date refers to a point going forward from which emissions reductions will be made to bring an area back into attainment.

In PTI No. 13-19 and 13-19A, requirements were established at the Warren Truck facility that created 658.75 tons of VOC offsets by reducing the allowed VOC emissions. FCA is using those reductions to offset the emissions increases associated with both the Mack Plant project and increases resulting from this project at the Warren Truck Assembly Plant.

The following table shows the actual VOC emissions from FCA Warren Truck for 2016 and 2017 for five areas of the facility:

Table Ap. 3-1: FCA Warren Truck Reductions from PTI No. 13-19

Source	Description	2016/2017 2-Year Average VOC Emissions (tpy)	Permit VOC Limit (tpy)	VOC Reductions (tpy)
EU-SOLVENT-WIPE	Body Solvent Wipe & Purge Materials	689.8	555	134.8
EU-COLOR-ONE	Spraybooth-Color 1	565.9	193	372.9
EU-COLOR-TWO	Spraybooth-Color 2	565.9	430	135.9
EU-REPROCESS	Spraybooth Reprocess	50.45	40	10.45
EU-TUTONE	Spraybooth-Tutone	24.7	20	4.70
Total (tpy)		1,896.75	1,238	658.75
Offsets required for DMAC (tpy)				420.31
Remaining VOC reductions available for offsets (tpy)				238.44

The table below presents the anticipated reductions to the current allowable/past actual VOC emissions that result from the proposed changes to the existing Warren Truck Assembly Plant.

Table Ap. 3-2: FCA Warren Truck Reductions from PTI No. 13-19A

Emission Source	Current PTI Allowable¹ or Past Actual² VOC Emissions (tpy)	Post Modernization Project VOC Emissions (tpy)	Post Modernization Project Net Reduction in VOC Emissions (tpy)
E-coat Tank	12.7 ²	2.01	10.69
Color #1 Booth	193.0 ¹	193.0	0
Color #2 Booth	430.0 ¹	0.0	430.0
Solvent Wipe/Purge/Clean	555 ¹	245.07	309.93
Tutone	20 ¹	0	20.0
Total	-	-	770.62
¹ Value was established in Warren Truck's PTI No. 13-19 and was carried forward in PTI No. 13-19A. ² Value is the source's two year average (2016 – 2017) actual emissions			

VOC emission calculations on a monthly and a 12-month rolling time period basis will be performed and maintained.

The table below demonstrates the emissions increases and offsets required for the new paint shop portion of the modernization project at Warren Truck will be offset by the reductions realized after the changes are completed to the existing facility. The offsets are available after those that are required for the Mack Plant project have been accounted for.

Table Ap. 3-3: Modernization Project Offsets

Source	Proposed Increase (tpy)	Offsets Required (tpy)	Offsets Available (tpy)	Remaining Offsets (tpy)
Warren Truck Project	206.32	226.95		
Remaining after Mack Plant Project			238.44	11.49
Post Modernization Reductions from Existing Sources			770.62	770.62
Total	206.32	226.95	1009.06	782.11

The VOC reductions that will be achieved through the modernization project at Warren Truck will provide enough offsets to accommodate both the Mack Plant project and the Warren Truck increases. Even though the proposed physical changes will be implemented in phases, at all times the appropriate amount of reductions/offsets will be realized in time to allow for any incremental phased increases. FCA will track emissions sources and maintain the appropriate records, on a monthly and 12-month rolling time period basis, to document the timing of reductions achieved as production is decreased and sources are removed/abated, in addition to the timing of the increases as new sources are brought on line and production is increased.