NORTH CAROLINA DIVISION OF AIR QUALITY

Air Permit Review

Permit Issue Date:

Region: Mooresville Regional Office
County: Gaston
NC Facility ID: 3600153
Inspector's Name: Carlotta Adams
Date of Last Inspection: 06/28/2016
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Daimler Trucks North America, LLC - Mt. Holly Plant

Facility Address:
Daimler Trucks North America, LLC - Mt. Holly Plant
1800 North Main Street
Mount Holly, NC 28120

SIC: 3711 / Motor Vehicles And Car Bodies
NAICS: 33612 / Heavy Duty Truck Manufacturing

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 15A NCAC 2D .0503, 2D .0515, 2D .0516, 2D .0521 & 2D .0530
NSPS: 2D .0524 Subpart Dc & Subpart JJJJ
NESHAP: MACT Subpart MMMM, Subpart PPPP & MACT ZZZZ
PSD: VOC BACT
PSD Avoidance: NA
NC Toxics: 15A NCAC 2Q .0702(a)(27)(B)
112(r): NA
Other: NA

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Eric Moser Sr. Environmental Engineer (704) 822-7034 1800 North Main Street Mount Holly, NC 28120	Jane Rosaasen Logistics Director (704) 822-7204 1800 North Main Street Mount Holly, NC 28120	Eric Moser Sr. Environmental Engineer (704) 822-7034 1800 North Main Street Mount Holly, NC 28120

Application Data

Application Number: 3600153.15B
Date Received: 08/12/2015
Application Type: Modification
Application Schedule: PSD

Existing Permit Data

Existing Permit Number: 03926/T43
Existing Permit Issue Date: 06/16/2015
Existing Permit Expiration Date: 10/31/2018

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2014	1.27	6.53	195.45	7.74	3.80	0.5339	0.1605 [Hexane, n-]
2013	0.0800	8.65	256.86	9.03	3.47	3.61	1.05 [Ethyl benzene]
2012	0.0800	7.12	218.71	7.67	2.89	3.61	1.02 [Ethyl benzene]
2011	0.0700	6.69	167.60	7.44	8.25	6.24	3.79 [Xylene (mixed isomers)]
2010	0.1100	3.99	35.15	5.32	0.6600	2.11	0.9070 [Xylene (mixed isomers)]

Review Engineer: Gautam Patnaik

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue: 03926T44
Permit Issue Date:
Permit Expiration Date:

I. Introduction and back ground

Daimler Trucks North America LLC (Daimler) owns and operates a truck manufacturing plant and is currently categorized under Standard Industrial Classification (SIC) code 3711. The facility islocated in Mount Holly, Gaston County, NC. The facility is currently operating in accordance with North Carolina Department of Environmental Quality (DEQ) Title V Permit No. 03926T43 issued on June 16, 2015, and is scheduled to expire on October 31, 2018.

Due to an increase in demand for heavy duty trucks and increase in customer requests for certain types of finishes on their trucks, Daimler plans to increase production at the Mt. Holly facility, which will increase the emissions of volatile organic compounds (VOCs) and thus the need to increase the Plant-wide Applicability Limit (PAL) for the facility.

The Riverbend Township of Gaston County, where this facility is located, was previously classified as marginal nonattainment for the 2008 8-hour ozone National Ambient Air Quality Standard (NAAQS). On April 16, 2015, the NC DAQ submitted a request to re-designate the entire Charlotte-Rock Hill area from nonattainment to attainment for the referenced NAAQS. On May 21, 2015, the EPA published a proposal in the Federal Register to re-designate the area to attainment (See Section "VII. Additional Impact Analysis, D. Air Quality Monitoring Requirements" of this review, below). The area was re-designated to attainment on July 28, 2015.

II. Existing Facility Description

The "Spray coating and assembly operations (ES-SCAO)" are currently permitted as follows:
Thirty-eight (38) paint spray booths (ES-PSB-1 through ES-PSB-38);
Twenty-three (23) paint drying ovens (ES-PDO-1 through ES-PDO-23);
Eight (8) flash off booths (ES-FO-1 through ES-FO-8);
One (1)wax booth (ES-WB-1);
Four (4) Sanding booths (ES-SB-1 through ES-SB-4);
One (1) ECoat operations (ES-ECoat), consisting of the following equipment:

- Two (2) 12,000 gallon RO Storage tanks;
- Two (2) 12,000 gallon RO rinse tanks;
- One (1) 22,000 gallon E-coat tank;
- Two (2) 11,000 gallon E-coat transfer tanks;
- One (1) 12,000 gallon permeate waste transfer tank and
- One (1) 6,000 gallon fresh resin storage tank;

Various operations including gluing, caulking, seamseal, solvent wipe, cleanup solvent and other non-coating sources of VOC (ES-1); and
Two (2) Paint mix room/storage areas (ES-PMR1 &2)

Other sources include:
Two 33.6 MMBtu/hr (each) natural gas/propane/No. 2 fuel oil fired boilers (ES-BLR-02 and ES-BLR-05);
One 5.5 MMBtu/hr natural gas fired boiler (ES-ECoat-Boiler);
One (1) Cab pretreatment line consisting of: spray pre-clean/degrease, immersion pre-clean/degrease, spray rinse, immersion rinse, immersion chrome treat, spray rinse, immersion DI rinse with recirculated DI water, spray DI rinse with fresh DI water (ES-EC-3A);

Welding operations consisting of:
- Axle welding with in-line duct filters (ES-WE-1);
- 5th wheel welding with in-line duct filters (ES-WE-2);
- FL-90 welding with in-line duct filters (ES-WE-3);
- Pool 35 welding with in-line duct filters (ES-WE-4);
- Fuel tank welding with in-line duct filters (ES-WE-5) and
- Laser welding with in-line duct filters (ES-WE-6)

Three (3) Emergency fire pumps with diesel fired engines with ratings of 182, 240, and 240 hp, respectively (ES-FP1 through ES-FP3);
One (1) 131.4 hp Natural gas fired emergency generator (IES-Gen);
Various insignificant activities, including:
- One (1) 10,000 gallon antifreeze tank (IES-1);
- Two (2) 10,000 gallon diesel fuel tanks (IES-2 & 3);
- Three (3) 10,000 gallon purge solvent tanks (IES-4 through 6);
- Miscellaneous combustion sources (IES-7);
- One (1) distillation unit with exhaust (IES-8);
- Two (2) propane vaporizers (1.440 MMBtu/hr and 0.833 MMBtu/hr maximum heat input each) (IES-9);
- Four (4) cooling towers (IES-10);
- Multiple parts washers (IES-11);
- Two (2) dynamometers for truck diagnostics testing (IES-12);
- Truck tail pipe exhaust for truck diagnostics testing (IES-13) and
- One (1) 10,000 gallon antifreeze tank (IES-14).

Proposed Modified Operations

The facility is planning a significant increase in truck production combined with other changes in the finishes. These changes will result in a VOC emissions increase above the PAL limit, which will trigger PSD review for emissions from the spray coating and assembly operations.

The original listing of booths and ovens in the spray coating and assembly operations (ES-SCAO) was developed during the PSD permit application in 2001. As part of this application, Daimler has reviewed all the currently operating sources and developed an updated listing of sources for this new PSD permit application. The requested listing of sources for the inclusion in the updated permit is as follows:

Spray Coating and Assembly Operation (ES-SCAO)
Fifteen (15) paint spray booths (ES-PSB-1 through ES-PSB-15);
Five (5) paint drying ovens (ES-PDO-1 through ES-PDO-5);
One (1) flash off area (ES-FO-1);
Three (3) sanding booths (ES-SB-1 through ES-SB-3);
One (1) ECoat operations (ES-ECoat), consisting of the following equipment:
- Two (2) 12,000 gallon RO Storage tanks;
- Two (2) 12,000 gallon RO rinse tanks;
- One (1) 22,000 gallon E-coat tank;
- Two (2) 11,000 gallon E-coat transfer tanks;
- One (1) 12,000 gallon permeate waste transfer tank and
- One (1) 6,000 gallon fresh resin storage tank;

Various operations including gluing, caulking, seamseal, solvent wipe, cleanup solvent and other non-coating sources of VOC (ES-1);
One (1) paint mix room/storage area (ES-PMR1) and
One (1) paint mix room/storage area (ES-PMR2)

The facility is also requesting to remove the following sources:
Axle welding with in-line duct filters (ES-WE-1);
FL-90 welding with in-line duct filters (ID No. ES-WE-3);
pool 35 welding with in-line duct filters (ID No. ES-WE-4) and
laser welding with in-line duct filters (ID No. ES-WE-6)

No other equipment will be added or modified.

The facility is also requesting that following sources be moved to the Insignificant Activities list since the potential emissions are less than 5 TPY and HAP emissions are less than 1,000 pounds per year from each of the sources below:

- Emergency fire pumps with diesel fired engines with ratings of 182, 240 and 240 hp, respectively. (ID Nos. ESFP1 through ESFP3 and currently subject to MACT, Subpart ZZZZ, will be listed as ID Nos. IESFP1 through IESFP3);
- Natural gas fired emergency generator (131.4 hp) (ID No. ES-GEN subject to MACT, Subpart ZZZZ and NSPS Subpart JJJJ will be listed as ID No. IES-GEN) and
- One Cab Pretreatment Line (ID No. ES-EC-3A subject to MACTs Subpart MMMM and PPPP (RACT compliance) will be listed as ID No. IES-EC-3A)

This Cab Pretreatment Line (ID No. ES-EC-3A) no longer uses chromic acid, there are no exhaust vents on the pretreatment line, and therefore no emissions from the pretreatment area. Even though there are no emissions from the pretreatment line, it is still added to the insignificant list as it is a key component of truck manufacturing that occurs prior to cab painting.

III. Purpose of Application No. 3600153.15B

Due to an increase in demand for heavy duty trucks and an increase in customer requests for certain types of finishes on their trucks, the facility plans to increase production by up to 60,000 trucks per year (12-month rolling average, manufacturing 200 trucks/day and 300 days per year).

This increase in production will cause an increase of the emissions of volatile organic compounds (VOCs). Therefore, the purpose of this application (.15B) is to establish a VOC BACT limit for the increase in truck production.

The facility does not propose any changes to the NO_x emissions or the CO_{2e} emissions in this application.

The initial application was a PSD/PAL application with a requested BACT limit and a PAL limit. This new PAL limit will contravene with the existing PAL limit in the permit. Thus, the original application (3600153.15B) could only have been processed as a Significant 2Q .0501(d) modification (one step) with a 30-day public notice and 45 day EPA review.

In a letter dated 10/18/2016 the applicant requested that this modification to increase the VOC PAL be split into two separate applications (3600153.15B and .16A). This will be done as follows:

1) Application (3600153.15B) will be processed as a PSD application (15A NCAC 2Q .0501(d)(1), satisfying the permitting requirements in 15A NCAC 2D .0530, “Prevention of Significant Deterioration,” with a 30-day public notice and a 30-day of EPA review period).

2) Application (3600153.16A) will be processed as a PSD/PAL 15A NCAC 2Q .0501(d)(2) significant modification (with a 30-day public notice and a 45-day of EPA review period). The PAL limit for VOC emissions will be adjusted during this period.

Therefore, the purpose of this application (.15B) is to establish a VOC BACT limit for the increase in truck production.

IV. Regulatory Summary for the proposed modification:

Due to increased production, most of the sources at the facility will be affected. The following regulatory discussion pertains to the Federal and State regulatory requirements that are applicable to the majority of the sources.

<u>MACT / RACT Sources</u>:

The facility is major for HAP emissions and is therefore considered a major source with respect to the National Emission Standards for Hazardous Air Pollutant (NESHAP) regulations. This application will not change the applicability and compliance of any Maximum Achievable Control Technologies (MACTs) listed below including the modified spray coating and assembly operations.

- 15A NCAC 2D .1111, MACT Subpart MMMM “Surface Coating of Miscellaneous Metal Parts and Products”

  All spray coating and assembly operations (ES-SCAO) sources, the pretreatment line (ES-EC-3A), and the E-Coat operations (ES-ECoat) are subject to requirements under NESHAP Subpart MMMM. These sources will remain in compliance with the rule and current permit requirements. As per Section 2.2 D. 2. c., of the current permit, compliance of this rule is demonstrated by complying with MACT Subpart PPPP “National Emission Standards for Hazardous Air Pollutants for Surface Coating of Plastic Parts and Products.”

  Compliance with MACT Subpart MMMM is also considered alternative controls for compliance with “reasonable available control technology” (RACT) (15A NCAC 02D .0952) for this facility (Section 2.2 B. 1., of the current permit).

- 15A NCAC 2D .1111, MACT Subpart PPPP “Surface Coating of Plastic Parts and Products”

  All spray coating and assembly operations (ES-SCAO) sources, the pretreatment line (ES-EC-3A), and the E-Coat operations (ES-ECoat) are subject to this rule. The increase in production does not change or affect the applicability, emission limits, compliance options, operating limits or work practice standards and notification requirements for this regulation.

Compliance with MACT Subpart PPPP is also considered alternative controls for compliance with "reasonable available control technology" (RACT) (15A NCAC 02D .0952) for this facility (Section 2.2 B. 1., of the current permit).

- 15A NCAC 2D .0952 - Petition for Alternative Controls for RACT for 15A NCAC 2D .0967 Miscellaneous Metal and Plastic Parts Coatings

  The Spray Coating and Assembly Operations, the E-Coat operations and various operations including gluing, caulking, seamseal, solvent wipe, cleanup solvent and other non-coating sources of VOC are all subject to this rule.

  For ozone nonattainment areas, Section 172 of the Federal Clean Air Act requires RACT to be installed on facilities that have the potential to emit 100 TPY or more of VOC or NO_X (major sources). The Mt. Holly facility has the potential to emit more than 100 TPY of VOC and was once located in a nonattainment area at the time of regulation applicability. The facility submitted an application in October 2007 requesting that compliance with NESHAP Subparts MMMM and PPPP MACT standards be considered RACT for 15A NCAC 2D .0934. This determination was approved by NC DAQ stating that the Mt. Holly facility has "installed and operates reasonable available control technology as the MACT Subpart MMMM and PPPP meets the requirements of RACT". The appropriate requirements were incorporated into the permit.

  Final compliance was demonstrated for the existing source RACT before April 1, 2009. Continued compliance with MACT Subparts MMMM and PPPP by all of these sources in ES-SCAO (listed in Section 2.1) constitutes compliance with RACT. DAQ has since repealed 2D .0934 and replaced it with 2D .0967. Per correspondence with DAQ in June 2015, it was decided that 2D .0967 is now the applicable rule and that Daimler can still comply with the rule by complying with NESHAP Subparts MMMM and PPPP (Section 2.2 B. 1., of the current permit).

  Gaston County currently is in an ozone attainment area, however, rule 2D .0967 "Miscellaneous Metal and Plastic Parts Coatings," remains in effect and the increase in production does not change or affect the applicability, monitoring, record keeping and reporting requirements for his rule.

- 15A NCAC 2D .1111, MACT Subpart ZZZZ "Stationary Reciprocating Internal Combustion Engines (RICE) MACT"

  This MACT establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

  This standard was first promulgated on June 15, 2004 and only regulated existing and new stationary RICE at major sources of HAP with a site rating of more than 500 brake horsepower

(HP) and finalized this rule on February 17, 2010. As per the rule a stationary RICE is "existing" if it commenced construction or reconstruction before June 12, 2006. This facility has the following existing emergency units at the site:

- Three emergency fire pumps with diesel fired engines with ratings of 182, 240 and 240 hp, respectively and
- One natural gas fired emergency generator (131.4 hp)

The emergency fire pumps are considered existing sources and the emergency generator is a new source. The increase in production does not change or affect the applicability or any other requirements of this regulation for these sources.

<u>Comply with MACT ZZZZ by complying with NSPS JJJJ</u>

40 CFR § 63.6590(c) requires certain stationary RICE sources to comply with MACT Subpart ZZZZ, by complying with NSPS subpart JJJJ for spark ignition engines. As per 40 CFR § 63.6590(c)(3) this requirement is for new RICE with a site rating of less than 250 brake HP located at a major source of HAP emissions. The natural gas-fired emergency generator rated at 98 kw or 131.4 hp (ID No. ES-GEN) fits this definition. Thus, the new generator will comply with MACT Subpart ZZZZ, by complying with NSPS subpart JJJJ. No further requirements shall apply to this engine under Part 63.

- 15A NCAC 2D .1109: CAA § 112(j); Case-by-Case MACT for Boilers & Process Heaters

The EPA issued a new final Boiler NESHAP rule in the Federal Register on January 31, 2013. 40 CFR § 63, Subpart DDDDD applies to industrial, commercial, and institutional boilers and process heaters located at a major source of HAP emissions. This facility submitted a request to obtain a 112(j) permit in September 2009 for the current boilers at the site; ES-BLR-02, ES-BLR-05, and ES-ECoat-Boiler and in accordance with the current permit, the units are subject to 112(j) and must meet best combustion practices.

The current 112(j) requirements expire on May 19, 2019. The boilers must comply with the final Subpart DDDDD requirements on May 20, 2019.

- 15A NCAC 2D .0524: NSPS 40 CFR 60, Subpart Dc

40 CFR § 60, Subpart Dc is applicable to units that began construction, modification, or reconstruction after June 9, 1989 and has a maximum design heat input capacity between 10 and 100 MMBtu/hr. The boilers (ID Nos. ES-BLR-02 and ES-BLR-05) are subject to this regulation and have demonstrated compliance.

The increase in production does not affect the emission limits, testing, monitoring, record keeping and reporting requirements of this regulation.

- 15A NCAC 2D .0524: New Source Performance Standards [40 CFR 60 Subpart JJJJ]

40 CFR § 60 Subpart JJJJ regulates owners and operators of stationary spark ignition (SI) internal combustion engines (ICE) that were ordered after June 12, 2006, are for emergency use, with a maximum engine power greater than 19 kW (25 hp) that were manufactured on or after January 1, 2009.

The emergency generator (ID No. IES-GEN) has an engine power of 98 kW (131.4 hp), and is a recently manufactured engine. This insignificant source emergency generator is subject to this regulation and meets all the applicable requirements of this regulation.

- 15A NCAC 2D .0503: "Particulates from fuel Burning Indirect Heat Exchangers"

As per this rule the allowable emissions of particulate matter shall be calculated by the equation below:

$E = 1.090 * Q^{-0.2594}$

Where
E = allowable emission limit for particulate matter in lb/million Btu.
Q = maximum heat input in million Btu/hour.

For the purposes of this rule, the maximum heat input shall be the total heat content of all fuels which are burned in a fuel burning indirect heat exchanger, of which the combustion products are emitted through a stack or stacks.

As per the above equation the boilers (ID Nos. ES-BLR-02 and ES-BLR-05) are subject to an emissions limit of 0.336 and boiler (ID No. ES-ECoat-Boiler) to 0.36 pounds of particulate matter per million Btu heat input, respectively.

The increase in production does not affect the emission limits, testing, monitoring, record keeping and reporting requirements of this regulation.

<u>MACT / RACT Sources</u>:

The facility is major for HAP emissions.

<u>Other Sources of VOC</u>

<u>Storage Tanks and Parts Washers</u>

All storage tanks and parts washers at this facility are insignificant sources of VOC and subject to VOC work practice standards.

- 15A NCAC 2D .0958: "Work Practices for Sources of Volatile Organic Compounds"

This regulation establishes work practice standards in paragraphs (c) and (d) of the rule for a variety of sources of VOC at the site. The facility will continue to ensure that the various emissions sources that are subject will comply with this VOC work practice standard.

Effective November 1, 2016, 15A NCAC 02D .0958 will no longer apply statewide. It remains applicable in the former nonattainment areas.

This facility is currently subject to RACT (See discussion on "MACT / RACT Sources," above). Thus, this regulation is not being removed.

Engines

The following engines are insignificant sources subject to the SIP regulations as well as NESHAP and NSPS standards.

1) Emergency fire pumps with diesel fired engines with ratings of 182, 240 and 240 hp, respectively (ID Nos. IESFP1 through IESFP3) and
2) Natural gas fired emergency generator (131.4 hp, ID No. IES-GEN)

- 15A NCAC 2D .0516: "Sulfur Dioxide Emissions from Combustion Sources

  Under this regulation, emissions of sulfur dioxide from combustion sources shall not exceed 2.3 pounds of sulfur dioxide per million Btu input. Compliance is achieved by firing natural gas and No. 2 oil in these sources.

- 15A NCAC 2D .0521 - Control of Visible Emissions

  Under this regulation, for sources manufactured after July 1, 1971, visible emissions shall not be more than 20 percent opacity when averaged over a six-minute period. Sources subject to this rule have demonstrated continuous compliance with this rule and with this project continued compliance is expected.

- 15A NCAC 2D .1111, MACT Subpart ZZZZ "Stationary Reciprocating Internal Combustion Engines (RICE) MACT"

  See discussion above for this regulation discussed under "MACT / RACT Sources," above.

- NSPS Subpart JJJJ: "Standards of Performance for Stationary Spark Ignition Internal Combustion Engines."

  The natural gas fired emergency generator (ID No. ES-GEN) is subject to this rule and will comply with emission limits, compliance requirements, monitoring requirements, record keeping requirements and reporting requirements of this rule.

Air Handling Units and Dynamometers

The air handling units and dynamometers at this facility are insignificant sources and emit VOC, but are not subject to any VOC regulations. However, they are subject to the SIP regulations listed below.

- 15A NCAC 02D .0515: Particulates from Miscellaneous Industrial Processes

There are emissions of particulate matter from the above sources. This regulation limits the particulate emissions from the above sources. There will be no change to the particulate emissions from the air handling units as a result of the proposed modification in this application.

- 15A NCAC 2D .0521 - Control of Visible Emissions

  Under this regulation, for sources manufactured after July 1, 1971, are subject to a 20 percent opacity emissions. Continued compliance is expected.

Propane Vaporizers

The propane vaporizers are insignificant sources and emit VOC, but are not subject to any VOC regulations. The SIP regulations they are subject to are listed below.

- 15A NCAC 2D .0516: “Sulfur Dioxide Emissions from Combustion Sources
- 15A NCAC 2D .0521 - Control of Visible Emissions

  Propane is a clean gas and the propane vaporizers are expected to be in compliance with the above regulation due to low emissions of any pollutants.

Pretreatment Line (ES-EC-3A)

There are no emissions from the pretreatment line (ES-EC-3A); thus there are no applicable requirements.

PM Sources

The welding operations (ES-WE-1 through ES-WE-6) and cooling towers (IES-10, Insignificant source) are sources with the potential to emit particulate matter. There are no VOCs emitted from these sources. They are subject to the following regulations:

- 15A NCAC 2D .0515: “Particulates from Miscellaneous Industrial Processes”

  This regulation specifies that the allowable emission rates for particulate matter from any stack, vent, or outlet, resulting from any industrial process for which no other emission control standards are applicable. As per this regulation the allowable emission rates for particulate matter from this source is as per the equation below:

  For process rates less than or equal to 30 tons per hour:
  $E = 4.10(P)^{0.67}$
  and for process rates greater than 30 tons per hour:
  $E = 55.0x(P)^{0.11} – 40$

  Where
  E = equals the maximum allowable emission rate for particulate matter in pounds per hour
  P = the process rate in tons per hour.

The particulate matter emissions from the welding operations and cooling towers are very small and the sources will always be in compliance.

- 15A NCAC 02D .0521 “Control of Visible Emissions”

  Continued compliance is expected from these sources.

Facility Wide Limits

- 15A NCAC 2D .0530: “Prevention of Significant Deterioration”

  Section 2.2 A. 1. a. of the current permit requires that in order to avoid the applicability of PSD, the facility wide emissions of SO_2 from all combustion sources including insignificant activities shall be less than 40 tons per consecutive 12-month period.

  This requirement was implemented as part of the PSD application in 2001. The sulfur content of fuel has dropped several orders of magnitude since 2001. Based on a 0.05% sulfur content (by weight) in fuel oil on the market, the maximum emissions from the entire facility is expected to be less than 1.0 tpy of SO_2 emissions. Thus, this requirement is removed from the permit.

State-Only Regulations Applicability

- 15A NCAC 2D .1100: “Control of Toxic Air Pollutants”

  The facility is subject to multiple NESHAP standards (40 CFR 63 Subparts PPPP, MMMM, ZZZZ, and DDDDD) and Daimler previously submitted a request for the removal of air toxics from the permit, as part of the most recent permit renewal. This request was approved and the permit that removed air toxics was issued on September 9, 2014.

  In the November 2012 renewal application, the facility compared the actual TAPs (toxics air pollutants) emissions from 2005 and 2006 (highest production years) to the current NC Air toxic limits in the permit and demonstrated that all TAPs emissions were less than the acceptable ambient level (AAL) standards.

  To determine the air toxics as a result of the anticipated production increase as listed in this application, the facility developed this same comparison and compared the highest production years (2005/2006) to the new potential production rate. The increase in actual truck production from 2005/2006 to the potential truck production in this application is a ratio of 2.0. To determine the air toxics as a result of the anticipated production, the actual emission rates from 2006 (highest production year) were multiplied by 2.0 and the results were compared to the previously modeled emission rates. Based on these updated numbers all pollutants are less than 20% of the standard.

  The potential facility-wide emissions of TAPs will remain below the previously permitted limits following the proposed project. The project will not cause an unacceptable risk to human health and continue to comply with House Bill 952.

- 15A NCAC 2D .0530: “Prevention of Significant Deterioration”

Congress first established the New Source Review (NSR) program as part of the 1977 Clean Air Act Amendments and modified the program in the 1990 Amendments. The NSR program requires pre-construction review prior to obtaining a permit. The basic goal of NSR is to ensure that the air quality in clean (i.e. attainment) areas does not significantly deteriorate while maintaining a margin for future industrial growth. The NSR regulations focus on industrial facilities, both new and modified, that create large increases in the emission of certain pollutants. PSD permits are a type of NSR permitting requirement for new major sources or sources making a major modification in an attainment area.

Pursuant to the Federal Register notice on February 23, 1982, North Carolina (NC) has full authority from the EPA to implement the PSD regulations in the State effective May 25, 1982. NC's State Implementation Plan (SIP) approved PSD regulations have been codified in 15A NCAC 2D .0530, which implement the requirements of 40 CFR 51.166. The Code of Federal Regulations (CFR) in 15A NCAC 2D .0530 are incorporated by reference unless a specific reference states otherwise.

The version of the CFR incorporated in 15A NCAC 2D .0530 is that of November 7, 2003, except those provisions noticed as stayed in 69 FR 40274, and does not include any subsequent amendments or editions to the referenced material. The PSD regulations applicable to this project are the regulations in 15A NCAC 2D .0530 in effect as of the final permit issuance date. The latest revisions to 15A NCAC 2D .0530 became effective on July 28, 2006.

Under PSD requirements, all major new or modified stationary sources of air pollutants as defined in Section 169 of the Federal Clean Air Act (CAA) must be reviewed and permitted prior to construction by the permitting authority, as applicable, in accordance with Section 165 of CAA. A "major stationary source" is defined as any one of 28 named source categories, which emits or has a potential to emit 100 tons per year of any regulated pollutant, or any other stationary source, which emits or has the potential to emit 250 tons per year of any PSD regulated pollutant.

The facility operates under the standard industrial classification (SIC) code 3711 which applies to “Motor Vehicles and Passenger Car Bodies” This industry classification is comprised of establishments primarily engaged in the manufacturing or assembly of complete automobiles, trucks, commercial vehicles, and buses, as well as specialty motor vehicles intended for highway use such as ambulances, armored cars, hearses, fire department vehicles, snow plows, and tow trucks.

The Motor Vehicles and Passenger Car Bodies industry (SIC Code 3711) is not one of the 28 named source categories. However, this Daimler facility has the potential to emit greater than 250 tpy of a PSD-regulated pollutant, and is therefore an existing PSD major stationary source as defined in 40 CFR 51.166(b)(1)(i)(b). For existing major stationary sources, there are several steps to determine whether the modification is a *major modification* and therefore subject to PSD pre-construction review. The first step is to determine whether there is a physical change or change in the method of operation. Second, there must be an emissions increase. The third, the net emissions increase must be equal to or greater than certain "significance levels" as listed in 40 CFR 51.166(b)(23)(i) for the regulated pollutants.

VOC Emissions

The potential VOC emissions from the spray coating and assembly operations for this proposed expansion in production was calculated using an estimate of the VOC emissions per truck, the forecasted number of trucks produced each day, and the number of operating days per year, as shown in the following equation:

$$\text{Potential Spray Coating VOC Emissions (lb/yr)} = \frac{\text{lb VOC}}{\text{truck}} \times \frac{\text{trucks produced}}{\text{day}} \times \frac{\text{operating days}}{\text{year}}$$

The input to the above equation is as follows:

- the spray coating of a truck will emit 25 lb of VOC,
- potential truck production will reach 200 trucks per day,
- 300 operating days per year and
- 60,000 trucks manufactured per 12-month period.
- total annual emissions equal to 750 tpy of VOCs.

For PSD purposes 40 CFR §51.166(b)(4) defines "*Potential to emit" as "*the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or ***operational limitation on the capacity of the source to emit a pollutant***, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. Secondary emissions do not count in determining the potential to emit of a stationary source."

The VOC emissions per truck were determined by using historical monthly tracking data that the facility uses to comply with the conditions of the current permit. The monthly usages of materials consumed are tracked and the amount collected in waste drums is subtracted. This assumes that the difference in material is either applied as paint or lost as emissions.

The facility tracks the usage per truck on a monthly average basis. Therefore, some trucks have a higher VOC emissions per truck than other trucks. Historically, the plant has operated as high as 25 lb VOC per truck on a monthly basis. Currently, the facility is producing trucks with an average VOC content of 15 lb VOCs/truck.

The Daimler Cleveland, NC facility is currently operating on an average of 25 lbs VOC/truck and the Daimler Western Star Plant in Portland, in Oregon is operating at 35 lbs VOC/truck because it finishes and paints a wider variety of trucks with glossier finishes. Daimler Trucks North America (DTNA) seeks the flexibility to produce all types/series of trucks in all locations in the event of a shutdown at any one of their facilities.

This 25 lbs of VOC/truck is the highest 12-month average in the last two years of data and accounts for additional finishes that are planned to be used on the coating line, but also to account for larger trucks which use additional paints and finishes.

PM Emissions

Particulate matter emissions from the spray coating and assembly operations are from spray painting, cab sanding, and hood sanding.

Spray Painting

Potential PM emissions from spray painting were calculated using an estimate of total annual paint applied (as solids), the transfer efficiency of the spraying method used, and the collection efficiency of the spray booths (filter or water wash), as shown in the following equation:

$$\text{Potential Spray Painting PM emissions (lb/yr)} = \text{Total Solids Applied (lb/yr)} \times (1 - \text{Transfer Efficiency}) \times (1 - \text{Collection Efficiency})$$

The annual paint applied was estimated by scaling actual usages from 2013 based on production to the potential production levels that the expansion will reach. The transfer efficiency depends on the type of paint booth. All manually operated paint booths employ high volume low pressure (HVLP) spray guns, which, have a transfer efficiency of 40%. Paint booths with robots operate with a transfer efficiency of 60%. The collection efficiency of the spray booths is assumed to be 99% (all the efficiency percentages are based on industry knowledge).

Cab and Hood Sanding

Potential particulate matter emissions from cab and hood were calculated using emission rates developed in a study on paint panels from the facility. The worst-case emission rate for the paint and associated material was used for both primer and topcoat sanding for cabs and hoods.

Emissions were based on the emission rate, number of sanders used, potential hours sanded per year, and the collection efficiency of the sanding booth filter, according to the following equation:

$$\text{Potential Hood Sanding PM emissions} = \text{Emission rate} \times \text{Annual Hours of Operation} \times \text{Number of Sanders} \times (1 - \text{Collection Efficiency})$$

Potential hours of operation was based on 8,760 hours per year, the number of sanders for both primer and topcoat operations were estimated to be a maximum of 4, and the collection efficiency of the sanding booth filter assumed to be 99%.

Emissions from other sources

Combustion sources include boilers, paint drying ovens, air makeup units, and other miscellaneous sources. These sources use natural gas as a fuel and emissions were calculated using AP-42 emission factors including emissions from the diesel fire pumps. To meet the NO_x PAL limit the potential NO_x from the boilers is 7.7 TPY. This was used to ratio the other pollutants. This also limits the amount of NO_2 fuel oil used in boilers ES-BLR-02 and ES-BLR-05 to 240,000 gallons per year.

Emissions from welding operations were based on emission factors provided by engineering estimation. Data from 2013 usage of various wires and rods used for welding were multiplied by the appropriate factor and emissions were scaled for potential production.

Emissions from storage tanks were calculated using data from 2013 in the TANKS program and scaled for potential future production levels.

Emissions from the dynamometers at the facility were calculated based on a potential rate of 200 trucks/day through the dynamometers. Emissions from the parts washers are calculated based on the potential usage of each material.

When previously permitted, the pretreatment line used chromium and had particulate matter and toxic emissions. The process has been changed to use non-chromium and non-VOC additives. There were no emissions from the pretreatment line.

The table below shows the emissions from affected sources
(all emissions are in tons per year)

Source	VOC	$PM_{10}/PM_{2.5}$	SO_2	NO_x	CO
ES-SCAO	750	9.66	0	0	0
ES-BLR-02 and ES-BLR-05	1.06	0.87	0.06	7.65	8.08
ES-Ecoat-Boiler	0.13	0.18	0.01	2.35	1.97
Other Combustion Sources	2.11	2.91	0.23	38.28	32.15
ES-WO	0	0.008	0	0	0
ES-FP1 through ES-FP3	0.4	0.36	0.34	5.13	1.11
ES-GEN	0.01	0.003	0.002	0.78	1.33
Storage Tanks	0.34	0	0	0	0
Propane Vaporizer	0.11	0.08	0.0	1.45	0.83
Cooling Towers	0	0.05	0	0	0
Parts Washer	0.4	0	0	0	0
Dynamometers	0.12	0	0	0	5.0
Total Emissions	754.71	14.12	0.64	56.4	50.53

The table below shows the potential emissions in tons per year (TPY) from the facility based on the emissions of 750 tpy of VOC from the spray coating and assembly operations (ES-SCAO)
(all emissions are in tons per year)

Pollutant	Potential Emissions (TPY)	Significant Emissions Rates (SER)(TPY)	PSD Triggered	PSD Applicability Explanation
CO	50.53	100	N	
NO_x	56.4	40	N	Potential emissions are equal to the PAL limit of 56.4 tpy (Section 2.3 B. a., of the current permit). Thus, PSD is not triggered.
SO_2	0.64	40	N	

Pollutant	Potential Emissions (TPY)	Significant Emissions Rates (SER)(TPY)	PSD Triggered	PSD Applicability Explanation
Particulate matter	14.2	25	N	
PM_{10}	14.12	15	N	See Potential Emissions Increase analysis.
$PM_{2.5}$	**14.12**	10	Yes prior to subtracting baseline emissions	See Potential Emissions Increase analysis, Section IV, Page 17.
VOC	754.71 (including potential emissions of *750 from the “Spray coating and assembly operations (ES-SCAO)	40	Y	Also exceed the PAL limit of 316.9 tons per year of VOC. (Section 2.3 A. a., of the current permit)
Pb	0.00	0.6	N	
CO_{2e}	66,973	75,000	N	Potential emissions are less than PAL limit of 93,463 tpy (Section 2.3 C. a., of the current permit)

*Application (3600153.16A) will be processed as a PSD/PAL significant modification and will incorporate the PAL limit of 750 tpy of VOCs from the “Spray coating and assembly operations (ES-SCAO). This operational limitation justifies to term these emissions as potential emissions.

PSD is not being triggered in this permit because of the increase in VOCs. The PAL limit remains at the current level in the permit (316.9 tpy VOCs). PSD is triggered because of the re-evaluation of the BACT limit for the VOC sources in ES-SCAO.

<u>Existing Baseline, Actual Emissions and Potential Emissions</u>

The facility is requesting an increase in VOC emissions. Based on the VOC emissions from the past 10 years, the highest VOC emissions occurred from January 2006 to December 2007. Thus, this 24-month period was selected for determining baseline actual emissions. The baseline actual emissions for sources other than the spray coating and assembly operations for the two-year period, as defined by the rule, were 0.5 TPY. There were no emission source shutdowns or newly constructed emission sources from which emissions would have to be quantified or calculated. The potential VOC emissions for the spray coating and assembly operations for this project is 750 TPY.

The potential emissions from the dynamometers (a new source) is 0.1 tons per year. In order to provide flexibility and to avoid conducting dynamometer calculations on a monthly basis, the facility requested to use a default of 0.1 tons per year for VOCs from the dynamometers (or 0.01 tons per month for dynamometers).

As per the table above the post-modification potential emissions for $PM_{2.5}$ from existing sources are greater than the SER. The facility is not proposing to add any new emission sources as part of this application. The facility has been operating the same equipment for the past 10 years. As such, to prove PSD is not triggered for $PM_{2.5}$, the facility has elected to perform a PSD project analysis.

Net emissions increase as defined by 40 CFR § 51.166(b)(3)(i) "the amount by which the sum of the following exceeds zero… The increase in emissions from a particular physical change or change in the method of operation at a stationary source…and...Any other increases and decreases in actual emissions at the major stationary source that are contemporaneous with the particular change and are otherwise creditable...".

The baseline actual emissions for this project for $PM_{2.5}$ emissions have been developed on a facility-wide basis to provide an equivalent comparison of pre-project baseline actual emissions to the post-project potential emissions. While the federal rules allow a ten year look-back to establish baseline actual emissions, the NC DAQ rules listed within 15A NCAC 2D .0530 allow a five year look-back to calculate baseline actual emissions.

The facility used 2013 and 2014 to develop baseline actual emissions for the site. The emissions calculations are as specified in the table below:

Potential Emissions Increase Analysis Table

Pollutants	Baseline Actual Emissions (2 year average actuals for 2013/2014)	Potential Emissions Increase from existing sources (TPY)	Net Increase = Potential Emissions Increase - Baseline Emissions (TPY)	Significant Emissions Rates (TPY)	PSD Triggered
$PM_{2.5}$	4.8	14.12	9.32	10	N

As per the $PM_{2.5}$ emissions analysis PSD is not triggered for this project.

V. Best Available Control Technology (BACT)

The spray coating and assembly operations (ES-SCAO) consist of the following sources as mentioned below:

Spray Coating and Assembly Operation (ES-SCAO)
Fifteen (15) paint spray booths (ES-PSB-1 through ES-PSB-15);
Five (5) paint drying ovens (ES-PDO-1 through ES-PDO-5);
One (1) flash off area (ES-FO-1);
Three (3) sanding booths (ES-SB-1 through ES-SB-3);
One (1) ECoat operations (ES-ECoat), consisting of the following equipment:
- Two (2) 12,000 gallon RO Storage tanks;
- Two (2) 12,000 gallon RO rinse tanks;
- One (1) 22,000 gallon E-coat tank;
- Two (2) 11,000 gallon E-coat transfer tanks;
- One (1) 12,000 gallon permeate waste transfer tank and
- One (1) 6,000 gallon fresh resin storage tank;

Various operations including gluing, caulking, seamseal, solvent wipe, cleanup solvent and other non-coating sources of VOC (ES-1);
One (1) paint mix room/storage area (ES-PMR1) and
One (1) paint mix room/storage area (ES-PMR2)

The BACT analysis was focused on developing a BACT for the entire spray coating and assembly operations.

Under PSD regulations, the basic control technology requirement is the evaluation and application of BACT. 40 CFR 51.166(b)(12) defines BACT as "an emissions limitation (including a visible emissions standard) based on the maximum degree of reduction for each regulated NSR pollutant which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combination techniques for control of such pollutant." In no event shall application of best available control technology result in emissions of any pollutant which would ***exceed the emissions allowed by any applicable standards***..

BACT's technology determination must include a consideration of numerous factors. The procedure upon which a decision should be made is not prescribed by Congress under the Clean Air Act. This void in procedure has been filled by what several guidance documents issued by the federal EPA. The only final guidance available is the October 1980 "Prevention of Significant Deterioration – Workshop Manual." As the EPA states on page II-B-1, "A BACT determination is dependent on the specific nature of the factors for that particular case. The depth of a BACT analysis should be based on the quantity and type of pollutants emitted and the degree of expected air quality impacts."

As per EPA "*The case-by-case analysis is far more complex than merely pointing to a lower emissions limit or higher control efficiency elsewhere in a permit or a permit application. The BACT determination must take into account all of the factors affecting the facility …. The BACT analysis, therefore, involves judgment and balancing.*[1]"

The BACT requirements are intended to ensure that the control systems incorporated in the design of the proposed modification reflect the latest control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the facility. Given the variation between emission sources, facility configuration, local air-sheds, and other case-by-case considerations, Congress determined that it was impossible to establish a single BACT determination for a particular pollutant or source. Economics, energy, and environmental impact are mandated in the CAA to be considered in the determination of case-by-case BACT for specific emission sources.

The EPA has issued additional DRAFT guidance suggesting the use of what they refer to as a "top-down" BACT determination method. The EPA Environmental Appeals Board recognizes the "top-down" approach for delegated state agencies,[2] however this procedure has never undergone rulemaking, and as such, the "top-down" process is not binding on fully approved states, including North Carolina.[3] The Division prefers to follow closely the statutory language when making a BACT determination and therefore bases the determination on an evaluation of the statutory factors contained in the definition of BACT in the Clean Air Act. As stated in the legislative history and in EPA's final October 1980 PSD Workshop Manual, each case is different and the state must decide how to weigh each of the various BACT factors.

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[1] US EPA Responses to Public Comments on the Proposed PSD Permit for Desert Rock Energy Facility, July 31, 2008, p 41-42.

[2] See, http://es.epa.gov/oeca/enforcement/envappeal.html for various PSD appeals board decisions including standard for review.

[3] North Carolina has full authority to implement the PSD program, 40 CFR Sec. 52.1770

North Carolina is concerned that the application of EPA's DRAFT suggested "top-down" process will result in decisions that are inconsistent with the Congressional intent of PSD and BACT.

Therefore, NC DAQ does not strictly adhere to EPA's top-down guidance. Rather NC DAQ implements BACT in strict accordance with the statutory and regulatory language. As such, NC DAQ's BACT conclusions may differ from those of the applicant or U.S. EPA.

Best Available Control Technology may be defined through an emission limitation based on the maximum degree of reduction of each pollutant subject to PSD regulation, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques.

As evidenced by the statutory definition of BACT, this technology determination must include a consideration of numerous factors. The structural and procedural framework upon which a decision should be made is not prescribed by Congress under the Act nor by the EPA through any rule. DAQ makes their BACT determinations based on an evaluation of the statutory factors contained in the definition of BACT in the Clean Air Act. The following are passages from the Legislative History of the Clean Air Act Amendments of 1977 and provide valuable insight for state agencies when making BACT decisions.

> *The decision regarding the actual implementation of best available technology is a key one, and the committee places this responsibility with the State, to be determined on a case-by-case judgement. It is recognized that the phrase has broad flexibility in how it should and can be interpreted, depending on site.*
>
> *In making this key decision on the technology to be used, the State is to take into account energy, environmental, and economic impacts and other costs of the application of best available control technology. The weight to be assigned to such factors is to be determined by the State. Such a flexible approach allows the adoption of improvements in technology to become widespread far more rapidly than would occur with a uniform Federal standard. The only Federal guidelines are the EPA new source performance and hazardous emissions standards, which represent a floor for the State's decision.*
>
> *This directive enables the State to consider the size of the plant, the increment of air quality which will be absorbed by any particular major emitting facility, and such other considerations as anticipated and desired economic growth for the area. This allows the States and local communities to judge how much of the defined increment of significant deterioration will be devoted to any major emitting facility. If, under the design which a major facility proposes, the percentage of increment would effectively prevent growth after the proposed major facility was completed, the State or local community could refuse to permit construction, or limit its size. This is strictly a State and local decision; this legislation provides the parameters for that decision.*
>
> *One of the cornerstones of a policy to keep clean areas clean is to require that new sources use the best available technology available to clean up pollution. One objection which has been raised to requiring the use of the best available pollution control*

technology is that a technology demonstrated to be applicable in one area of the country in not applicable at a new facility in another area because of the differences in feedstock material, plant configuration, or other reasons. <u>For this and other reasons the Committee voted to permit emission limits based on the best available technology on a case-by-case judgement at the State level</u>. [emphasis added]. This flexibility should allow for such differences to be accommodated and still maximize the use of improved technology.

<u>Establishing the BACT Floor</u>

As per the applicant "The least stringent emission rate allowable for BACT is any applicable limit under either New Source Performance Standards (NSPS Part 60) or National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61). While Clean Air Act section 112(b)(6) precludes use of Part 63 NESHAPs from establishing the floor, such standards are considered informative, representing maximum achievable control technology. State SIP limitations must also be considered when determining the floor."

40 CFR §§51.166(b)(12) describes BACT as "Best available control technology means an emissions limitation (including a visible emissions standard) based on the maximum degree of reduction for each a regulated NSR pollutant which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combination techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61. If the reviewing authority determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results."

Based on the above description of the BACT one would argue that this precludes use of Part 63 NESHAPs from establishing the BACT floor. However, §169(3) of the federal Clean Air Act defines BACT as follows: The term "best available control technology" means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of "best available control technology" result in emissions of any pollutant which will exceed the emissions allowed by any applicable standard established pursuant to section 111 or 112 of this Act." In other words, National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61 and 63) should be taken into account when establishing the BACT floor, which also includes all applicable State SIPs limitations when determining the floor (see "Comparison of BACT with MACTs," below).

The BACT requirement applies to each new or modified emission unit from which there are emissions increases of pollutants subject to PSD review. The proposed project is subject to PSD permitting for VOC, and thus, subject to BACT for this pollutant. There are no new sources at the facility.

<u>BACT for VOC Control</u>:

i) *Step 1 – Identify Control Options:*

The first step is to define the spectrum of process and/or add-on control alternatives potentially applicable to the similar emissions units. A review of the RACT/BACT/LAER Clearinghouse and a review of technologies in use at similar sources, and State issued air permits was conducted for similar manufacturing facilities. The RACT/BACT/LAER Clearinghouse search provision was used to search for VOC emissions from:

- Automobiles and Trucks Surface Coating (OEM) (Process Code 41.002);
- Miscellaneous Metal Parts and Products Surface Coating (Process Code 41.013) and
- Plastic Parts & Products Surface Coating (Process Code 41.016),
  from a period from 2005 to current.

Also an EPA publication "Control Techniques Guidelines (CTG) for Miscellaneous Metal and Plastic Parts Coatings[4], was used to compile a list of potentially applicable control technologies to the processes at this facility.

The selection of the application technology can have a significant effect on the amount of coating used and the resulting VOC emissions from the operation. *The 2008 CTG for Miscellaneous Metal and Plastic Parts Coatings was intended to reflect the advances in coating and application technologies*. This CTG recommends that coating operations reduce emissions through one of the following three options:

1) Apply low VOC coatings utilizing an "application technique" designed to reduce VOC emissions;
2) Meet equivalent VOC emission rate limits through the use of a combination of low VOC coatings, specified application methods and add-on controls; Or
3) Use high efficiency add-on control in lieu of reducing VOC content in coatings or utilizing improved application techniques.

<u>Control Options</u>:

The following add-on control technologies were identified as being potentially applicable to the paint booth operations:

- Regenerative Thermal Oxidizer (RTO);
- Regenerative Catalytic Oxidizer (RCO);

[4] U.S. Environmental Protection Agency. *Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings.* September 2008. (EPA-453/R-08-003)

- Concentrator combined with RTO;
- Carbon adsorption;
- Use of low-VOC coatings; And
- Biofiltration.

Discussion of each these technologies is provided below:

Regenerative Thermal Oxidizer (RTO) & Regenerative Catalytic Oxidation (RCO)

The principles utilized in regenerative catalytic oxidation (RCO) and regenerative thermal oxidation (RTO) of VOC are based on simple chemistry and heat transfer phenomena. Oxidation technologies have been widely accepted as the most effective technologies for VOC destruction.

Oxidation, or "combustion," of VOC involves a chemical reaction between hydrocarbons and oxygen to form carbon dioxide and water vapor. Combustion of VOC emission streams occurs spontaneously at elevated temperatures, which are typically attained by combustion of an auxiliary fuel within the "combustion zone" of the combustion equipment. The percent conversion of VOC to carbon dioxide and water is dependent upon temperature and "residence time" of the VOC in the fuel combustion zone. Combustion of VOCs in the presence of a catalyst is referred to as "catalytic oxidation" and allows oxidation to occur at substantially lower temperatures, thereby requiring less auxiliary fuel to maintain the desired temperature.

RTOs use high-density media such as a ceramic-packed bed still hot from a previous cycle to preheat an incoming VOC-laden waste gas stream. The preheated, partially oxidized gases are heated again in the combustion chamber by auxiliary fuel (usually natural gas) to maintain a typical temperature range of 1400 to 1500 °F in order to achieve the most efficient VOC destruction. Exhaust from the combustion zone is then passed through another packed bed, which absorbs and retains heat until it can be used to preheat the inlet stream to the RTO. Air flow is periodically switched to allow beds through which hot exhaust gases have passed to preheat the emission stream prior to passing through the combustion zone. Regenerative systems are typically designed to recover nearly all of the heat of combustion, greatly reducing auxiliary fuel requirements. Thermal oxidation is most economical when the inlet concentration is between 1500 and 3000 ppmv VOC because the heat of combustion of the hydrocarbon gases is sufficient to sustain combustion with the addition of auxiliary fuel.

Per the EPA fact [5]sheet, VOC destruction efficiency depends upon design criteria (i.e., chamber temperature, residence time, inlet VOC concentration, compound type, and degree of mixing). Typical regenerative oxidizer control efficiencies range from 95 to 99 percent for RTO systems and 90 to 99 percent for RCO systems, depending on system requirements and characteristics of the contaminated stream. Lower control efficiencies are generally associated with a lower concentration of VOCs in the exhaust gas stream.

Catalysts used in the RCO systems are typically based on a noble metal, and can be contained in a fixed or fluidized bed. Despite the decreased oxidation temperature, process exhaust gas must still be preheated, typically through heat exchange or direct heating in a combustion chamber, prior to contact with the catalyst bed. Catalytic oxidizers are very sensitive to particle

[5] http://www.epa.gov/ttn/catc/dir1/fregen.pdf

contamination, and can normally only be used on very “clean” exhaust streams containing little or no particulate.

Concentrator with RTO

To minimize the cost of oxidation control technologies for dilute exhaust streams, which must be supplemented with large quantities of natural gas to ensure proper combustion, the VOCs can be concentrated. A common media used for concentrating dilute streams is known as “Zeolites.” Zeolites are produced from naturally occurring minerals that have microporous aluminosilicate structure. Paint booth exhaust is passed through a rotating zeolite bed, which removes VOCs through adsorption within the micropores. The zeolite media in the rotating beds are sequentially rotated out of service and into heated zones to allow thermal desorption of VOCs prior to cooling and recirculating the zeolite back into service. The concept is that a high volume of exhaust is adsorbed onto the zeolite. A lower volume of heated air desorbs the VOCs and thus a lower volume of air with a higher concentration of VOCs are sent to the control device. Thus, thermally desorbed VOCs are carried to a regenerative thermal oxidization (RTO) system at only 5 to 10 percent of the original stream volume.

Carbon Adsorption

Carbon adsorption systems utilize adsorption media (typically activated carbon) to capture certain VOC species. The core component of a carbon adsorption system is an activated carbon bed contained in a steel vessel. The VOC laden gas passes through the carbon bed where the VOC is adsorbed on the activated carbon. The cleaned gas is discharged to the atmosphere. The spent carbon is regenerated either at an on-site regeneration facility or by an off-site activated carbon supplier.

Over time the adsorption media will be saturated with VOCs, requiring that it be “desorbed” (remove from a surface or media on which it is adsorbed) prior to further use. The adsorption process is highly exothermic.

As per the CTG (page # 17) “Carbon adsorption is generally economically attractive only if the recovered solvent can be reused directly. Carbon adsorbers are most suitable for solvents that are immiscible with water, such as toluene and xylene, but are not recommended for water-soluble VOC, such as methyl ethyl ketone and methyl isobutyl ketone. In the case where a water-soluble VOC is present, the water vapor will be adsorbed and desorbed along with the VOC vapor, and the VOC may require subsequent purification if it is to be reused.”

Biofiltration

Biofiltration uses microorganisms to biologically degrade VOCs into carbon dioxide and water. In bio-filtration systems, the VOC-containing exhaust gas stream is passed through one or more beds of biomedia such as compost or beds of packing using nutrient recycle material. Since biofilters are dependent upon biological activity to destroy VOC, removal efficiencies of biofilters are widely variable. All biofilters are extremely sensitive to a number of exhaust stream characteristics including moisture content, temperature, VOC species and concentration and bed retention time.

Biofiltration is an efficient control for a system that provides a consistent flow of VOC, pH balanced moisture, and lower operating temperature. Biofiltration systems are suitable for processes operating within the typical temperature range of the paint booths; these systems, however, are sensitive to having a relatively stable, continuous supply of nutrients (i.e., VOC) to keep the microorganisms active/alive. Additionally, the painting operations may not operate continuously thus there would not be a steady stream of VOC's to keep the microorganisms active.

Use of Low-VOC Coatings

The 2008 CTG for Miscellaneous Metal and Plastic Parts Coatings contains recommended options for reducing coating emissions. For metal parts coatings, recommended emission limits are listed in the table below:

Coating Type	Surface Coating CTG and Current Permit Requirements (lb VOC/gallon)
Extreme Performance (Chassis Painting)	3.5
Basecoat[1]	5.0
Clearcoat[1]	4.5

[1]Levels under the 2008 Surface Coating CTG for "low bake/air-dried coatings - Exterior Parts (page 34),"

As per CTG "Air-Dried coating means a coating that is cured at a temperature below 90°C (194°F). Because the surface temperatures of parts being painted at this facility is around 180 °F or less, all of the coatings applied at the Cleveland facility would be considered "low bake/air-dried."

In developing the 2008 CTG, EPA evaluated and analyzed VOC limits associated with metal and plastic parts coatings around the country and found that the limits listed in Table 6-3 were mostly technically and economically feasible.

The spray coating and assembly operations currently operate with a BACT limit of 3.5 lb VOC/gallon coating and a total VOC limit of 1,365 tons/year (Section 2.1 B. 4. a., of the current permit). The 3.5 lb/gallon limit is calculated on a calendar monthly average as coating applied, and includes only coatings. That limit does not include VOC from other sources, such as from glues or seam sealing materials. VOCs from the coatings and all other sources are included in the 1,365 tons/year BACT limit on the spray coating and assembly operations.

ii) *Step 2 – Eliminate Technically Infeasible Control Options and Operational Practices:*

The second step is to evaluate the technical feasibility of the alternatives identified in the first step and to reject those that are technically infeasible based on an engineering evaluation or on chemical or physical principles.

The following criteria were considered in determining technical feasibility: previous commercial-scale demonstrations, precedents based on issued PSD permits, state requirements for similar sources, and technology transfer. Selection of a control technology is made on the basis of stream-specific characteristics such as flow rate, hydrocarbon concentration, temperature, and moisture content.

Biofiltration

For the biofiltration systems, the plant may not operate the painting operations continuously, which results in extended periods of time during which the micro-organisms would not have a food source. Optimal biofilter performance requires a continuously operating source of VOC emissions. Additionally, the gas streams existing from the painting operations are in many cases emitted from ovens, which significantly reduce the exhaust stream moisture content.

The operations in the facility depends on truck orders. Coating operations are sometimes performed intermittently, and will not occur 24/7. There are scheduled plant shutdowns throughout the year.

As discussed above, the operations at this facility do not provide the high-moisture exhaust stream necessary or the consistent VOC stream (concentration & volume) to effectively operate the biofiltration system. For these reasons, biofilter control is therefore deemed technically infeasible for control of the exhaust streams at this facility and is not considered any further in this BACT analysis.

Carbon adsorption

Carbon adsorption systems are designed for generally one solvent that you desire to collect, desorb, and re-use, such as toluene. These systems are also designed for high concentration, low volume streams. Carbon adsorption systems cannot operate well with variability to the emission stream conditions like changes in temperature, humidity and the composition of VOCs stream.

The paint systems at this facility use a variety of solvents; some which will adsorb, some of which will not adsorb. One of the many compounds used is methyl ethyl ketone, which has been documented as a problem pollutant for carbon adsorption systems.[6] Additionally, the VOC air streams are low concentration, high volume, and are subject to variable stream conditions. Based on the preceding reasons, carbon adsorption systems are eliminated as technically infeasible.

The technologies (as described in Step 1) that are considered feasible for this project are as listed below:

Control Technology
RCO and RTO with or without VOC concentration
Use of low-VOC coatings

The above listed technologies are addressed in the section, below, of this review.

iii) Step 3 - Ranking of VOC Control Technologies

The third step is an assessment, or ranking, of each technically feasible alternative considering the specific operating constraints of the emission units undergoing review. After determining what control efficiency is achievable with each remaining alternative, they were ranked into a

[6] Section 4.6 of Control Technologies for Hazardous Air Pollutants Handbook, EPA/625/6-91/014

control hierarchy from most to least stringent, using the percent removal efficiency for the pollutant of concern.

Add-on VOC controls for spray coating operations which includes RTO/RCO with or without VOC concentration and use of low VOC coatings are considered technically feasible control technologies. A summary of the VOC control efficiencies of all of the control technologies under consideration, ranked in order of decreasing control effectiveness, is presented below:

Control Technology	VOC control efficiencies %
RCO and RTO with or without VOC concentration	90 to 95%
Use of low-VOC coatings	Varies

iv) *Step 4 – Evaluate Control Options:*

In the fourth step, a cost effectiveness-environmental-energy impact analysis is required for the control technically that remains feasible. If the top level of control is selected as BACT, then a cost effectiveness evaluation is not required. An element of the environmental impacts analysis is the consideration of toxic or other pollutant impacts from the control alternative choice. The economic analysis is performed using procedures recommended by the EPA's OAQPS Control Cost Manual (sixth edition).

<u>Cost Effective Analyses for using Control Devices</u>

The economic impacts section of the BACT analysis includes budgetary estimates of total capital and annual costs, as well as an estimated cost effectiveness of each technically feasible control technology evaluated that was not eliminated in Step 2. EPA provides guidance to estimated annualized control technology costs and the amount of VOCs removed based on the procedures presented in EPA's Cost Control Manual, 6th Edition (the cost factors based on USEPA Office of Air Quality Planning and Standards Control Cost Manual EPA 450/3-90-006).

For the purposes of this analysis, the facility split the spray coating and assembly operations into five different areas. This is because it is infeasible to use a single control device for the exhausts of the entire area. There are large distances between the painting areas within the plant and there are huge volumes of air with low concentrations of VOCs from the exhausts from the plant. Due to the large distances, it would take large amounts of ductwork sprawling across the plant. Such ductwork would be very costly to engineer and install and would substantially increase the costs.

The total volume from all these areas together would be extremely large to the extent no vendor would build an RTO of such size. Due to the large volumes of air, the same number of control devices would most likely be identified in the end if control devices had been deemed to be economically feasible.

Areas were determined based on flow rates and physical locations. In the evaluation of cost-effectiveness, the lowest cost-effectiveness for the control technology among the areas was used. The design flow values for each booth and oven was obtained from the plant and used in our calculations. The flow volumes from each area were summed together to obtain a total flow. The facility does not track exact amounts of paint sent to each area. Plant personnel do know the total amount of paint used; and based on the number of parts painted and size of parts painted, the facility estimated a percentage of the paint that is utilized in each area.

The flow rates for each of the areas and estimated VOC emissions are as shown below:

Area	Area	Flowrate (acfm)	Estimated VOC Emissions (tpy)	Percent of Total VOC Emissions (tpy) (by weight per area)
Area 1	Chassis Booths	269,700	263[O] / 150[R]	35%[O] / 20%[R]
Area 2	Seam Seal/Undercoat	76,200	30	4%
Area 3	E-Coat/New prep	49,600	60	8%
Area 4	Main Paint Center	716,900	353[O] / 465[R]	47%[O] / 62%[R]
Area 5	Offline/CRC	120,160	45	6%
Total			750	100%

[O] – Original application
[R] – Revised BACT on 5/16/2016

The groupings of area's include the paint booths and ovens which are the areas of the expected VOC emissions by such grouping the intent was to reduce the total number of RTOs required. The applicant provided the flow rates from each of the individual sources within the spray coating and assembly operations (ES-SCAO) but not the mass emissions rate from the individual sources since they estimate the VOC emissions on a monthly basis. The annual VOC emissions from each of the above areas were based on engineering estimation. The flowrates of some areas were modified again on 5/16/2016.

Regenerative Thermal Oxidizer

Economic Impacts

The applicant used direct annual costs, including labor, maintenance, electricity, and fuel based on *vendor quote* and the OAQPS Cost Manual. Other cost impacts are estimated using EPA cost methodologies. The table below presents a breakout of costs used in the economic impacts evaluation for an RTO.

The flow rates for each area, Total Direct Costs, Total Capital Investment, Total Annual Cost and Control Cost Effectiveness ($/ton) are shown in the table below:

Areas	**Area # 1**	**Area # 2**	**Area # 3**	**Area # 4**	**Area # 5**
Description of Areas	Chassis Booths	Seam Seal/Undercoat	E-Coat/New prep	Main Paint Center	Offline/CRC
Flowrate (acfm)	269,700	76,200	49,600	716,900	120,160
Total Direct Costs	$4,653,964	$2,454,400	$1,687,400	$10,409,156	$3,511,008
Total Capital Investment	$5,763,756	$3,039,680	$2,089,780	$12,891,340	$4,348,249
Total Direct Annual Costs	$1,430,441	$440,207	$304,082	$3,718,981	$665,172
Total Annual Cost	$2,323,974	$925,688	$647,273	$5,680,188	$1,346,670
VOC Removed (tpy)	142.50	28.50	57.00	441.75	42.75

Areas	Area # 1	Area # 2	Area # 3	Area # 4	Area # 5
Control Cost Effectiveness ($/ton)	$16,309	$32,480	$11,356	$12,858	$31,501

Total direct costs include the RTO and instrumentation with taxes, the foundations and installation, all the electrical, piping and ductwork installation. The Total Capital Investment includes the Total direct costs plus the indirect installation costs like engineering, construction and field expenses, contractor fees, performance testing and contingencies.

The total direct annual costs include the labor, maintenance, electricity and the fuel and compressed air used. The total capital investment is based on EPA Air Pollution Control Cost Manual and equipment quote from NESTEC, Inc. Costs were estimated based on similar flowrate units. The tons of VOC removed were based on a control efficiency of 95%. The costs were based on an equipment life of 10 years, 8,760 hours per year of operation and a 7% interest rate.

As shown in the table above the lowest cost-effectiveness of operation for the five areas as identified is $11,356 /ton of VOC emissions.

Regenerative Catalytic Oxidation (RCO)

The analysis estimated the total costs associated with the VOC control equipment, including the total capital investment of the various components ***intrinsic*** to the complete (RCO) system.

The flow rates for each area, Total Direct Costs, Total Capital Investment, Total Annual Cost and Control Cost Effectiveness ($/ton) are shown in the table below:

Areas	Area # 1	Area # 2	Area # 3	Area # 4	Area # 5
Description of Areas	Chassis Booths	Seam Seal/Undercoat	E-Coat/New prep	Main Paint Center	Offline/CRC
Flowrate (acfm)	269,700	76,200	49,600	716,900	120,160
Total Direct Costs	$5,808,619	$2,684,065	$1,829,284	$13,644,637	$3,903,621
Total Capital Investment	$7,193,752	$3,324,111	$2,265,498	$16,898,359	$4,834,484
Total Direct Annual Costs	$1,534,200	$455,244	$308,885	$3,980,508	$697,121
Total Annual Cost	$2,641,939	$974,764	$669,831	$6,533,377	$1,442,887
VOC Removed (tpy)	142.50	28.50	57.00	441.75	42.75
Control Cost Effectiveness ($/ton)	$18,540	$34,202	$11,751	$14,790	$33,752

Annualized costs were based on an interest rate of 7% and an equipment life of 10 years. The cost analysis of the add-on control technology includes the capital cost of installing the equipment, ductwork, electrical and instrumentation necessary to operate the unit. The cost also included the add-on cost to convert the RTO to an RCO such as catalyst, design and structural costs. These costs are based on vendor quotes and the OAQPS Cost Manual methodologies. The lowest cost effectiveness for the seven areas as identified in the above table is $11,751/ton of VOC emissions.

Energy Impacts of RTO & RCO

For the RTO the energy required to operate an RTO or an RCO in one of the specified areas is between 9.72 to 14.37 million KWH/yr.

Environmental Impacts of RTO & RCO

There are adverse impacts from the operation of an RTO in the form of increased emissions of criteria pollutants and GHGs emitted as by-products of natural gas used for supplemental fuel and actual VOC destruction. Installation of the RTO or RCO would require combustion of additional fuel annually resulting in an increase of combustion pollutants including Nitrogen Oxides (NO_x), Carbon Monoxide, (CO), Carbon Dioxide (CO_2), Methane (CH_4), and HAPs including:

- Formaldehyde
- Benzene
- Hexane
- Toluene
- 1,4 dichlorobenzene

Carbon dioxide, methane and nitrous oxide emissions are primary greenhouse gases (GHGs) that are subject to reporting under EPA's Mandatory Reporting Rule. According to EPA, GHG emissions are expected to endanger public health and public welfare through the negative "effects in the atmosphere, their effect on climate, and the public health and welfare risks and impacts associated with such climate change. Increases in ambient ozone are expected over broad areas of the country, and they are expected to increase serious adverse health effects in large population areas that are and may continue to be in nonattainment."

The final Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, published in the Federal Register on December 15, 2009, established the multitude of adverse effects from GHGs emissions and detailed the science from which these findings are based. Other negative impacts include effects on ground level ozone, increase in fugitive PM and GHG emissions from delivery traffic.

Under the PSD program, VOCs are regulated to prevent significant deterioration of air quality due to ozone formation. Ozone is formed in the atmosphere due to atmospheric chemical reactions of NO_x and VOC catalyzed by sunlight, and excessive ambient concentrations of ozone in the lower atmosphere can be injurious to health and damage vegetation. The facility is located in a moderately populated but developed area of North Carolina, and ambient concentrations of ozone in this area are in attainment with the NAAQS for this pollutant.

Recent developments in air dispersion modeling and studies in ozone formation seem to indicate that even substantial reductions in VOC emissions in areas such as the Gaston County facility will have a relatively small impact on ozone formation, consequently, any reduction of VOC emissions from the spray booths will negligibly reduce ozone formation and concentrations in the area, while installation of a RTO that generates NO_x emissions from the combustion of supplemental fuel would likely increase ozone formation in the area.

Concentrator Combined with RTO

Economic Impacts

For this analysis the applicant used the same procedure, cost methodologies, interest rate and equipment life as the RTO to determine the Total Annual Cost.

Total Annual Cost = Annualized Total Capital Investment + Annual Operating Cost + Total Indirect Annual Cost.

The flow rates for each area, Total Direct Costs, Total Capital Investment, Total Annual Cost and Control Cost Effectiveness ($/ton) are shown in the table below:

Areas	**Area # 1**	**Area # 2**	**Area # 3**	**Area # 4**	**Area # 5**
Description of Areas	Chassis Booths	Seam Seal/Undercoat	E-Coat/New prep	Main Paint Center	Offline/CRC
Flowrate (acfm)	269,700	76,200	49,600	716,900	120,160
Total Direct Costs	$3,835,000	$2,454,400	$1,687,400	$13,499,200	$3,374,800
Total Capital Investment	$4,749,500	$3,039,680	$2,089,780	$16,718,240	$4,179,560
Total Direct Annual Costs	$870,158	$440,208	$304,082	$2,229,671	$415,548
Total Annual Cost	$1,611,761	$925,688	$647,273	$4,764,127	$1,071,777
VOC Removed (tpy)	142.50	28.50	57.00	441.75	42.75
Control Cost Effectiveness ($/ton)	$11,311	$32,480	$11,356	$10,785	$25,071

Results of the cost analysis for operation of the concentrator system combined with an RTO are presented above. These costs are based on vendor quotes and the OAQPS Cost Manual methodologies. The lowest cost effectiveness for the seven areas as identified in the table above is $10,785/ton of VOC emissions.

Energy Impacts

The energy required to operate a concentrator system with an RTO in one of the specified areas above, is between 5.99 to 8.86 million KWH/yr.

Environmental Impacts

There are adverse impacts from the operation of a concentrator system with an RTO in the form of increased emissions of criteria pollutants and GHGs emitted as by-products of natural gas used for supplemental fuel and actual VOC destruction.

Costs comparison with other facilities

An effort was made to contact several similar facilities (Process Code 41.002) using thermal oxidizers as a means of VOC cost to compare cost-effectiveness of such control devices. These facilities are listed below:

RBLC ID	Corporate/Company Name	Response	Process	Control device	Permit	Issued	Limits	Notes
OH-0312	Kenworth Truck Co.	No Response	robotic cab paint booths (line 1 & 2)	Thermal Oxidizer	06-08317	01/29/2008	3.5000 lb/gal excluding water and exempt solvents	
OH-0309	Daimler Chrysler Corporation/ Toledo Supplier Park - Paint Shop	Responded	topcoat booths (2) for basecoat and clearcoat	Thermal Oxidizer	04-01358	05/03/2007	5.42 lb voc/gal of applied coating	100% capture and 95% control ***Not for PSD purposes***
OH-0187	Navistar International Transportation Corp.	Responded	for robotic cab paint booths (line 1 & 2)	Thermal Oxidizer	08-862	10/29/1987	3.5000 lb/gal before control	
OH-0295	General Motors Truck & Bus Moraine Assembly Plants	No Response	topcoat lines	Carbon Adsorption followed by Thermal Incineration	08-02506	01/14/2003		thermal incinerator: 95% destruction
OH-0215	General Motors Truck & Bus Moraine Assembly Plants	No Response	surface coating	Carbon Adsorption followed by Thermal Incineration	08-2506	10/23/1992		
IN-0149	Subaru of Indiana Automotive, Inc.	Responded	Trim line	Catalytic incinerator	157-31885-00050	10/04/2012	0.4000 lb/gal monthly volume weighted average	***uses a catalytic incinerator on ovens.***
AL-0211	HYUNDAI MOTOR MANUFACTURING ALABAMA, LLC	Responded		Regenerative Thermal Oxidizer (RTO) and airless guns	209-0090-X001	03/14/2005	1.0000 lb/gal acs after control device	RTO (95% destruction only on ***Oven Exhaust***) and airless guns ***Oven Exhaust controlled by RTO (RTO-1)***
NOT in RBLC								
SC	BMW Manufacturing Corporation	Responded	VOC emissions from the oven portion are controlled by an RTO Conclusion of BACT/LAER for VOC: BACT/LAER for VOCs from the paint mixing / spent paint solids recovery is best management practices. And for the primer curing ovens, the emissions will be controlled with an RTO. Have two RTOs and were installed in 1994 and 2002					

Most of the above facilities had the control devices installed when their respective areas were in nonattainment and the control devices were mostly used to control emissions only from the ovens. None of the pre-determinations/reviews for the above facilities having control devices had a cost-effectiveness study for using thermal oxidizers as a means of VOC emissions control.

v) *Step 5 – summarize the selection of BACT:*

The DAQ BACT determination is not just based on cost alone, but also includes various other factors. For use of a RTO, on any of the areas as mentioned above the price per ton of VOC controlled ranges from $11,356 to $32,480, for RCO it ranges from $11,751 to $34,202 and for a Concentrator Combined with RTO it ranges from $10,785 to $32,480.

The energy demand ranges for a RTO or and RCO in the specified areas is between 9.72 to 14.37 million KWH/yr, and the energy required to operate a concentrator system with an RTO in one of the specified areas above is between 5.99 to 8.86 million KWH/yr.

The adverse impacts of using any of the control devices is in the form of increased emissions of criteria pollutants and GHGs emitted as by-products of natural gas used for supplemental fuel and actual VOC destruction. The control devices would generate NO_x emissions from the combustion of supplemental fuel and would likely increase ozone formation in the area.

The final step is to summarize the selection of BACT using the research data and the cost analysis above to propose the associated emission limits or work practice standards to be incorporated into the permit plus any recommended recordkeeping and monitoring conditions.

<u>Use of Low-VOC Coatings</u>

The spray coating and assembly operations currently operate with a BACT limit of 3.5 lbs VOC/gallon coating as applied on a calendar monthly average basis.

As mentioned above the 2008 CTG for Miscellaneous Metal and Plastic Parts Coatings contains recommended options for reducing coating emissions for metal parts coatings. The CTG recommended options for reducing coating emissions ranges from of 3.5 lb VOC/per gallon of coating for extreme performance (chassis painting) to 4.5 lb VOC/per gallon of coating for clearcoat (the increased truck production would be requiring clearcoat).

Per Section VI. “Recommended Control Options,” of the 2008 CTG, states “to control VOC emissions from miscellaneous metal and plastic part surface coatings, we are recommending the following three options:

(1) VOC content limits for each coating category based on the use of low-VOC content coatings and specified application methods to achieve good transfer efficiency;
(2) Equivalent VOC emission rate limits based on the use of a combination of low-VOC coatings, specified application methods, and add-on controls; or
(3) An overall VOC control efficiency of 90 percent for facilities that choose to use add-on controls instead of low-VOC content coatings and specified application methods.”

DAQ recommends an emission limit of 3.5 lb VOC/per gallon of coating to control VOC emissions. Thus, there are no changes to the existing BACT requirements as specified in Section 2.1 B. 4. a. i., of the permit.

<u>Comparison of BACT with MACTs</u>

In January 2004, the EPA promulgated the National Emission Standards for Hazardous Air Pollutants for Miscellaneous Metal Parts and Products Surface Coating (40 CFR 63, subpart MMMM). In April 2004, the EPA promulgated the National Emission Standards for Hazardous Air Pollutants for Plastic Parts and Products Surface Coating (40 CFR 63, subpart PPPP).

The Spray Coating and Assembly Operations (ES-SCAO) are subject to MACT Subpart PPPP. This Subpart has an emissions limit of no more than 0.16 lbs organic HAP emitted per lbs coating solids used (Section 2.2 D. 1. b., of the permit) and MACT Subpart MMMM has an emissions limit of no more than 2.6 lbs organic HAP per gal coating solids used (Section 2.2 D. 2. b., of the permit).

The above MACT limits are based on:
1) lb of volatile HAP per lb of coating solids for PPPP and
2) lb of volatile HAP per gallon of coating solids for MMMM.

Further the facility has to meet client specifications using a variety of coatings and thus it is rather difficult to compare the units of measurement for the MACT standards with the proposed measurements of the 3.5 lb VOC/per gallon of coating.

DAQ reviewed the Ford Motor Company's (Ford) Kentucky Truck Plant (KTP) construction permit application. This facility produces the Ford Super Duty Truck (F-250, 350 etc.), the Ford Expedition and Lincoln Navigator.

The facility proposed the construction of a new paint shop and the application was to modify the existing VOC PAL limit. This facility is subject to 40 CFR 63, Subpart IIII for light duty trucks and 40 CFR 60, Subpart MM for light duty trucks. MACT Subpart IIII emission limitations are in pounds of VOCs per gallon of coating solids and NSPS Subpart MM emission limitations are in kilograms of VOC per liter of applied coating solids. As stated in the previous section, there are few similarities in the units of measurement when comparing the two facilities to the proposed VOC BACT limit for the Daimler Plant and it is difficult to determine the stringency of the limits when compared.

However, to ensure that the facility does comply with the MACT subpart PPPP and subpart MMMM, while complying with the BACT Section 2.1 B. 4. ii., of the permit requires the Spray Coating and Assembly Operation (ES-SCAO) to comply with MACT Subpart PPPP (Section 2.2 D.1., of the permit) and MACT Subpart MMMM (Section 2.2 D.2., of the permit)

DAQ reviewed the Ford Motor Company's (Ford) Kentucky Truck Plant (KTP) construction permit application. This facility produces the Ford Super Duty Truck (F-250, 350 etc.), the Ford Expedition and Lincoln Navigator.

The facility proposed the construction of a new paint shop and the application was to modify the existing VOC PAL limit. This facility is subject to 40 CFR 63, Subpart IIII for light duty trucks and 40 CFR 60, Subpart MM for light duty trucks. MACT Subpart IIII emission limitations are in pounds of VOCs per gallon of coating solids and NSPS Subpart MM emission limitations are

in kilograms of VOC per liter of applied coating solids. There are no similarities in the units to the proposed VOC BACT limit for the Daimler Plant.

Ford Motor Company applied individual BACTs to areas like spray booths, paint drying ovens, flash off area, sanding booths, ECoat operations, and paint mix rooms. This Daimler facility does a monthly tracking of the of materials consumed and VOC emissions and the BACT limit of 3.5 lbs VOC/gallon coating as applied on a calendar monthly average basis is more practical to the facility.

DAQ also reviewed the Volvo Cars US Operations Inc., located in Ridgeville, South Carolina. This was (when permitted) a greenfield automobile manufacturing facility which includes a paint shop that includes metal surface pretreatment, an electrodeposition coating line, a sealing line, a primer line, and a top coat process consisting of base coat and clear coat lines. The facility requested that a PSD avoidance condition (less than 250 tons per year) be included in the permit using control devices for the emissions of VOCs, PM, PM10, and PM2.5. Since the facility was not subject to BACT, the cost ($$/ton of pollutant removed) was not evaluated.

Project Aggregation

Performing several small projects in an attempt to avoid PSD permitting is not allowed under PSD regulations. In the past several years several modifications have been done at this facility.

Summary of applications in the past few years are mentioned in the table below:

Application #	Summary	Permit issued
3600153.15A	Facility requested the addition of a booth to the spray coating and assembly area. Emissions from the spray booths will be accounted for under the existing PAL limits.	03926T43
3600153.14A	adding a new natural gas fired emergency generator rated at 98 kw or 131.4 hp (ID No. ES-GEN) and a 10,000 gallon antifreeze storage tank	03926T42
3600153.12D	Renewal of an existing Title V permit	03926T41
3600153.13A	Administrative Changes	03926T40

NCDAQ does not take any position as to whether the previous projects and modification of the “Spray Coating and Assembly Operations” (ES-SCAO) should be aggregated as a single project. The NCDAQ typically applies the economic relationship test to determine if two projects should be aggregated. (EPA published in the Federal Register on Thursday, January 15, 2009, guidelines for aggregation of sources and their relationship regarding NSR applicability[7]). As per the above information in the table, there was an addition of a booth and a 10,000 gallon antifreeze storage tank to the spray coating and assembly area, both of which were accounted for under the existing PAL limits.

VI. Air Quality Impact Analysis

PSD regulation 40 CFR 51.166(k) requires that an air quality analysis of the ambient impacts associated with the construction and operation of the proposed source or modification be performed.

[7] http://www.epa.gov/nsr/fr/20090115_2376.pdf

The analysis should demonstrate that the emissions from the proposed major source or modification, in conjunction with existing sources, will not cause or contribute to a violation of any applicable NAAQS or PSD increment. The US EPA has not established a NAAQS for VOC emissions. VOCs are also not considered visibility-affecting pollutants. Therefore, there are no modeling requirements for this pollutant.

Volatile Organic Compounds (VOCs)

VOC emissions in combination with NO_x and sunlight, are precursors to ozone formation. Previous and on-going regional air modeling efforts associated with attainment planning within the North Carolina air shed have shown that a VOC emissions increases will not contribute to significant ozone formation. No additional monitoring or modeling is required to demonstrate that the proposed project will not result in an exceedance of any Class I Area increment standards.

VII. Additional Impact Analysis

A. Local Visibility, Soils, and Vegetation

PSD regulation 40 CFR 61.166(o)(1) requires that applications for major modifications include an analysis of the impairment to visibility, soils, and vegetation that would occur as a result of the proposed modification and the associated commercial, residential, industrial, and other growth. The analysis need not include an evaluation of the impact on vegetation having no significant commercial or recreational value.

The proposed project is not anticipated to have any impact on local visibility impairment.

Gaseous air pollutants can potentially cause harmful acute, chronic, and long-term effects on vegetation. Acute and chronic effects are caused by the pollutant acting directly on the organism, while long-term effects are indirectly caused by secondary agents, such as changes to soil pH.

VOCs, along with NO_x and sunlight, is a precursor to ozone formation. Ground-level ozone can have detrimental effects on plants and ecosystems, including:

- Interference with the ability of plants to produce and store food, making them more susceptible to certain diseases, insects, other pollutants, competition and harsh weather;
- Damage to leaves of trees and other plants, negatively impacting the appearance of urban vegetation, National Parks, and recreation areas; and,
- Reduction of crop yields and forest growth, potentially impacting species diversity in ecosystems.[8]

The facility is located in a moderately populated and developed area of North Carolina and ambient concentrations of ozone in this area are in attainment with the NAAQS for this pollutant. Recent developments in air dispersion modeling and studies in ozone formation seem to indicate that even substantial reductions in VOC emissions in rural areas such as the Gaston County will

[8] U.S. Environmental Protection Agency. (March 6, 2007). *Ground-Level Ozone, Health and Environment.* Retrieved February 8, 2008 from U.S. EPA website: http://www.epa.gov/air/ozonepollution/health.html

have a relatively small impact on ozone formation. The formation of ozone in North Carolina has been shown to be NOx-limited. There is already an excess of VOC in the atmosphere with respect to ozone production. Further, it has been estimated that 90% of VOC emissions occur from biogenic sources (naturally occurring); with industrial facilities accounting for only 2% of those emissions.[9]

The only potential impact on soils and vegetation resulting from the proposed project would be long-term damage associated with elevated ozone levels. The atmosphere in the region is considered NO_x limited with regards to ozone formation. Given the relatively small quantities of VOCs emitted by this facility (when compared to the overall regional VOC budget) into an already VOC-rich atmosphere, any change in ozone formation associated with the project, and thus the potential for harmful impacts on soils and vegetation, will be negligible.

The main point is that the southeastern US (including Gaston County, NC) is considered NO_x limited with respect to ozone formation, meaning that increases in NO_x emissions would contribute to more ozone production in the atmosphere.

B. <u>Growth Impacts</u>

PSD regulation 40 CFR 61.166(o)(2) requires that applications for major modifications include an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the proposed modification.

Associated growth includes residential and commercial/industrial growth resulting from the new facility. Residential growth depends on the number of new employees and the availability of housing in the area, while associated commercial and industrial growth consists of new sources providing services to the new employees and the facility.

The proposed project will increase production at the existing facility. There will not be any construction of buildings or sources associated with this increase. There will be an increase in workforce, which will be filled from available work force already in the area. There will be no other infrastructure expansions, and as such, the growth in the area related to the project will be minimal. Therefore, the project is not expected to create substantial growth within the area.

C. <u>Visibility Impacts on Class I Areas</u>

PSD regulation 40 CFR 61.166(p) provides an opportunity for the Federal Land Manager (FLM) to determine whether the proposed modification would have an adverse impact on an air quality related value (AQRV), including visibility, on any Class I areas.

A visibility analysis is not required for this project because the project does not result in a net significant emissions increase for any pollutants (PM_{10}, NO_x or SO_2) that would be of concern for potential visibility impairment. However, the Federal Land Manager was provided a copy of this PSD application and no comments have been received.

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[9] Presentation entitled, *Modeling Application Process*, by NCDAQ – Attainment Planning Branch, September 30, 2004.

D. Air Quality Monitoring Requirements

In accordance with the requirements of 40 CFR 51.166(m)(1)(i)(b), a project that results in a net significant emissions increase must contain an analysis of existing ambient air quality data in the area to be affected by the proposed project. Since the project does result in a net significant increase of a PSD-regulated pollutant (VOC), this analysis is required.

There are no National Ambient Air Quality Standards (NAAQS) for VOC and as per 40 CFR §81.334 "Designation of Areas for Air Quality Planning Purposes" (North Carolina – Gaston County) the National Ambient Air Quality Standards (NAAQS) are as mentioned below:

Pollutant	NAAQS Standards
TSP	Better than national standards
1971 Sulfur Dioxide NAAQS (Primary and Secondary)	Better than national standards
Carbon Monoxide	Unclassifiable/Attainment
North Carolina-Ozone (1-Hour Standard)[10]	Unclassifiable/Attainment
1997 Annual PM2.5NAAQS	Unclassifiable/Attainment
1997 24-Hour PM2.5 NAAQS	Unclassifiable/Attainment
2006 24-Hour PM2.5 NAAQS	Unclassifiable/Attainment
NO2 (1971 Annual Standard)	Cannot be classified or better than national standards
1997 8-Hour Ozone NAAQS (Primary and Secondary)	Attainment (This action is effective 12/2/13)
2008 8-Hour Ozone NAAQS (Primary and secondary) Gaston County (part)	Attainment (This action is effective 7/28/2015)
2008 8-Hour Ozone NAAQS (Primary and secondary) Gaston County (Township)	Unclassifiable/Attainment

However, 40 CFR 51.166(m)(1)(ii) calls for "the plan … with respect to any such pollutant for which no National Ambient Air Quality Standard exists, the analysis shall contain such air quality monitoring data as the reviewing authority determines is necessary to assess ambient air quality for that pollutant in any area that the emissions of that pollutant would affect."

DAQ has determined that no additional monitoring and reporting is required than as specified in Section 2.1 B. 4. d., and e., of the modified permit.

VIII. PSD Increment Tracking

[10] The 1-hour ozone standard is revoked effective June 15, 2005 for all areas in North Carolina except the Cumberland Co. (Fayetteville), Triad (Greensboro-Winston-Salem-High Point), and Unifour (Hickory-Morgantown-Lenoir areas where it is revoked effective April 15, 2009.

The minor source baseline for Gaston County was triggered for PM-10 on 05/16/89 by Gaston County MSW Facility, for SO2 on 02/15/82 by Lithium Corp. Of America and for NOx on 05/16/89 by Gaston County MSW Facility.

For this application (3600153.15B) only the BACT is being re-established with no hourly emissions changes to the facility there is no emissions to be tracked (See Section III. "Purpose of Application," in this review above).

IX. NSPS, NESHAPS, RACT, CAM, Compliance Status, Zoning Consistency Determination and Application Type.

NSPS

The emergency fire pumps (ID Nos. IESFP1 through IESFP3) are subject to NSPS Subpart Dc and the natural gas fired emergency generator (ID No. ES-GEN) is subject to NSPS Subpart JJJJ (See Section IV. "Regulatory Summary," of this review, above).

NESHAP/MACT

This facility is subject to the 112(j) instead of the Boiler MACT (Subpart DDDD), Surface Coating of Plastic Parts and Products MACT (Subpart PPPP) and the Surface Coating of Miscellaneous Metal Parts and Products MACT (Subpart MMMM) and Stationary Reciprocating Internal Combustion Engine MACT (Subpart ZZZZ) (See Section IV. "Regulatory Summary," of this review, above).

RACT

The facility is located in Gaston County which was once a non-attainment area and is subject to RACT. The facility chose to comply with RACT by complying with MACT Subparts MMMM and PPPP.

CAM

The Compliance Assurance Monitoring (CAM) rule promulgated on November 21, 1997, is required for major units using control devices to comply with Federal Clean Air Act (FCAA) standards established prior to 1990.

This facility does not have any emission sources with uncontrolled emissions greater than the major source threshold and therefore are not subject to CAM. The CAM applicability status will not change as a result of this application.

Compliance Status

The latest inspection done on 06/28/2016 by Ms. Carlotta Adams of the Regional Office stated "Based on my observations during this inspection, this facility appeared to be in compliance with the applicable air quality regulations"

Consistency Determination

As per North Carolina General Statute § 143-215.108(f) and DAQ policy the applications for air quality permits for new or expanded facilities include a request for a zoning consistency determination. Under this requirement the applicant must identify each local government having jurisdiction over any part of the land on which the facility and its appurtenances are to be located and must request a determination (zoning consistency determination) as to whether the local government has in effect a zoning or subdivision ordinance applicable to the facility and whether the proposed facility would be consistent with the ordinance. The request to the local government, to be delivered to the clerk of the local government personally or by certified mail, must include a copy of the draft permit application.

The consistency determination for this modification was provided by the facility.

Application Type

(See Section III. "Purpose of Application," of this review, above).

X. Public Notice/EPA, Regional Office & Applicant Review

Public Notice Requirements – 40 CFR 51.166(q) requires that the permitting agency make available to the public a preliminary determination on the proposed project, including all materials considered in making this determination. With respect to this preliminary determination the NCDAQ:

- i) Will make available all materials submitted, a copy of the preliminary determination, and all other information submitted and considered. This same information will be available at the NCDAQ Mooresville Regional Office.
- ii) Will publish a public notice, by advertisement in a local paper including the preliminary decision and the opportunity for public comment.
- iii) Send a copy of the public notice to:
  - a) The applicant
  - b) EPA Region IV for comment
  - c) Officials having cognizance over the location of the location of the project as follows:
    - 1) Any affected state/local air agency – No other state or local agencies are expected to be affected by this project.
    - 2) Chief Executives of the city and county in which the proposed project is to be located. Notices will be sent to the County Manager, Gaston County
    - 3) Federal Land Manager – As noted above, the FLM for the closest Class I area did not request any analysis to be performed.

Regional Office, the applicant and the SSCB (Stationary Source Compliance Branch) were provided a draft of this permit and their comments taken into consideration.

In an e-mail on September 08, 2015, MS. Denise Hayes of the Regional Office wrote "The facility would like the following sources to be evaluated and moved to the insignificant list. Three emergency fire pumps (ESFP1-ES_FP3)
One natural gas fired emergency generator (ES-Gen)
One cab pretreatment line (ES-EC-3A)"
The above three sources have been moved into the insignificant source list in the draft permit.

The applicant made several comments on the drafts 2/24/2017 and major ones and action taken are mentioned below:

Comments on the draft permit:

- The Responsible person was changed to Ms. Jane Rosaasen, Logistics Director.
- The applicant made some minor configuration changes to the Spray Coating and Assembly Operation (ES-SCAO).
- The applicant wanted removal of the Section 2.1 B. 4. c., of the permit. This requires the applicant may be required to reevaluate its BACT analysis if construction does not commence on the PSD affected sources within 18 months after the effective date of the PSD permit.

  Our rule 2D .0530 Or 51.166 does not include this requirement. This is listed in Section 52…. for EPA run programs. Thus, this request is accepted and Section 2.1 B. 4. c., is struct off the modified permit.

- Applicant wanted removal of Section 2.3 B. a. iii). This section requires the applicant to manufacture no more than 60,000 trucks per 12-month period. (For NO_x PAL)

  The Mt. Holly (MTH) Plant has historically operated at 25 lb VOC/truck. In some of the most recent months the average has been around 15 lb VOC per truck. The Cleveland plant has been operating at a recent average of 25 lb/truck and the Portland plant is operating at a recent average of 35 lb/truck. The trucks at Cleveland are larger than MTH and the trucks at Portland are even larger.

  Daimler needs the flexibility of making any truck in the Daimler family of trucks. Based on an average spray coating of a truck to emit 25 lb of VOC and with full production of 300 operating days per year the annual emissions will not exceed 750 tpy of VOCs from the spray coating and assembly operations (ES-SCAO). This level of emissions will not cause the NOx emissions to exceed 56.4 tpy (Section 2.3 B. a., of the permit). Thus, the above requirement is removed.

XI. Recommendations

It is recommended that Air Quality Permit No. 03926T44 be issued.

XII. Changes made in the proposed Permit.

The following table describes the changes in modified permit:

Pages	Section	Description of Changes
	Insignificant Activities list	Emergency fire pumps with diesel fired engines (ESFP1 through ESFP3) moved as insignificant source (IESFP1 through IESFP3)
	Insignificant Activities list	Natural gas fired emergency generator (ES-GEN) moved as insignificant source (IES-GEN)
	Insignificant Activities list	One Cab Pretreatment Line (ES-EC-3A) moved as insignificant source (IES-EC-3A)
3	Source Table	Modified Spray Coating and Assembly Operations (ES-SCAO)
9	2.1 B	Modified Spray Coating and Assembly Operations (ES-SCAO)
11	2.1 B. 4.	The Spray Coating and Assembly Operation (ES-SCAO) shall comply with MACT Subpart PPPP **And** MACT Subpart MMMM as part of BACT
13	2.1 C.	One Cab Pretreatment Line (ES-EC-3A) removed

Pages	Section	Description of Changes
25	2.2 A.	2Q .0317 avoidance conditions for PSD SO2 emissions – Removed.
25	2.2 B.	Modified Spray Coating and Assembly Operations (ES-SCAO)
27	2.2 D.	Modified Spray Coating and Assembly Operations (ES-SCAO)
38	2.3 A. a. ii.,	Modified Spray Coating and Assembly Operations (ES-SCAO)
41	2.3 B. a. ii.,	Modified Spray Coating and Assembly Operations (ES-SCAO)
46 through 55	Section 3	Updated General Conditions