Jefferson North Assembly Plant
Sustainment Project

Application for
Permit to Install

March 2020

FIAT CHRYSLER AUTOMOBILES

FCA

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ATTACHMENTS

1.0 INTRODUCTION

Fiat Chrysler Automobiles US LLC ("FCA") owns and operates the existing Jefferson North Assembly Plant ("JNAP") located at 2101 Conner Avenue in Detroit, Wayne County, Michigan. The historical activities at the JNAP complex include automobile and light duty truck manufacturing. JNAP currently produces two SUV models; the Jeep Grand Cherokee and the Dodge Durango.

The facility currently operates three main topcoat coating lines. Originally, the facility operated a tutone line in addition to the three main topcoat lines. The tutone line has been inoperable for several years and the terms and conditions associated with its operation were eliminated from the current Renewable Operating Permit several years ago. FCA is now planning to implement a sustainment program that includes various activities within the existing facility, one of which includes reactivating the tutone coating booth and oven to accommodate demand for vehicles with a tutone roof. The tutone booth structure and space for the oven remain in their former location. In addition, a rapid repair operation will be relocated to a small building expansion to better accommodate tutone operations. Details of the current permit status for JNAP and the plans for various sustainment activities and reactivation of the tutone operation are provided in the following sections.

BACKGROUND

As noted above, the plans for the JNAP facility include an overall sustainment effort which is intended to refurbish and update the facility, which is necessary in order to maintain consistent production and launch the next generation of vehicles. The sustainment efforts will be implemented without resultant increases in production rates or production capacity beyond those of the original facility.

The air use permit (i.e., Permit to Install or "PTI") for the current JNAP operations was issued on April 19, 2010 as PTI number 18-08. The permit terms and conditions applicable to the existing operations were structured and formatted according to the Michigan Flexible Permitting Initiative ("FPI"). The terms and conditions of the FPI were subsequently rolled into the Renewable Operating Permit ("ROP") MI-ROP-N2155 dated June 9, 2017 (which is also a Source-Wide PTI). The current version of the ROP expires on June 9, 2022.

The FPI conditions include an overall ton per year limit for volatile organic compounds ("VOCs") from assembly operations at the existing facility (1,085.8 tpy) as well as a pounds of VOC per job limit (4.8 pounds per vehicle), each an average on a 12-month rolling basis. Other criteria pollutants are subject to annual emission and fuel consumption limits as well.

The JNAP facility is located in an area currently designated as attainment with respect to the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants except ozone. The Southeast Michigan area where JNAP is located was designated as an ozone non-attainment area in 2018 with respect to the updated 8-hour ozone NAAQS. The JNAP facility is an existing major stationary source under both the Prevention of Significant Deterioration ("PSD") and the federal non-attainment new source review ("NANSR") programs (40 CFR Part 52) because potential VOC emissions exceed the 250/100 ton per year (tpy) thresholds, respectively.

The proposed sustainment activities at JNAP will constitute a minor modification under the NANSR program for VOCs (as precursors to ozone) as well as the PSD program for attainment pollutants. As a result, there are no offset or lowest achievable emission rate (LAER) requirements applicable to the changes to VOC sources.

Pursuant to Michigan Air Pollution Control Rules 336.1702 (Rule 702), the proposed changes as part of the sustainment activities will be required to demonstrate that any new or modified VOC sources will institute best available control technology ("BACT") for VOCs.

Section 2.0 of this document provides an overview of the project, Section 3.0 provides background on the proposed tutone process and the relocation of the rapid repair operation. Sections 4.0 through 9.0 address the various state and federal regulatory requirements and demonstrations associated with this application. Section 10.0 provides the application's conclusions.

2.0 PROJECT ANALYSIS

FCA evaluated whether the proposed activities at the JNAP facility ("the JNAP Project") potentially trigger the applicable PSD and Nonattainment NSR programs. As explained elsewhere in this application, we have determined that the JNAP Project will not trigger PSD or NSR.

In reaching this conclusion, FCA considered the potential for "project aggregation," including whether the JNAP Project merits aggregation with the project at the Mack Assembly Plant ("MAP") that was previously permitted by PTI #14-19 on April 26, 2019. The project aggregation analysis effectively mimics that for determining when to combine activities for evaluation of Rule 278 circumvention or "sham permitting." As explained below, the JNAP Project constitutes a separate project and set of activities from the previously permitted MAP permitted activities.

The federal law and guidance regarding "project aggregation" was clarified by USEPA at *Prevention of Significant Deterioration (PSD) and Nonattainment NSR: Aggregation; Reconsideration,* 83 Fed. Reg. 57,324 (Nov. 15, 2018). In addition to summarizing the relevant body of federal guidance that developed over the years, USEPA's 2018 Aggregation Action clarified several points of potential confusion, including the key points from prior applicability determinations and earlier Federal Register items. In general, USEPA continues to focus on whether projects are "substantially related," which includes consideration of whether the projects in question:

- Were jointly planned in the same capital improvement or engineering study
- Technically or economically depend on each other for viability, sharing an interrelationship and interdependence
- Share an intrinsic relationship (e.g., physical proximity, stages of production process, etc.)
- Occur close in time and at components that are functionally interconnected, either technically or economically, although timing alone is not determinative

Comparing the JNAP and MAP projects, they: (1) were not jointly planned, but rather were reviewed as separate project/activities in different years, each with a separate corporate review and approval process; (2) can each exist and operate independently as separate facilities, as confirmed by JNAP's independent operation for decades; (3) do not have an intrinsic relationship given that they involve two entirely separate manufacturing operations and different assembly lines; (4) will have distinct emission units at the respective facilities; and (5) each have entirely separate management personnel and separate financial centers. As a result, the JNAP Project merits treatment as a standalone project rather than part of a larger, staged project.

Under the overlapping state guidance for evaluating Rule 278 circumvention or sham permitting, cited in the January 2016 PTI Workbook (PDF p.21-22) and October 2005 PTI Guidebook (PDF pp.18-21), the JNAP and MAP projects do not merit treatment as a single activity. In addition to the temporal separation, the activities were proposed, reviewed, and approved as separate capital appropriations in separate years, thereby satisfying the "rule of thumb" provided by AQD. Combined with the lack of interdependence (e.g., unlike the related coating line and power source discussed in the PTI Guidebook example on PDF p.18), there is no evidence of Rule 278 circumvention or sham permitting

3.0 PROCESS DESCRIPTION

The following sections briefly describe the various planned sustainment activities at the JNAP facility, including the new tutone process and relocated rapid repair operations being installed as part of the project.

3.1 BODY SHOP

There will be no significant changes to the existing body shop (a.k.a. Body in White, or "BIW") needed to accommodate the planned tutone line equipment and related sustainment installations. There will be some retooling, including that required to accommodate electric vehicle product and replacing or repairing of old conveyors and carriers. A small amount of new or replaced natural gas equipment and some welding equipment will be upgraded. FCA anticipates that these changes will result in similar emissions as to those in the past, and no significant emission units will be modified in the body shop.

3.2 GENERAL ASSEMBLY ("GA")

Various departments within the GA area will be retooled to include replacing old conveyance, carriers and making station improvements. Supplemental/replacement glass installation stations will be incorporated into the existing general assembly operations; testing laboratories will be relocated to small building bump-outs, and some small combustion equipment will be replaced. The changes to GA do not result in an increase in production capacity.

3.3 PAINT SHOP

At the existing paint shop, un-coated vehicles enter from the BIW area and proceed to a phosphate tank for surface treatment. Except for natural gas combustion related emissions from air handling units and the drying oven, no other process emissions result from these operations. After phosphate, the vehicles proceed through the electro-deposition ("E-coat") dip tank and oven, then proceed to sealer application, powder guidecoat operations, followed by entrance into one of three topcoat booths that apply solvent borne basecoat and clearcoat.

The E-coat oven VOC emissions are controlled by a thermal oxidizer. The guidecoat/primer operation is a dry powder application and a curing oven with no VOC controls. The topcoat lines rely on VOC controls for portions of the booth application areas and the ovens. VOC emissions from topcoat booths are routed to a concentrator followed by a thermal oxidizer. VOCs from the topcoat ovens are exhausted directly to a thermal oxidizer.

The new tutone process is designed to apply a base and clear coat to just the roof area of the vehicle. Vehicles that will have the tutone roof will be processed as follows: The vehicle will receive a tack off of the roof area and then proceed to the proposed tutone booth where only the exterior roof of the vehicle will receive base (black) and clear coatings. There will be no additional topcoat applied or sprayed to the roof area once a tutone roof is applied.

With the exception of an observation area (where no coating is applied), the exhaust from the tutone booths will be routed to a concentrator and then an oxidizer to control emissions of VOCs. The tutone oven exhaust will also be directed to an oxidizer.

The remainder of the vehicle's surface area will be coated in one of the three topcoat color lines. The tutone roof will be masked (i.e., covered) and no coating will be applied to that masked area in the topcoat line.

After exiting a topcoat booth, vehicles will enter an oven and cooling tunnel. Upon cooling, vehicles are inspected and polished. Severely blemished vehicles are directed back to one of the main topcoat booths. Less major repairs are conducted in one of the rapid repair booths. Due to the location of the tutone operation, the current rapid repair area will be relocated to a new building addition. Air in the rapid reprocess booths is filtered and then exhausted to atmosphere. Completed vehicles then leave the paint shop and are directed to the general/final assembly area.

Additionally, there are certain paint shop operations that will be refurbished or relocated as part of the planned sustainment activities at JNAP.

1. Coating applicators in the topcoat booths will be replaced with new units and automation to improve overall efficiency,
2. Powder coating operations will receive new automation
3. The rapid repair operation will be relocated and a new building addition constructed to house the process;
4. The existing purfoam operation will be relocated to the paint shop, using the same exhaust design as the current operation (i.e, the process has no exhaust stacks and the minimal emissions will exhaust into the in-plant environment). There will be no change to material used or the per unit application rates;
5. The sealer operations will include replacement of existing robotic sealer application equipment, but no new materials or exhaust systems are anticipated;
6. Conveyor systems will be replaced or repaired

These changes will not result in an increase to the topcoat line's production rate or capacity.

3.4 COMBUSTION EQUIPMENT

As part of the proposed sustainment project, FCA will install a small amount of new or replace existing combustion equipment that will consist only of natural gas-fired units. The new equipment will include the tutone oven, the relocated rapid repair air supply units, various other air supply houses, air make-up units, space heaters and a concentrator/thermal oxidizer control device. The table below provides a summary of the proposed new installations of combustion equipment and their respective heat input ratings.

Table 3.0 - Combustion Equipment

Equipment Type	Heat Input (MMBtu/hr)
Concentrator/Oxidizer	20.0
New Ovens/ASH/AMU/Space Heat	171.6
TOTALS	191.6 MMBtu/hr

As noted, the majority of the sustainment activities are intended to refurbish and update the facility in order to maintain consistent production at the current capacity, accommodate electric vehicles components and launch the next generation of vehicles. Only certain changes will result in changes to emissions which have been addressed within this document.

4.0 CRITERIA POLLUTANT EMISSION ESTIMATES

Presented in the table below are the proposed annual criteria pollutant emission levels associated with new or modified equipment as part of the sustainment efforts. Appendix B provides detailed calculations with assumptions regarding control equipment, etc. demonstrating the methods for determining the emission levels in the table.

Table 4.0 – Project Criteria Pollutant Emission Summary Table

Emission Source	VOC Emissions (tpy)	NOx Emissions (tpy)	CO Emissions (tpy)	PM-10/2.5 Emissions (tpy)	SO2 Emissions (tpy)	GHG Emissions (tpy)
Tutone Booth/Oven	20.9	-	-	0.56	-	-
Rapid Repair	0.86	-		0.23	-	-
Purge/Clean Solvents	7.7	-	-	-	-	-
Combustion-Ovens/ASH	2.38	15.55	36.28	3.28	0.26	43,971
Combustion-RTO/Conc	0.43	3.94	6.62	0.6	0.05	5,125
Color line reductions for tutone vehicles*	**- 10.1**					
TOTAL	**22.11**	**19.49**	**42.9**	**4.67**	**0.31**	**49,096**
Major Modification Threshold	**40**	**40/40**	**100**	**15/10**	**40**	**75,000**

* - The roof area of each vehicle will be coated in either the tutone line or a Color line, not both. Therefore, the corresponding reduction realized at the Color line for the projected tutone vehicles is included.

The basic method used to calculate estimated emissions from the upgrades and new coating installations is described below.

4.1 VOC EMISSION ESTIMATES

Potential new sources of VOC emissions associated with the sustainment project include: surface coating operations (tutone) and natural gas fuel combustion.

In general, VOC emissions from coating applications are estimated based on projected material usage, the VOC content of the material and emission reduction achieved by the control system, as appropriate. The following general approach was used, where CE stands for a control device control efficiency.

Gallon/vehicle * lbs VOC/gallon * vehicles/yr * 1 ton/2000 lbs * (1-CE) = X tons/year

Emissions from fuel combustion are based on the projected amount of fuel consumed (based on burner rating) and the corresponding published emission factor. In general, add-on emission controls for VOCs from natural gas sources are not relied upon.

4.2 PARTICULATE MATTER (PM, PM_{10} AND $PM_{2.5}$) EMISSION ESTIMATES

Potential new sources of particulate matter (“PM”) emissions associated with the sustainment project include: tutone surface coating operations, surface repair operations and fuel combustion.

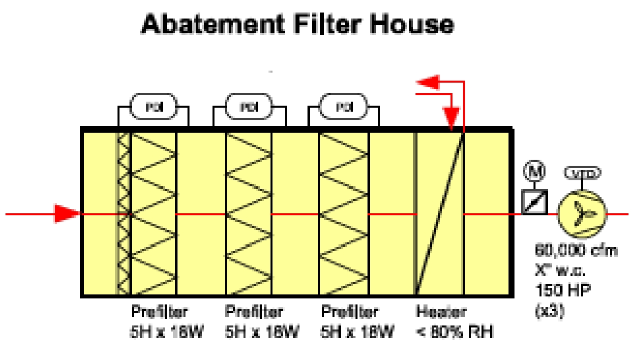
The following discussion describes the basis for the PM emissions calculation for each source type.

4.2.1 Coating PM emissions

Emissions of particulate matter from the tutone coating line overspray will be controlled with the use of a water wash system that relies upon a downdraft designed booth. This system is also used throughout the existing topcoat application process and is similar to that which is employed for PM control in other paint shops. In addition, the tutone operation booth air will be routed to a concentrator followed by an oxidizer. Prior to the VOC control systems, an additional level of PM control is required in order to minimize particulate matter from negatively impacting the control devices. As a result, the overall emission profile for particulate matter emissions (both PM_{10} and $PM_{2.5}$) from the tutone coating booths is substantially reduced.

Potential emissions of PM for the proposed tutone operations are been based upon an industry accepted assumed grain loading (1.5 grains/1000 ft^3) in the exhaust, an assumed air flow rate from the tutone booth (based upon the air flow rate through the coating zones) and the hours of operation for the calendar year. The booth design requires filtered air to be introduced into the booth and additional filtration systems prior to exhausting to the control devices. For the tutone coating operation, all of the booth coating application zones will be controlled by a concentrator followed by thermal oxidation. The tutone oven will exhaust directly to the RTO.

The figure below provides an example of the tutone booth exhaust pre-concentrator filter system:



FCA has conservatively assumed that the second filtration system (filter house) prior to the concentrator and oxidizer will be 98% efficient. Below is the particulate matter calculation for the primer and topcoat booths.

1.5 grains/1000 cubic feet * (1-0.98) removal *Xft3/min = Y grains/min

Y gr/min * 60 min/hr * 1 lb/7000 grains = Z pounds per hour

Z pounds/hour * 8,760 hours/yr * 1 ton/2000 lbs = **W tons per year**

Note that the coating booths will likely operate less than 8,760 hours per year.

PM emissions for the relocated rapid repair operation were estimated based upon the use of dry filtration systems and previous testing of PM emissions at FCA assembly plants.

It should be noted that the increase in PM_{10} and $PM_{2.5}$ emissions based upon the proposed allowable emissions provided are below their respective major source thresholds and therefore, the emissions of these pollutants are not subject to the BACT requirement nor the impact analysis under the federal PSD program.

4.2.2 Combustion Devices

FCA is proposing the use of natural gas as the fuel in any new or replaced combustion devices as part of the sustainment efforts at JNAP. The PM_{10} and $PM_{2.5}$ potential emissions based upon the maximum capacity of these units will be in the range of 4.0 tons per year. PM emissions from these units was based on AP-42 or manufacturer's emission factors for natural gas fired combustion devices and the maximum rated heat input capacity of the combustion units. FCA also assumed that $PM_{2.5}$ is equal to PM_{10}.

For the majority of new air supply houses and air makeup units, the combustion exhaust air will require filtration and temperature/humidification control. The exhaust from the combustion of natural gas will be mixed with fresh air and then filtered followed by cooling. Once cooled, the air will be filtered again prior to introduction into the spray booths or other areas of the facility.

4.3 NO_X EMISSION ESTIMATES

For annual NOx emissions from the new combustion operations, the following approach was used:

MMcf/yr * Emission Factor lbs NOx/MMcf * hrs/yr * 1 ton/2000 lbs = X tons per year

4.4 OTHER CRITERIA POLLUTANTS

Other criteria pollutants (i.e., CO, SO2) that were the result of combustion emissions were estimated in the same fashion as NOx above (i.e. using AP-42 emission factors).

5.0 REGULATORY ANALYSIS

5.1 FEDERAL NEW SOURCE REVIEW – MODIFICATIONS

As indicated, the sustainment activities and change to the JNAP facility will be completed in an area that is now designated as marginal non-attainment for ozone, and attainment of the NAAQS for all other criteria pollutants. The applicability of federal and state air quality regulations has been evaluated accordingly. The proposed sustainment efforts that include a new tutone booth/oven and rapid repair operation at the existing assembly plant will be considered a minor modification (an increase less than significance) of an existing major stationary source of regulated air pollutant emissions under the federal NANSR program. Increases of the other criteria pollutants will also remain below the corresponding major modification (significance) thresholds for attainment pollutants.

The following sections present an evaluation of the proposed changes with respect to NANSR and PSD, as appropriate.

5.1.1 VOC Sources

FCA has evaluated the emissions associated with the proposed sustainment efforts at JNAP based upon potential emissions from the proposed new emission sources. The emissions increases associated with the new tutone operation are based upon a 163,800 jobs/year maximum production rate in the tutone booth and oven. Rapid repair is based upon historical emissions and repair rates for the entire paint shop and any new or replaced combustion equipment is based upon projected natural gas usage. Other sustainment related changes at the existing topcoat operations, like replacing old applicators with new, more efficient equipment, will likely result in a decrease in VOC emissions.

As indicated, the VOC emissions from the proposed sustainment activities, including the new operations, will result in increases that are less than the major modification significance thresholds under the NSR program. As a result, the proposed changes to VOC emissions are not subject to NANSR review.

5.1.2 PSD - Attainment Pollutants

Potential emissions of Nitrogen Oxides, Carbon Monoxide, Greenhouse gases, SO_2 and Pb have been estimated based upon standard emission factors and the maximum rated heat input capacity of any new natural gas-fired combustion units planned for installation as part of the sustainment project. As noted previously, the potential emissions are all less than the NSR major modification significance levels for these pollutants, including NOx as an ozone nonattainment precursor (see Table 4.0).

5.2 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES (NSPS)

The federal Standards of Performance for New Stationary Sources (NSPS) consist of technology-based emission standards for new, modified or reconstructed categories of stationary sources. Specific proposed new equipment installations at the plant will be subject to NSPSs, which are found at 40 CFR Subpart 60.

5.2.1 Surface Coating of Automobiles and Light Duty Trucks

New Source Performance Standards (NSPS) for surface coating of automobiles and light duty trucks, 40 CFR 60 Subpart MM will apply to the new tutone coating line. Specifically, standard limitations are

E-Coat - 1.34 lbs VOC/GACS
Primer – 12.0 lbs VOC/GACS
Topcoat - 12.27 lbs VOC/GACS

At JNAP, the facility complies with the applicable Subpart MM standards based upon the performance levels for E-Coat, primer and topcoat. The NSPS limits are subsumed within the FPI permit limits and conditions. This will also be the case for the proposed tutone operation.

5.2.2 Natural Gas Combustion

The NSPS found in 40 CFR 60 Subpart Dc for Small Industrial-Commercial-Institutional Steam Generating Units may be applicable to any natural gas-fired combustion unit that will be installed above the 10 MMBtu/hr heat input threshold. At this time, there are no plans to install any units that would be subject to Subpart Dc.

5.3 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

5.3.1 Auto MACT

The NESHAPs (or MACT standards) are applicable to facilities that are existing, new or reconstructed major sources of hazardous air pollutants (HAPs). 40 CFR 63 Subpart IIII established National Emission Standards for Hazardous Air Pollutants (NESHAP) for Surface Coating of Automobiles and Light Duty Trucks. The existing JNAP facility is subject to the standards in Subpart IIII for existing sources and complies without the use of add-on control devices. Similarly, for the new tutone operation, FCA anticipates being able to comply with the same standards for existing sources and will be able to do so without the use of add-control equipment.

Based upon the plans for tutone and the sustainment efforts, FCA has concluded that the proposed changes do not result in JNAP being considered a new or reconstructed source subject to the new source MACT standard under Subpart IIII.

Pursuant to the Subpart IIII standards, reconstruction is addressed as follows in § 63.3082 [emphasis added]:

(f) An affected source is reconstructed if its **paint shop** undergoes replacement of components to such an extent that:

> (1) The fixed capital cost of **the new components** exceeded 50 percent of the fixed capital cost that would be required to construct a **new paint shop**; and
> (2) It was technologically and economically feasible for the reconstructed source to meet the relevant standards established by the Administrator pursuant to section 112 of the Clean Air Act (CAA).

(g) An affected source is existing if it is not new or reconstructed.

Based upon the above definition, FCA has determined that the costs associated with new components in the paint shop would not exceed 50% of the cost of an entirely new paint shop. See Appendix I for the detailed cost demonstration. Accordingly, the reconstruction cost estimate indicates that the facility will continue to be subject to existing source requirements pursuant to 40 CFR 63 Subpart IIII.

5.3.2 Boiler MACT

At this time, FCA does not anticipate the project will include the installation of new boilers or process heaters subject to 40 CFR 63 Subpart DDDDD for Industrial, Commercial, and Institutional Boilers and Process Heaters.

5.3.3 RICE MACT

At this time, FCA does not anticipate that there will be additional emergency engines installed as part of this project at JNAP.

5.4 STATE APPLICABLE REQUIREMENTS

The following sections address State of Michigan Act 451 regulations that are applicable to the proposed changes.

5.4.1 State New Source Review

Submittal of this document and the application form included in Appendix A addresses the State of Michigan's NSR program requirements.

State of Michigan Public Act 451, Rule 336.1201 (Rule 201) requires that a Permit to Install (PTI) be obtained for the construction or modification of a process or process equipment which may emit an air contaminant. While the proposed changes will result in emissions increases, JNAP's current FPI permit is structured such that these changes could be accommodated by the current limits and not require a PTI application. However, due to the emissions control proposed for the tutone operation, the AQD has indicated that the FPI needs to be amended to include the appropriate terms for operation of those controls.

5.4.2 State Best Available Control Technology Requirements

State of Michigan Rule 702 addresses new sources of VOCs specifically and states the following [emphasis added]:

R 336.1702 New sources of volatile organic compound emissions generally.

Rule 702. A person who is responsible for any new source of volatile organic compound emissions shall not cause or allow the emission of volatile organic compound emissions from the new source in excess of the lowest maximum allowable emission rate of the following:

(a) The maximum allowable emission rate listed by the department on its own initiative ***or based upon the application of the best available control technology.***

(b) The maximum allowable emission rate specified by a new source performance standard promulgated by the United States environmental protection agency under authority enacted by title I, part A, section 111 of the clean air act, as amended, 42 U.S.C. §7413.

(c) The maximum allowable emission rate specified as a condition of a permit to install or a permit to operate.

(d) The maximum allowable emission rate specified in part 6 of these rules which would otherwise be applicable to the new source except for the date that the process or process equipment was placed into operation or for which an application for a permit to install, under the provisions of part 2 of these rules, was made to the department. If the part 6 allowable emission rate provides for a future compliance date, then the future compliance date shall also be applicable to a new source pursuant to this subdivision.

In accordance with Rule 702 (a), FCA has addressed best available control technology ("BACT") for the sustainment project. In addition, at the request of EGLE-AQD, this application also includes a demonstration that the current FPI limits continue to be consistent with and satisfy BACT obligations. These demonstrations are presented in Section 6.0.

5.4.3 State Toxic Air Contaminants Requirements

The Michigan Air Pollution Control regulations include Rules 224 which requires new or modified sources to implement T-BACT (Toxics BACT) for sources or emissions of TACs. Rule 225 states that:

"*Rule 225. (1) A person who is responsible for any proposed new or modified emission unit or units for which an application for a permit to install is required by part 2 of these rules and which emits a toxic air contaminant (TAC) shall not cause or allow the emission of the toxic air contaminant from the proposed new or modified emission unit or units in excess of the maximum allowable emission rate which results in a predicted maximum ambient impact that is more than the initial threshold screening level or the initial risk screening level, or both, except as provided in subrules (2) and (3) of this rule and in R 336.1226*."

FCA has completed a detailed impact analysis for TAC emissions in Section 7.0 of this application.

6.0 BEST AVAILABLE CONTROL TECHNOLOGY

As noted previously, VOC emissions associated with the proposed sustainment project, including the proposed new tutone coating operation, will not result in an emission increase that exceeds the 40 ton per year significance threshold for a major modification in a marginal ozone non-attainment area. Due to the controls associated with tutone, AQD has indicated that it is necessary to incorporate additional terms in the FPI conditions that will address operation of the planned VOC controls. As such, AQD has requested that FCA provide a demonstration that BACT will continue to be satisfied for both new and existing VOC emission units that will be addressed by the FPI.

In addition, Michigan's Rule 702 requires new sources of VOCs to demonstrate that BACT will be implemented for each new or modified emission unit. The paragraphs that follow provide FCA's demonstration that the existing and proposed new operations will incorporate BACT in relation to sources of VOC emissions.

BACT is defined as that emission reduction technology which provides the maximum degree of reduction achievable based on energy, environmental and economic impacts and other costs associated with emission control. BACT is determined on a source-specific case-by-case basis and must be at least as stringent as any applicable New Source Performance Standards (NSPS) (i.e., in this case 40 CFR 60 Subpart MM).

US EPA's top-down BACT requirements can be classified in five distinct steps as follows:

STEP 1: Identify All Control Technologies
STEP 2: Eliminate Technically Infeasible Options
STEP 3: Rank Remaining Control Technologies by Control Effectiveness
STEP 4: Evaluate Most Effective Controls and Document Results
STEP 5: Select BACT

Although Michigan does not specifically require a top-down approach, the steps of the top down BACT process will satisfy the Rule 702 requirements in Michigan.

6.1 BACT APPROACH

For purposes of the BACT analysis, FCA addressed the various VOC sources similar to previous BACT analyses, with the emphasis on emission reduction technologies from the same type of coating operation and less emphasis on the source specific emission rates since the JNAP facility is existing and physical modifications are not being proposed for the majority of the VOC sources. Below is the BACT demonstration for the various VOC sources at JNAP.

6.1.1 Paint and Body Shop Sealers BACT

Although the sealer application systems are only being updated and relocated, FCA reviewed the various State Implementation Plans (SIPs) and also the Control Techniques Guideline (CTG) for Automobile and Light Duty Trucks issued by USEPA under Section 183e of the Clean Air Act in September 2008 for existing sources. The SIPs reviewed and the CTG did not identify any more efficient emission reduction techniques or stringent limitations for sealers than those identified in the RACT/BACT/LAER Clearinghouse (RBLC) or issued permits with specific limits for sealers.

The proposed upgrades to the sealer operations utilize low VOC containing materials with an average VOC content of less than 0.3 pounds per gallon on a weighted average basis (not including glass sealers). In contrast, the SIPs and CTG reviewed only identify recommended existing source limits of over 5 lbs VOC/gallon. FCA has not identified other available sealers with lower VOC contents that would substantially reduce VOC emissions from this operation (below the proposed level). FCA believes this to be the case due to the need for sealers to be viscous enough to be pump-able or hand applied to the vehicle body.

The following is a summary of the recent RBLC, permit limits, and related determinations applicable to sealers reviewed as part of this application.

Table 6.1 - Summary of Recent Sealer VOC BACT/LAER Determinations

Source	Date	Lbs VOC/Gallon Minus H_2O
GM Shreveport Assembly	3-24-00	0.5
GM Lansing GR Assembly	2-27-00	0.3
Nissan North America	4-4-01	0.3
GM Delta Assembly	9-26-01	0.3
FCA Jefferson North	12-17-01	0.3
GM- Lansing Craft Ctr.	4-2-02	0.3
Honda Manufacturing Alabama	10-18-02	0.3
Ford Michigan Truck	9-8-03 (1-8-09)	FPI Limit
GM Lordstown (Ohio BAT)	2-12-04	0.3
Toledo Supplier Park	9-3-04	0.3
Toyota Texas**	6-16-04	0.3
Kia Motors Georgia	6-20-07	0.45
Volkswagen, Tennessee	10-10-08	N/A
FCA Belvidere Assembly (Body shop only)	9-16-11	0.16 automated application and 0.25 manual (monthly avg)
Hyundai Motor Alabama	6-12-12	0.3
Ford Kentucky Truck	2-19-14	0.3
Subaru of Indiana	5-19-14	0.38 lbs/gal
GM Delta Twp	5-9/2014	0.3
Tesla, Fremont California	7-9-15	Included in guidecoat limits for ovens
FCA SHAP (Bed only)	4-16-18	0.25
FCA WTAP	8-26-19	0.25 monthly average

* All of the above are BACT determinations except GM Lordstown and FCA WTAP.
** Combined sealers, adhesives and undercoat

The materials at JNAP are similar to other assembly plants using low VOC materials. For a portion of the paint shop sealers that are exposed to the sealer oven, the emissions from the oven are routed to one of two existing E-coat Oxidizers (Oxidizer B). Due to the fact that the majority of other sealers applied throughout the facility are applied at stations on the plant floor and emissions tend to be fugitive in nature, there is essentially no opportunity to implement further emission reduction techniques such as add-control for sealer application stations. Note that any sealer VOCs that are released in the E-coat or Topcoat ovens will be routed to a thermal oxidizer along with the other emissions released in the ovens. Based upon the above determinations, FCA has determined that

BACT for the body and paint shop sealers and adhesives is the use of low VOC materials and the FPI limits should not be revised as the existing sealer operations continue to meet BACT for VOCs.

6.1.2 E-Coat BACT

STEP 1: Identify All Control Technologies – E-coat

FCA recognizes that there are three key aspects to defining BACT for emission reductions from surface coating operations as presented below. The current JNAP E-coat system utilizes thermal oxidation on the E-Coat oven portion of emissions. Accordingly, the sections that follow address the appropriateness of oxidation on the oven and provides an analysis of utilizing VOC emission reduction techniques for the existing dip tank, which is presently not controlled.

Emission reduction technologies:

1) Coating Materials
2) Coating Application Methods
3) VOC Control

Each one of these is addressed below for the existing JNAP E-coat operations:

1) E-Coat Materials

Although E-coat emission levels are such that they are not considered significant or major, FCA has addressed E-coat in the BACT review process since the E-coat operation will be part of the analysis demonstrating that the existing FPI limits are appropriate and should be retained. For E-coat materials, low VOC waterborne materials are an industry standard and have been widely used across the U.S. FCA is not aware of any coating materials that would provide additional VOC reductions beyond those which are currently used in the industry. Although solvent borne coatings could be used in a dip tank like the E-coat operations, such materials evaporate much more rapidly than waterborne E-coat materials and therefore constant addition of solvent would likely be required, increasing emissions and likely impeding coating quality and consistency. Additionally, safety issues with the electro-deposition process prohibit solvent coatings from being viable for E-coat immersion. FCA is not aware of any other coatings available that would reduce VOC emissions further.

2) E-Coat Coating Application Methods

The electro-deposition process provides essentially 100% transfer efficiency of the coating particles (resin and pigment) in the E-coat materials. Through electrochemistry, particles migrate toward the vehicle body and are deposited onto the body surface, creating a strong bond between the coating and the body to provide a durable coating. Once the coating application deposition is completed, the body is rinsed in a succession of individual spray and/or immersion rinse stations. FCA did not identify any other application methods that could be implemented at JNAP that would provide a transfer efficiency greater than that of immersion and reduce VOC emissions.

3) VOC Control

Add-on controls reduce the amount of VOC emissions by either destruction or recovery with or without recycling of VOC emission in the exhaust streams. FCA identified the following as available add-on control technologies for the control of VOCs from the proposed E-coat operations as well as typical control efficiencies for VOCs:

- Thermal Oxidation (90-99%)
- Catalytic Oxidation (90-99%)
- Carbon Adsorption (90-95%)
- Condensation (50-85%)

FCA believes that condensation technology is not technically feasible for this application due to the high humidity associated with a water-based dip tank, and the dilute nature of the exhaust streams (as a result of low emissions from E-Coat materials). Furthermore, FCA is not aware of any automotive surface coating operations that have successfully utilized condensation controls on E-coat.

The two categories of add-on control devices typically used by the automobile and light-duty truck assembly coatings operations are: combustion (thermal or catalytic oxidation) and recovery (adsorption). While other types of control devices can be used to reduce VOC emissions, the following summary covers those control devices known to be used with automobile and light-duty truck surface coating operations: oxidation and hybrid systems (concentrator followed by an oxidizer).

Table 6.2 provides a summary of the RBLC and issued E-coat operation control technologies.

Table 6.2 - Summary of Recent E-Coat VOC BACT/LAER Determinations

Source	Tank	Oven	Date	lbs/GACS*
Nissan North America	NA	Oxidation	4-4-01	0.13
GM Delta Assembly	Oxidation	Oxidation	9-26-01	0.04
GM- Lansing Craft Ctr.	Oxidation	Oxidation	4-2-02	0.04
Honda Manufacturing Alabama			10-18-02	0.13
GM Lansing Craft	Oxidation	Oxidation	2-11-03	0.04
Ford Michigan Truck	Oxidation	Oxidation	9-8-03 (1-8-09)	FPI Limit
Ford Wixom Assembly	Oxidation	Oxidation	2-26-04	0.25
Toledo Supplier Park	Oxidation	Oxidation	09-07-04	0.04
Toyota Texas	NA	Oxidation	6-16-04	0.13
Kia Motors Georgia	NA	Oxidation	6-20-07	0.19
Volkswagen, Tennessee	NA	Oxidation	10-10-08	0.26
Hyundai, Alabama	NA	Oxidation	06-12-12	0.13
Ford Kentucky Truck	Oxidation	Oxidation	2-19-14	0.04
Subaru of Indiana	NA	Oxidation	5-19-14	1.15 lbs/gal
Tesla, Fremont California	Oxidation	Oxidation	7-9-15	1.42

* The above are BACT or LAER determination results
NA – No controls identified

Oxidation destroys VOC emissions in an exhaust stream by exposing the stream to an oxidizing atmosphere at high temperatures. Oxidizers are typically used in the automobile and light-duty truck surface coating industry to control bake oven exhaust emissions. Oxidizers may be of thermal or catalytic design and combust VOC-containing exhaust streams. Catalytic oxidizers are similar to thermal oxidizers but employ a catalyst to aid in the oxidation reaction. As a result, catalytic oxidizers operate at lower combustion temperatures relative to that required in thermal oxidizers. Both types of oxidizers generally utilize either regenerative or recuperative techniques to preheat inlet gas in order to decrease energy costs associated with high oxidation temperatures. They may also use primary or secondary heat recovery to reduce energy consumption. In general, oxidizers may achieve destruction efficiencies of greater than 95 percent as applied to coating application operations with high and constant concentrations of VOC.

Hybrid systems consist of a concentrator followed by an oxidizer. Hybrid systems are used in the automobile and light-duty truck surface coating industry to control spray booth exhaust emissions, most often exhaust from automated zones of the spray booth. The concentrator is typically a carbon or zeolite rotor. The concentrator reduces the volume and increases the VOC concentration of the inlet stream to the oxidizer.

STEP 2: Eliminate Technically Infeasible Options

As noted above, powder coatings and in general, spray application methods have been eliminated from this analysis due to the lack of a spray coating application that provides the coverage needed for corrosion protection at this stage in the vehicle body coating operation. Add-on condensation controls have also been eliminated due to the low exhaust concentrations from the E-coat operations.

STEP 3: Rank Remaining Control Technologies by Control Effectiveness

Of the remaining emission reduction technologies which are all add-on controls, the rankings are as follows:

- Thermal Oxidation (90-99%)
- Catalytic Oxidation (90-99%)
- Carbon Adsorption (90-95%)

Of the above control options, limited collateral environmental impacts are noted. Combustion of natural gas in thermal and catalytic oxidizers results in slight increases in combustion emissions, but carbon adsorption results in waste issues as well. FCA has determined that collateral issues do not obviate the consideration of the top three options.

STEP 4: Evaluate Most Effective Controls and Document Results

FCA currently relies on thermal oxidation for control of VOCs from the E-Coat oven. Since this is the most effective control in terms of efficiency, there is no need to demonstrate or document the results any further.

With regards to add-on controls for the Ecoat tank, FCA evaluated available options for the existing JNAP operation. The current thermal oxidizer used to abate the Ecoat oven also provides the heated air to dry the vehicles in the oven. The oven thermal oxidizer does not have the capacity to accommodate an increase in air flow from the tank exhaust and routing the moist tank air to the oven would tax the drying system and jeopardize energy efficiency. On this basis, FCA determined that it is not technically feasible to rely on the existing control system for tank VOC emissions reductions and, therefore, the analysis requires the inclusion of a new oxidizer to realize such control.

In order to determine whether such an approach would constitute BACT for JNAP, FCA completed a cost analysis to determine the $/ton value associated with a new thermal oxidizer (see Appendix H). The VOC input used in the cost analysis was determined by looking at the VOC emissions contribution from Ecoat relative to the total facility wide emissions. E-Coat contributes approximately 2.45% of the total VOC emissions. Using this same percentage (2.45%) in relation to the current FPI allowable VOC emission level of 1,085 tpy, E-coat's emissions available for control are 26.6 tons VOC/year. This value is considered conservative since it includes the total VOC emissions from the E-coat oven which are already controlled and would not be addressed with a new oxidizer. The BACT cost analysis indicates the annual $/ton VOC control cost is $13,630 which is considered cost prohibitive (see Appendix H).

STEP 5: Select BACT

For purposes of BACT and the existing E-coat operations, FCA reviewed available information related to the E-coat processes at numerous recently permitted automotive manufacturing facilities. All recently permitted E-coat operations identified were noted as utilizing water-borne immersion (vehicle dip) application methods. The low VOC waterborne material and the dip application method followed by oxidation of the oven (or the tank and oven emissions) and FCA did not identify other similar E-coat operations using different materials or application methods that would serve to reduce E-coat emissions further at JNAP.

Based upon the information in the included cost analysis and contained in Table 6.2, FCA has concluded that BACT for E-coat is the use of thermal oxidation to control VOCs from the E-coat oven and that the opportunity to control the tank emissions is cost prohibitive. Accordingly, the current FPI limit should not be adjusted as the current control profile reflects BACT for E-coat at JNAP.

6.1.3 Tutone (Topcoat) BACT

As described above, FCA will reactivate an existing but currently inactive tutone booth that will apply both basecoat and clearcoat to the roof portion of vehicles. The proposed booth will rely on VOC emission controls on both the booth and oven exhaust. Table 6.3 below provides a summary of the RBLC for topcoat operations as well as VOC emission limits and control technologies identified in various permits. Due to the limited number of tutone specific limits and the fact that tutone typically relies on the same basecoat and clearcoat technology employed by topcoat (it is typically considered part of topcoat in regulatory programs), FCA referred to the topcoat technologies and control profiles for this analysis.

STEP 1: Identify All Control Technologies

FCA recognizes that there are three key aspects to defining BACT for emission reductions control technologies from tutone surface coating operations as follows:

1) Coating Materials
2) Coating Application Methods
3) VOC Control

Each one of these is addressed below for tutone

1) Coating Materials

Through a review of the RBLC and recently issued permits for assembly plants, FCA has determined that evaluated topcoat (or tutone) materials have consisted of the following:

- Solvent Borne High Solids – Basecoat and Clearcoat
- Solvent Borne Low Solids – Basecoat and Clearcoat
- Water Borne – Basecoat and Clearcoat
- Powder

2) Topcoat/tutone Application Methods

Application technologies for topcoat/tutone materials consist of the following:

- High Volume (HV) Electrostatics
- Low Volume (LV) Electrostatics
- HV Low Pressure
- LV Low Pressure
- Air atomized

The above application methods can be performed with either robotic or manual application methods. Coating technologies such as flow coating, dip coating, airless air spray, roll coating, and thin film atomized technologies have all proven to be technically infeasible for spray application of topcoat materials to automobiles and light duty trucks primarily due to market driven quality objectives.

3) Topcoat/Tutone Add-on Controls

Add-on controls available for topcoat/tutone booths include the following:

- Thermal Oxidation (90-99%)
- Catalytic Oxidation (90-99%)
- Carbon Adsorption (or VOC concentrators) (90-95%)
- Condensation (50-85%)

The following table provides a review of the recent topcoat BACT/LAER Determinations and the type of control technology for topcoat/tutone operations.

Table 6.3 - Summary of Recent Topcoat (Tutone) VOC BACT/LAER Determinations

Source	Date	Booth Control Technology	Oven Controls	Lbs VOC per GACS
Nissan North America - Mississippi (New topcoat booth in 2015)	4-4-01 (revised 1/14/15)	Concentrator & Oxidation on CC automatic sections	Oxidation	5.2
GM Delta Assembly - Michigan	9-26-01	Oxidation on CC automatic sections	Oxidation	5.42

Source	Date	Booth Control Technology	Oven Controls	Lbs VOC per GACS
GM Grand River - Michigan	4-02	Concentrator & Oxidation on CC automatic sections	Oxidation	5.2
GM- Lansing Craft Ctr. - Michigan	4-2-02	Concentrator & Oxidation on CC automatic sections	Oxidation	6.6
Honda Manufacturing - Alabama	10-18-02	Oxidation on CC automatic sections	Oxidation	5.2
GM Lordstown – Ohio	2-12-04	Concentrator & Oxidation on CC automatic sections	Oxidation	6.07
Honda of America – Marysville, Ohio	2-26-04	Oxidation on CC automatics	Oxidation	8.00
Ford Wixom Assembly – Michigan (Closed)	2-26-04	Oxidation on CC automatics	Oxidation	5.29
Hyundai Motor - Alabama	3-23-04	Oxidation on CC automatic sections	Oxidation	5.2
Toyota – San Antonio Texas	6-21-04	Carbon followed by Oxidation on CC automatics	Oxidation	5.2
FCA Supplier Park - Toledo, Ohio	9-3-04	Oxidation on BC Flash Zones and CC automatics	Oxidation	5.42
GM Flint Assembly - Michigan	8-29-05	WB Basecoat/Oxidation on CC automatics	Oxidation	5.5
Nissan – Canton Mississippi	12-1-05	WB Basecoat/Oxidation on CC automatics	Oxidation	5.2
Volkswagen, Tennessee	10-10-08	WB Basecoat/Oxidation on CC automatics	Oxidation	5.2
Kia Motors Georgia	6-20-07	WB Basecoat/Oxidation on CC automatics	Oxidation	5.2
Hyundai Alabama	6-12-12	WB Basecoat/Oxidation on CC automatics	Oxidation	5.2
Ford Michigan Truck	1-8-09/revised 2018	Solvent BC and CC/Oxidation on Booths/Ovens	Oxidation	FPI Limit
Ford Kentucky Truck	2-19/14	3-Wet – Oxidation on booths and ovens	Oxidation	3.53
Subaru Indiana	5-19-14	Oven Oxidation Only	Oxidation	10.96 lbs/gallon; 10.41 lbs/gal
Tesla Fremont California	7-9-15	Solvent BC&CC/Oxidation on booths and ovens	Oxidation	4.8 (combined primer and topcoat)
Ford Chicago Assembly	6-30-2017	Exterior automatics routed to oxidizer	Oxidation	12.0
FCA SHAP*	4-6-18	WB BC/Solvent CC Oxidation on Booths/Ovens	Oxidation	2.32
FCA Mack Avenue **	4-26-19	WB BC/Solvent CC Concentrators/RTO on booths	Oxidation	FPI Limit

Source	Date	Booth Control Technology	Oven Controls	Lbs VOC per GACS
FCA WTAP New Paint Shop**	8-26-19	WB BC/Solvent CC Concentrators/RTO on booths	Oxidation	3.53
FCA WTAP Refurbished Line 1**	8-26-19	Solvent BC/Solvent CC Concentrators/RTO on booths	Oxidation	3.53

* Application indicates controls on WB Booths for TACs compliance only and lbs/GACS value applies only to coating a truck bed, not the entire vehicle.

** Permitted sources currently under construction.

STEP 2: Eliminate Technically Infeasible Options

Materials

As noted above, FCA is proposing to rely on solvent borne basecoats and a solvent borne clearcoat in the tutone booth to maintain consistency with the materials and coating quality from the current JNAP coating operations. Based upon the proposed coating materials, FCA considered whether there were technically feasible lower emitting materials that could be used in the proposed tutone operations.

As described, FCA is proposing the use of a system which incorporates one or two basecoat colors and solvent borne clear coat. The reason this system is being proposed is because the topcoat operations in the existing paint shop and proposed tutone coating line must produce a vehicle coating quality that is consistent. In order to accomplish this objective, the booth structure, paint delivery/application system, air handling and booth set up must be relatively close to the same as the current coating application equipment. It should be noted that the use of powder guidecoat (powder anti-chip) in combination with the proposed tutone basecoat and clearcoat system are likely the lowest VOC content system being used with solvent borne technology. As a result of the above, no further consideration is given to coating material technology in this analysis.

Application Technologies

FCA is proposing to rely on robotically operated applicators with the majority being high volume electrostatics that includes some bell/bell technology. There are currently no plans for routine use of manual application to address cut-ins etc. (i.e., the booth will be entirely automated) except for emergency circumstances. For purposes of this analysis, this application method provides the greatest transfer efficiency (TE) of the available coating technologies within the automobile and light duty truck industry. It should be noted that specific transfer efficiencies are dynamic in that each vehicle and coating may have slightly different overall transfer efficiency. Hence, this analysis did not attempt to identify actual percentages at other facilities due to the variance that occurs in TE over time and the limited application surface area for the tutone roof. Accordingly, there is no need to complete the remaining steps of the BACT analysis for coating application technology.

Add-on Controls

All of the add-on controls identified are technically feasible.

STEP 3: Rank Remaining Control Technologies by Control Effectiveness

As noted, the topcoat materials must be identical to the current paint shop topcoat materials, and the most efficient application methods, robotic electrostatics and bell technology, will be utilized. Hence, the only remaining step for ranking is related to the add-on controls. As noted above, thermal oxidation is considered the most efficient add-on control and the one that FCA is proposing for use on the proposed tutone operation. Emissions from the booths will be cascaded/recirculated and the exhaust will be directed to a concentrator followed by a thermal oxidizer. The tutone oven exhaust will be routed directly to an oxidizer.

STEP 4: Evaluate Most Effective Controls and Document Results

FCA will control the booth portions of the tutone application zone, the heated flash-off zones and tutone bake oven. Accordingly, since concentrator/thermal oxidation systems are the most efficient emission reduction technique available in terms of add-on controls, there is no need to consider BACT further for the tutone booth.

STEP 5: Select BACT

FCA is proposing to rely on VOC emission controls on the tutone line that are consistent with recently permitted solvent/solvent chemistry topcoat lines. FCA will operate tutone within the JNAP FPI-based VOC limits. The emission levels associated with the FPIs for other sources are generally not reflective of modifications such as the installation of a tutone line (which essentially relocates coating of the roof from the basecoat booth to the tutone line) and existing emission units. As a result, FCA relied on these permits for technology-based information as opposed to information related to performance and emission levels.

FCA believes that the most appropriate BACT demonstration is the use of controls on the tutone booth and oven which is planned for the proposed coating line followed by incorporation into the current FPI limit applicable to JNAP (i.e., FCA is not requesting an increase to the FPI limits). It should also be recognized that coating the roof in a separate tutone booth and eliminating the application of those coatings to the roof in the main color booths will result in a decrease in VOC emissions for the main topcoat portion of the operation.

6.1.4 Existing Topcoat Color Lines BACT

There are three existing topcoat Color lines at JNAP. Each spray booth relies on emission controls where bell applicators are used as well as VOC emission controls on the oven exhaust. For those portions of the spray booths that remain uncontrolled (the robotic zones that were formerly manual application zones), FCA evaluated whether additional emission reductions could be achieved through the use of add-on emission reduction technologies.

STEP 1: Identify All Control Technologies

FCA recognizes that there are three key aspects to defining BACT for emission reductions control technologies from the existing topcoat operations as follows:

1) Coating Materials
2) Coating Application Methods

3) VOC Control

Each one of these is addressed below for topcoat.

1) Topcoat Materials

Through a review of the RBLC and recently issued permits for assembly plants, FCA has determined that evaluated topcoat materials have consisted of the following:

- Solvent Borne High Solids – Basecoat and Clearcoat
- Solvent Borne Low Solids – Basecoat and Clearcoat
- Water Borne – Basecoat and Clearcoat
- Powder

2) Topcoat Application Methods

Application technologies for topcoat materials consist of the following:

- High Volume (HV) Electrostatics
- Low Volume (LV) Electrostatics
- HV Low Pressure
- LV Low Pressure
- Air atomized

The above application methods can be done with either robotic or manual application methods. Coating technologies such as flow coating, dip coating, airless air spray, roll coating, and thin film atomized technologies have all proven to be technically infeasible for spray application of topcoat materials to automobiles and light duty trucks primarily due to market driven quality objectives.

3) Topcoat Add-on Controls

Add-on controls available for topcoat booths include the following:

- Thermal Oxidation (90-99%)
- Catalytic Oxidation (90-99%)
- Carbon Adsorption (or VOC concentrators) (90-95%)
- Condensation (50-85%)

STEP 2: Eliminate Technically Infeasible Options

Topcoat Materials

As noted above, FCA relies on solvent borne basecoats and a solvent borne clearcoat in the color booths at JNAP. This coating technology system is part of the overall design at JNAP and the paint shop is structured to accommodate the materials and coatings currently used in the paint shop. Based upon plans to retain the current coating system in the main color booths, emission reductions by converting the basecoat portion of the topcoat system to a waterborne system would require a complete replacement of the booths with structures and materials that would accommodate waterborne coatings. As such, no further consideration is given to the topcoat materials planned for use in the existing Color lines as they are typical VOC content solvent borne materials.

Application Technologies

FCA relies on robotically operated applicators with the majority being high volume electrostatics that includes bell/bell technology. As noted, JNAP booths rely on robotic and reciprocating electrostatic bell applicators technology. FCA routinely updates coating applicators as coating quality and technology updates allow, for example, when technology issues warrant it (i.e., new software compatible systems are needed) or when improvements in efficiency can be realized. As part of the sustainment activities, FCA anticipates replacing the current coating applicators with what are anticipated to be more efficient applicators that rely on updated software systems. It should be noted that specific transfer efficiencies ("TE") are dynamic in that each vehicle configuration (e.g., new model years) and coating may have slightly different overall transfer efficiency. Hence, this analysis does not attempt to identify actual TE percentages at other facilities due to the variance that occurs in TE over time. Accordingly, there is no need to complete the remaining steps of the BACT analysis for coating application technology, as FCA employs equipment that is designed to yield surface coating's state of the art transfer efficiencies.

Add-on Controls

All of the add-on controls identified are technically feasible

STEP 3: Rank Remaining Control Technologies by Control Effectiveness

As noted, the topcoat materials in the existing booths will continue to use solvent borne technology and the most efficient application methods, robotic electrostatics and bell technology, will also be utilized. Therefore, the only remaining step for ranking is related to the add-on controls. Whether there is an effective method to increase the emission reduction potential of the existing systems such that BACT would dictate a change and the FPI limits would need to be adjusted is the basis for considering control of the booth sections that are currently uncontrolled.

FCA evaluated the viability of using the current exhaust system in the topcoat booth and the current emission control system (concentrators/oxidizers for booths and oxidizers for ovens) to control the robot zones of the existing booths. The large exhaust air flow rates from the JNAP booths lends itself to using the concentrator/oxidizer type of control, however the current system (both duct work and control equipment) do not have the capacity to accommodate the additional volume of air. In order to reduce these exhaust rates, the booths would require a complete reconfiguration to allow for recirculation of the air. Performing this reconfiguration would require a protracted production downtime, resulting in this option being so costly that FCA did not consider this option any further.

Therefore, controlling the robot zones of the booth exhaust directly with a new thermal oxidation is considered the most efficient in terms of control. Considering the large air volume, it is much more cost effective to concentrate the VOCs and then route a smaller portion of air to an oxidizer, similar to the current system. Accordingly, FCA considered this approach in Step 4 below.

STEP 4: Evaluate Most Effective Controls and Document Results

FCA evaluated the potential for routing the uncontrolled portions of the existing booth exhaust to VOC controls and determined that the costs associated with adding separate new controls would prove cost prohibitive. The analysis demonstrated costs in excess of $17,091/ton of VOCs controlled (see Appendix H).

The costs analysis is specific to JNAP and what would be involved to ensure that the existing booth configurations and the exhaust could be directed to new control devices on the roof and near the topcoat booths. The analysis did not include production down time or other similar operational impact costs, even though such costs would be significant. The attached COST spreadsheets have been created for the scenario where the current uncontrolled booth exhaust is routed to a concentrator followed by an oxidizer. The capital costs included in the COST sheets are based upon the estimates specific to JNAP. The key criteria used in the cost analysis are as follows:

- The VOC emissions available for control were estimated to be 442 tpy
- The exhaust flow rate of the uncontrolled portion of the booth was 612,000 cfm
- A concentrator would be used to capture 90% of the VOCs and reduce air flow to an oxidizer to 10% of the total exhaust (612,000 cfm to 61,200 cfm)
- The oxidizer would be capable of 95% destruction of the VOCs from the concentrator (90% of the 442 tpy)
- Each control device and associated equipment would have a 20-year life

Based upon the information in the attached cost analysis and contained in Table 6.3 above, FCA has concluded that BACT for topcoat at JNAP is the continued use of concentrators and thermal oxidation as they are currently configured to control VOCs. Accordingly, the current FPI limit should not be adjusted as the current control profile reflects BACT for the existing topcoat operations at JNAP.

6.1.5 Purge/Clean BACT

FCA reviewed the various SIPS and state regulations with VOC emission limits for purge and cleaning operations. FCA did not identify a SIP limit that was more stringent that the limits contained within the various permits reviewed. Accordingly, Table 6.4 below provides a summary of the RBLC for purge/clean operations as well as VOC emission limits and control technologies identified in various permits.

Table 6.4 - Summary of Recent Cleaning Solvent/Purge VOC BACT/LAER Determinations

Source	Date	Tons VOC per 1000 Vehicles*	VOC Emission Limit
GM Lansing GR Assembly	2-27-00	NA	127 tpy
GM Delta Assembly	9-26-01	0.55	161.9 tpy
Honda Manufacturing Alabama	10-18-02	NA	100 tpy
Toyota – Princeton, Indiana	6-27-03	1.85	836.3 tpy
GM Lordstown	2-12-04	0.53	266.7 tpy
Toyota San Antonio Texas	6-21-04	1.74	348.4 tpy
FCA Toledo Supplier Park	9-3-04	1.18	237.6 tpy

Source	Date	Tons VOC per 1000 Vehicles*	VOC Emission Limit
Nissan North America	12-1-05	0.75	372.57 tpy
Kia Motors Georgia	6-20-07	0.6	NA
VW Tennessee	10-10-08	NA	391 tpy
Hyundai Alabama	6-12-12	NA	150 tpy
Ford Kentucky Truck	2-19-14	NA	NA
FCA SHAP**	4-6-18	0.2	82.6 tpy
Ford Michigan Truck	8-15-18	NA	FPI Limit

* Tons VOC emitted per 1,000 vehicles are calculated values of expected performance. Some have been evaluated as part of a facility's BACT review but none are included as permit limits except for the SHAP facility.
** The SHAP facility is a truck bed only paint shop

Tons VOC emitted per 1,000 vehicles are calculated values of expected performance. Some have been evaluated as part of a facility's BACT review, but few are included as permit limits. Based upon the information presented above, very recent permitting actions for solvent cleaning and purge operations (i.e., recent BACT analyses in Michigan) for automotive assembly operations have suggested that the review include an evaluation of emission rates that represent tons or pounds of VOC per vehicle (or per 1,000 vehicles) produced.

Due to the uniqueness of each facility and the associated cleaning operations, FCA has concluded that the most appropriate approach for solvent cleaning and purge used in the tutone operation is based upon the use of low VOC materials (where applicable), implementation of appropriate work practices (including waste management practices) and capture of solvent based purge followed by controls being operated when purging occurs.

FCA also has determined that a pound per vehicle value varies widely because the emissions from solvent cleaning operations are not directly dependent upon vehicle production. As mentioned earlier, relatively constant amounts of booth and equipment cleaning are required whether production volume is high or low. Assembly plants also use production down time to perform deep cleaning operations. For the tutone and topcoat operations, cleaning will occur even when the demand for tutone or non-tutone vehicles may be low. Historically, JNAP has VOC emissions in a range slightly less than 0.6 tons per 1000 vehicles. While the additional tutone booth will impact this value, the fact that the booth will essentially be 100% controlled will serve to reduce purge and cleaning emissions.

Accordingly, and as noted, the BACT for purge and solvent cleaning at JNAP is best defined as reclaiming solvent-based purge materials, where appropriate, and implementing work practice standards to minimize VOC emissions from solvent cleaning operations. FCA currently implements work practice standards to minimize emissions and capture purge for reclamation. Therefore, the FPI limits do not require adjustment as a result of the above BACT demonstration for purge and cleaning operations at JNAP.

6.1.6 Repair Operations

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

The relocated rapid repair operations are directly impacted by process quality assurance and quality control programs within the industry. FCA strives to minimize repairs and believes that the proposed relocated and updated rapid repair operation will allow for increased control over issues typically resulting in post-production repair. Nevertheless, VOC emissions from repair operations are dictated by the type of repair required (i.e., E-Coat repair vs topcoat) the size of repair, and the VOC content and usage rates of the repair materials. FCA did not identify any new technologies for repair operations that would lower VOC emissions beyond what is used in the current repair operations. Accordingly, the repairs to the vehicle must be identical in order to produce a quality coating on the vehicle planned for production. As repairs are a non-value added activity it is inherent that FCA will take efforts to minimize the number of repairs. BACT for repair operations is somewhat undefined, but the use of coatings containing no more than 4.8 lbs VOC/gallon has been established as BACT in many recent permits. The coatings used in the repair operations will have average VOC contents below the 4.8 lbs/gallon level and total emissions are expected to be less than one ton per year of VOCs. As a result, the current operation satisfies BACT and the current FPI VOC limits do not warrant adjustment to account for any changes to the rapid repair operation.

6.1.7 Fluid/Fuel Fill Operations

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

BACT for fuel fill operations is based upon the production levels for each facility since introduction of gasoline into fuel storage tanks followed by dispensing into vehicles are a function of stage I (storage tank filling) and stage II (vehicle dispensing) VOC emission controls. The majority of permits reviewed for gasoline fill operations did not contain specific limits since the majority of these operations are similar and emissions are dependent upon production levels. All of the most recent permits noted that Stage II emission controls have been replaced by the use of on-board recycling and vapor recovery (ORVR) systems. ORVR systems typically provide 95% or greater control of VOCs and nearly 100% of vehicles produced in the U.S. now employ ORVR.

For gasoline storage tanks, BACT has been defined as the use of submerged fill and a vapor balance system. All of the permits reviewed suggested that this technology was being utilized and emission rates were not typically included (typically tank sizes were noted, but emission levels were not). FCA incorporates these technologies at JNAP for gasoline storage tanks as well as the ORVR system on the vehicles produced there. Based upon the above BACT demonstration for fuel filling operations, FCA believes that the FPI limits should not be reduced for fuel filling since the current system constitutes BACT.

6.1.8 Washer Fluids

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

Similar to gasoline fill, the VOC emissions from use of windshield washer fluid fill are a function of the vehicle production level. These operations are typically not controlled but will employ submerged fill for tank filling operations. A review of the various permits suggests that VOC emission limits are typically not included in permits and that BACT or LAER for fluid fill operations is essentially the same across the industry since the fluid is typically methanol and must meet certain physical parameters. Based upon the filling of small containers on the vehicle, FCA did not identify any emission reduction techniques that would constitute BACT beyond what FCA currently uses at JNAP. Accordingly, adjustment of the FPI VOC limits are not warranted as a result of washer fluids.

6.1.9 TANKS

Emissions of VOCs from storage tanks for gasoline used in vehicles are dependent upon the physical characteristics of the tank, the location of the tank (i.e., which part of the country) and the proposed throughput. Accordingly, emissions from storage tanks are not typically included as part of a BACT demonstration other than for the proposed vapor balance/control systems and the RVP of the gasoline. FCA's emission estimates for such tanks is completed using USEPA's TANKS program. The existing storage tanks all rely upon submerged fill and vapor balance in accordance with MDEQ-AQD's Part 7 regulations. As a result, FCA believes that for tanks of a similar size and in a similar location, BACT is the reliance on the Part 7 requirements. No other technologies or emission reduction techniques were identified for storage tanks.

Other storage tanks are used for windshield washer fluid (methanol), brake fluid, engine coolant and refrigerants.

For the methanol storage, the same submerged fill and vapor balance system as gasoline is used. For those materials with low volatility (brake fluid and engine coolant) only submerged fill is relied upon since emissions will be minimal. Refrigerants are stored in pressurized vessels which do not result in emissions. FCA requires all delivery/shipments be completed with tankers that are equipped with Stage I vapor controls.

For purposes of the BACT analysis related to storage tanks other than for gasoline, the same concepts apply in that the materials are relatively standard across the industry and emission levels are dependent upon the location of the facility geographically and the weather conditions throughout the year. Emissions from these tanks are in the pounds per year range and therefore, are typically not addressed in permits with specific limits.

Accordingly, FCA believes that BACT is represented by the current tank systems and no adjustment to the FPI limits are warranted as a result of the tanks at JNAP.

6.1.10 Body Solvent Wipe

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

The body solvent wiping process involves pre-moistened wipes which are containerized and provide for a single use method that minimizes evaporative losses of VOCs. These containers can be closed when not in use. Typically, solvent wiping occurs in uncontrolled booths or areas of the facility and as a result, essentially all VOCs are assumed to evaporate. It should be noted that there may be waste materials that are ultimately disposed of, but these materials are difficult to track and estimate. BACT for these operations are essentially the same across the industry and nearly all plants use containerized, single use wipes. FCA estimates wipe emissions at JNAP have historically been roughly 0.17-0.2 pounds per vehicle for solvent wipe. These materials are usually included in the purge and cleaning solvent category and could be considered part of the BACT demonstration identified for purge and cleaning materials as well. The sustainment operations and the addition of a tutone booth should have minimal impacts on the solvent wipe operations. Currently, FCA knows of no specific methods to reduce solvent wipe emissions beyond what is currently being done at the facility. Accordingly, BACT for solvent wipe does not warrant an adjustment of the current FPI levels.

6.1.11 Glass Installation

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

Glass installation involves the use of primer and wiping materials prior to installation with adhesives. Note that due to safety requirements, these materials are standardized across the industry. For example, Michigan's Rule 621 states the following:

> *Four and nine-tenths pounds of volatile organic compounds emitted per gallon of coating, minus water, as applied for glass adhesion body primer. For the purpose of this subdivision, "glass adhesion body primer" means the prime coating that is applied to automobile or truck bodies as part of the glass bonding system.*

Due to the safety requirements for glass in vehicles, the use of alternative materials is generally considered difficult if not impossible and the use of emission controls is not warranted due to the low level of VOC emissions from this operation. As a result, FCA determined that BACT for VOCs is represented by the current materials and operation and the FPI limits should not be adjusted based upon glass installation.

6.1.12 VOCs from Combustion Sources

VOCs generated from combustion sources are limited to products of combustion of natural gas. FCA did not identify any lower emitting fuels or burner configuration technologies that would reduce VOC emissions from the proposed and existing natural gas combustion sources, FCA has determined that the use of natural gas as fuel in these units constitutes BACT based upon USEPA's AP-42 Compilation of Air Emission Factors which is considered a widely acceptable emission rate for VOCs from natural gas combustion. The FPI limits should not be adjusted based upon the fact that there are no further opportunities to reduce VOC emissions from natural gas combustion.

6.2 BACT SUMMARY – JNAP SUSTAINMENT

The table below provides the results of the above VOC BACT analysis in summary format for the existing JNAP facility and the planned sustainment activities.

Table 6.5 – BACT Summary

Source	Application/Matls	Controls	BACT
Sealers	Robotic pump/manual Applied	Some sealers will be exposed to controls on abated ovens	**Current Low VOC Materials**
Ecoat Tank	Immersion/Low VOC waterborne coatings	None	**Current Materials and Application**
Tutone (Topcoat)	High efficiency applicators	BC/CC Booth to concentrator/RTO, BC Flash, and Oven to RTO	**Controls on Booth and Ovens**
Topcoat 1,2 and 3	High efficiency applicators	Controls on recip. robotic zones in booths and ovens	**Current Control Profile**
Purge/Clean	NA	Purge Capture and work practices	**Current Solvent Management System**
Repair	Manual	None	**Current Profile**
Fuel Fill/Tanks	ORVR/Submerged fill and Vapor Balance	ORVR/Submerged fill and Vapor Balance	**Current ORVR/Submerged fill and Vapor Balance**
Washer Fill	Standard Material	Submerged fill	**NA**
Glass Installation	Safety Based Materials	None	**Current Materials and Application**
Process Fuel Combustion	NA	None	**Natural Gas**

6.3 FLEXIBLE PERMIT BACT

As noted previously, the EGLE-AQD has requested that FCA amend the FPI to address the tutone VOC emission controls and include in the application a demonstration that the FPI limits are appropriate based upon the applicability of Rule 702 to both the new and existing emission sources. As provided in Table 6.6, FCA's proposed sustainment activities and the addition of the tutone operation include the use of VOC emission reduction techniques that are equivalent to BACT for the existing operations and the new operations on an emission unit specific basis.

The following section provides a demonstration as to the continued applicability of the current FPI limits from a facility wide basis. The current FPI emission limits applicable to the VOC sources at JNAP consist of a ton per year limit and a pound per job limit as noted below.

Table 6.6 – Existing FPI Conditions

Pollutant	Limit	Time Period/ Operating Scenario	Equipment
1. VOC	1085.8 tpy	12-month rolling time period as	FG-FACILITY
2. VOC	4.8 pounds per job	12-month rolling time period	FG-FACILITY

FCA evaluated the various FPIs from the most recent permits issued and the applicable annual and pounds VOC per job limits. The table below presents a summary of the various FPI limits FCA used for this comparison:

Table 6.7 - Summary of MI FPI Limits

Source	Date	Pounds VOC/job	VOC Emission Limit
GM Lansing GR Assembly	3/13/2006	5.73	264.3 tpy
GM Orion Assembly	2/26/2010	4.6	748.5 tpy
GM Flint Assembly	3/31/2014	4.8	649.6 tpy
FCA Sterling Heights	1/4/2011	4.5	673.2 tpy
FCA Jefferson North	4/19/2010	4.8	1085.8 tpy
Ford Dearborn Assembly	1/24/2007	4.8	897 tpy
Ford Michigan Assembly	1/8/2009	4.8	903.0
Ford Flat Rock Assembly	11/23/2010	4.8	732.0
FCA Mack Assembly	4/26/2019	3.0	381.1 tpy

In addition, pound per job based limits were identified in the RBLC for the Toyota facility in Georgetown, Kentucky and include the following:

Table 6.8 – Toyota Georgetown Permit Limits

Source	Date	Pounds VOC/Job	VOC tpy Limit
Topcoat	11//26/2013	3.54	NA
E-Coat	11/26/2013	0.116	NA
Primer (Guidecoat)	11/26/2013	1.026	NA
Sealer	11/26/2013	0.8	NA
	Total	5.482	

From these limits, it can be concluded that the overall pound per job value at the Georgetown facility is greater than the most recently issued FPI levels discussed above. Only four of the VOC sources are identified for the Kentucky plant and the total (5.482 lbs/job) is above the existing FPI limits, which typically includes all of the main VOC operations within the paint shop (e.g., purge and cleaning solvents, etc.).

Finally, FCA also considered Plantwide Applicability Limits (PAL) Permits provided in the table below. As can be seem from the table, PAL permits are generally developed based upon historic baseline emission levels and are not necessarily driven by BACT or LAER. Hence, the limits in PAL permits when compared on a pound per job basis, are generally higher.

Table 6.9 - VOC PAL Summary

Source	Date	PAL VOC Limit	Equivalent lbs/job
Ford Kansas City Assembly	2009/renewed in 2018	2,353 tpy	NA
BMW South Carolina	9-8-2009	>324,000 jobs – 855 tpy	5.28

As can be seen from the above tables, the FPI VOC limits associated with the JNAP facility are in the range of those for existing sources. FCA recognizes that the most recent permitted facility is Mack Assembly and that the FPI limit was established at 3.0 pounds per vehicle. However, the Mack Assembly facility is still under construction, and will be a water-based topcoat facility with two main, recirculated booths and full abatement of those booths. JNAP is a solvent borne topcoat facility with three main coating lines and VOC controls on a significant portion of the booths and ovens. The booth air flow configuration and the topcoat chemistry employed at Mack Assembly are not comparable to that of JNAP, and, therefore, the lbs/job limits are also not comparable (see Sec 6.1.4 for further details and discussions of JNAP's configuration).

FCA has also reviewed JNAP's past actual VOC emissions relative to the FPI limits. The highest VOC emissions levels, based on the 12-month rolling average (as reported in the facility's Quarterly Emissions Report) for the last four years are presented below:

Table 6.10 – Past Actual Emissions

Year	Highest VOC (tpy)	% of limit	Highest VOC (lbs/job)	% of limit
Current FPI Limit	1,085.8		4.8	
2015	693.6	63.9%	3.87	80.6%
2016	733.3	67.5%	4.06	84.6%
2017	809.5	74.5%	4.42	92.1%
2018	809.3	74.5%	4.33	90.2%

As can be seen from the above table, JNAP has operated within a reasonable margin of compliance relative to the FPI annual and pound per job limits.

Therefore, the above demonstration confirms that the existing FPI limits, with the existing and proposed emission reduction techniques, continue to demonstrate the best available control technology for the proposed sustainment and existing activities at JNAP.

6.4 VOLUNTARY ADJUSTMENT OF EXISTING FPI LIMITS

As concluded in the previous section, the current FPI limits do not require adjustment and are considered BACT for the operations at JNAP. However, FCA is proposing a voluntary reduction to the FPI limits. These new limits would be applicable 12 months after the completion of the sustainment project. FCA is proposing a reduction of the lb VOC /job and VOC tpy limit as noted below:

Table 6.11 – Proposed FPI Limits Adjustments

Pollutant	Current Limit	Proposed Limit	Time Period/ Operating Scenario	Equipment
1. VOC	1085.8 tpy	995.3 tpy	12-month rolling time period	FG-FACILITY
2. VOC	4.8 lbs/job	4.4 lbs/job	12-month rolling time period	FG-FACILITY

Similar to the FPI limit for VOCs, there are annual limits applicable to other criteria pollutants as well. As part of the analysis of the FPI limits, the past actual emissions for the various pollutants by calendar year were compared to the applicable FPI limit:

Table 6.12 – Past Actual Emissions

Year	NOx (tpy)	CO (tpy)	PM_{10} (tpy)	SO_2 (tpy)
Current FPI Limit	153.9	133.6	42.4	3.4
2015	56.8	7.6	33.13*	0.4
2016	53.1	8.9	32.5*	0.4
2017	54.7	4.7	33.1	0.4

Year	NOx (tpy)	CO (tpy)	PM_{10} (tpy)	SO_2 (tpy)
Current FPI Limit	153.9	133.6	42.4	3.4
2018	58.7	5.0	33.88*	0.6

* - FCA notes that the PM_{10} values noted in the MAERS database appear to contain erroneous information, as each entry is off by a factor of 10. The values noted in this table are correct and were submitted in JNAP's corresponding quarterly emissions report.

FCA has reviewed the FPI limits for the various criteria pollutants above and believes that certain pollutant allowable emission levels can also be reduced, while others should remain unchanged. FCA believes PM (applicable to both PM_{10} and $PM_{2.5}$) allowable emission levels should remain as they currently exist in the FPI since PM emissions are not expected to change substantially. For NOx and CO, FCA is proposing to voluntarily reduce both the allowable natural gas usage levels as well as allowable emission rates for these pollutants.

Natural gas usage is currently subject to a FPI based limit of 3,719.7 MM ft^3/year. FCA is proposing to reduce the allowable natural gas combustion level to 3,000 MM ft^3/year (a 20% reduction). FCA is, therefore, also proposing a commensurate 20% reduction in NOx and CO emission levels to 122.4 tons NOx per year and CO to 107.81 tpy.

FCA notes that any new or replacement natural gas combustion equipment will be equipped with low NOx burner technology, providing an additional basis for the proposed reduction in allowable NOx (also a non-attainment pollutant).

FCA has proposed adjusted levels as noted in the table below:

Table 6.13 – Proposed Voluntary FPI Limits Adjustments

	NOx (tpy)	CO (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	Natural Gas (MMCf/yr)
Current Limit	153.9	133.6	42.4	NA	3.4	3,719
Proposed Limit	122.4	107.81	42.4	42.4	3.4	3,000

7.0 TOXIC AIR CONTAMINANTS AND DISPERSION MODELING

7.1 TOXIC - BEST AVAILABLE CONTROL TECHNOLOGY REQUIREMENTS

Michigan Rule 224 requires the application of Best Available Control Technology for toxics (T-BACT) for new or modified sources of toxic air contaminants for which a permit to install is required to be submitted. However, Rule 224(2)(c) indicates that the requirement for T-BACT does not apply to "*An emission unit or units which only emits toxic air contaminants that are particulates or VOCs and which is in compliance with BACT or LAER requirements for particulates and VOCs.*" As indicated in Section 5 of this document, the proposed new coating line will meet the requirements of LAER and BACT for VOC. Therefore, the T-BACT requirement has been satisfied since the TACs resulting from operation of the coating operations are VOCs as well.

7.2 HEALTH BASED SCREENING LEVEL REQUIREMENTS

Michigan Rule 225 states that new or modified sources of toxic air contaminants (TACs) which are subject to the requirements to obtain a PTI *shall not cause or allow the emission of the toxic air contaminant from the proposed new or modified emission unit or units in excess of the maximum allowable emission rate which results in a predicted maximum ambient impact that is more than the initial threshold screening level (ITSL) or initial risk screening level (IRSL) or both*.

Ambient air impacts are typically estimated using dispersion modeling. The recommended dispersion model in the USEPA's "Guideline on Air Quality Models" (Appendix W to 40 CFR 51) is AERMOD. Therefore, AERMOD version 19191 was used to estimate the maximum potential ambient air impact concentrations of TACs from the new processes at JNAP pursuant to Michigan Rule 225.

The impact concentrations calculated in AERMOD are directly proportional to the emission rate used in the model (i.e., if a process is modeled with an emission rate of 1 lb/hr, but the actual emission rate of the TAC is 0.2 lb/hr, then the actual impact concentration will be 1/5 of the predicted impact concentration). This proportionality was used to simplify the modeling process to predict the maximum impact concentrations of many TACs using fewer modeling runs.

The modeling for TACs associated with the proposed project was completed using a non-pollutant specific emission rate from each exhaust stack or source of 1 lb/hr. The maximum ambient air impact concentration of a particular TAC from each stack or source can then be determined by scaling these non-pollutant specific impacts by the maximum potential emission rate of the TAC from that stack or source. The maximum ambient air impacts of the TAC from each stack were then summed to determine a total maximum ambient air impact for the TAC. While this method reduces the number of modeling iterations needed, it is overly conservative as the sum of maximum impacts per stack will almost always be greater than the true maximum impact, due to the fact that the maximum impact for each stack is not likely to coincide geographically (i.e., at the same receptor) or temporally (i.e., at the same time) with every other stack.

Appendix C presents tables containing the calculated emissions for each TAC from each process associated with the proposed changes to JNAP. The emission rates were based upon the maximum potential usage rate of materials, maximum projected production rates, as well as the design of the oxidizer controls, where appropriate.

7.2.1 Stack Height and Building Downwash Consideration

The AERMOD dispersion model considers the influence of building structures on exhaust stack plumes. These conditions occur when the height of an exhaust stack is less than its Good Engineering Practice (GEP) stack height (generally 2.5 times the height of the influencing structure). A building will have an influence on an exhaust plume if the distance between the two is less than five times the height or width (whichever is smaller) of the building.

The location of the influencing structures at the existing facility relative to the proposed exhaust stacks associated with the proposed new operations were calculated using the USEPA Building Profile Input Program - Prime (BPIP-Prime). BPIP-Prime calculates the projected influence of building widths and heights depending upon wind direction for use in the building downwash algorithms of the AERMOD model.

Appendix D provides an electronic copy of the dispersion modeling files, including the BPIP-PRIME files.

7.2.2 Meteorological Data

The most recent year of available surface and upper air meteorological data (2018) recorded at the nearest National Weather Service (NWS) Station to the facility was used to calculate TAC impact concentrations. The surface air meteorological data was recorded at the Coleman A. Young International Airport (DET) located in Detroit, Michigan, station number 14822. The upper air data was recorded at NWS station in White Lake, Michigan.

The meteorological data used in the AERMOD calculations was based upon one-minute readings from the NWS Automated Surface Observing System (ASOS). Pursuant to EGLE procedure, the meteorological data was processed using the adjusted frictional velocity (u*) to improve model performance during periods of low winds/stable conditions. The meteorological data was downloaded from the EGLE Internet site.

7.2.3 Dispersion Coefficients

Dispersion modeling uses data that represents the dispersion of pollutants in rural or urban areas. The Guideline on Air Quality Models presents the procedures for determining the appropriate dispersion coefficients. The Guideline indicates that the selection of rural or urban dispersion coefficients should follow "*one of the procedures suggested by Irwin*[74] *to determine whether the character of an area is primarily urban or rural*." The Guideline goes on to indicate that "*of the two methods, the land use procedure is considered more definitive*". Therefore, the land use method will be used to determine the appropriate dispersion coefficients for use with the modeling.

The land use procedure is identified in 7.2.1.1(b)(i) of the Guideline and states:

> *"Classify the land use within the total area, A_o, circumscribed by a 3km radius circle about the source using the meteorological land use typing scheme proposed by Auer*[75]*. If land use types I1, I2, C1, R2, and R3 account for 50 percent or more of A_o, use urban dispersion coefficients; otherwise, use appropriate rural dispersion coefficients."*

The area circumscribed by a 3-km radius surrounding the JNAP facility is comprised of greater than 50% of land types I1, I2, C1, R2, and R3. Therefore, modeling options for urban areas was used in the dispersion modeling analyses.

7.2.4 Receptors

Receptor positions (i.e., locations where pollutant impact concentrations are calculated) were established based on the USEPA definition of ambient air, that is, "that portion of the atmosphere, external to buildings, to which the general public has access." It is the USEPA's policy that the portion of air exempt from being considered ambient air is that which is owned or controlled by the source, where the source employs measures, which may include physical barriers, that are effective in precluding access to the land by the general public. JNAP precludes access to the facility through the use of fences, surveillance, and twenty four-hour security personnel.

Based on the USEPA definition of ambient air, an initial set of receptors with spacing of approximately 25 meters was placed along fence and/or property lines of the facility and extended to 50 meters beyond the fence line. To ensure that the locations of the maximum ambient air impact concentrations were identified, an additional receptor grid with a spacing of 100 meters, extending to 400 meters beyond the fences were utilized.

The location of the calculated air pollutant impact concentrations are expressed in Universal Transverse Mercator (UTM) coordinates.

7.2.5 Terrain Elevation

The AERMOD dispersion model is capable of accounting for terrain elevation when calculating impact concentrations. To ensure that the results of the dispersion modeling analysis were as accurate as possible, terrain elevations were included in this modeling analysis. The elevations were based upon Digital Elevation Model (DEM) terrain data gathered by the United States Geological Survey (USGS). The DEM data was obtained from the USGS's National Elevation Dataset which can be accessed via the internet and the 'National Map Viewer'.

7.2.6 Dispersion Modeling Results

Table C-7 in Appendix C presents the maximum ground-level TAC impact concentrations from the proposed operations.

As indicated in the table, the predicted ambient air impact concentrations of TACs are below the applicable Michigan Rule 225 thresholds.

8.0 CRITERIA POLLUTANT EMISSIONS IMPACT ANALYSIS

Construction or modification of major sources resulting in a proposed potential emission increase of criteria pollutants greater than corresponding significance levels must demonstrate compliance with both PSD increments and the NAAQS. The existing JNAP facility is a major source of VOCs, and as indicated in Section 3 of this document, the proposed operations will not result in a significant increase in potential emissions of VOCs. Nevertheless, the area where JNAP is located is considered an ozone non-attainment area (VOC and NOx as precursors), so FCA completed the MERPs analysis below as part of this application to demonstrate the ozone impact.

8.1 OZONE IMPACT ANALYSIS

Current USEPA guidance respective to addressing impacts of single source emissions on ground level ozone are based upon a two-tier approach. The first tier is based upon the use of technically credible relationships between emissions of precursors (i.e., VOC) and ambient impacts based upon existing modeling results or studies. The second tier, when necessary, involves a case by case application of chemical transport modeling (e.g., Lagrangian models or Eulerian grid models).

Tier 1 demonstrations are typically based upon Modeled Emission Rates for Precursors (MERP). Per US EPA guidance, a MERP describes an emission rate of a precursor that is expected to result in a change in the ambient pollutant that would be less than a specific critical air quality threshold (i.e., the Significant Impact Level, or SIL). For ozone, that threshold is 1 ppb. MERP values are expressed in tons per year and are derived via the following equation:

$$MERP = (Applicable\ SIL) \times \frac{(Modeled\ emission\ rate\ from\ hypothetical\ source)}{(Modeled\ ambient\ impact\ from\ hypothetical\ source)}$$

MERPs are based upon geographical location, which take into account the area's sensitivity to precursor emissions and regional or local atmospheric conditions. Based upon a review of the data provided in US EPAs "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program", FCA believes that the most representative source is a low-level source located in Macomb Co., Michigan. The ozone impacts and associated emission rates of precursors VOC and NO_X respective to the representative source are:

Precursor	Emission Rate (tpy)	Impact (ppb)
VOC	500	0.251
NO_X	500	0.941

Based upon the equation above, the MERPs for VOC and NO_X are:

$$VOC\ MERP = (1\ ppb) \times \frac{(500\ tpy)}{(0.251\ ppb)} = 1{,}992\ tpy$$

$$NOx\ MERP = (1\ ppb) \times \frac{(500\ tpy)}{(0.941\ ppb)} = 531\ tpy$$

As indicated in Section 3 of this document, the maximum potential emission rates of VOC and NO_X from the proposed project are 31.36 and 19.49 tpy, respectively. Each of these values are well below the MERP for their respective pollutants. Additionally, the sum of the ratios of the proposed emissions to the MERPs is well below 1.0:

$$VOC\ MERP\ Ratio = \frac{(32.18\ tpy)}{(1{,}992\ tpy)} = 0.016$$

$$NOx\ MERP\ Ratio = \frac{(19.49\ tpy)}{(531\ tpy)} = 0.04$$

$$Combined\ MERP\ Ratio = 0.016 + 0.04\ = 0.056$$

The sum of VOC and NO_X MERP ratios less than 1.0 indicates that the combined emissions will not result in emissions that will cause or contribute to a violation of the ozone NAAQS.

8.2 MINOR SOURCE MODELING POLICY – AQD 22

Construction or modification of major sources resulting in a proposed potential emission increase of criteria pollutants greater than corresponding significance levels must demonstrate compliance with both PSD increments and the NAAQS. As indicated in Section 3 of this document, the proposed modifications will result in emissions increases less than their respective significance levels for all criteria pollutants. Therefore, the changes are not subject to criteria pollutant modeling pursuant to federal NSR.

However, EGLE-AQD makes a determination on whether emissions from such projects (i.e., minor modifications) will interfere with the NAAQS or PSD increments for other criteria pollutants. EGLE-AQD Policy and Procedure document number AQD-22 provides guidance for the AQD to assist in making this determination, and whether dispersion modeling of a minor source or minor modification should be required.

Table 1 of AQD-22 applies to emissions of NO_X, SO_2, and PM_{10} NAAQS and increment. For SO_2, the proposed increase in emissions will be below 25% of the SER, indicating that modeling is not required, regardless of the stack parameters associated with the emission unit.

Table 2 of AQD-22 indicates that for emission sources of CO less than the SER, no impact analysis is required, regardless of stack parameters. As noted previously, the project's CO emissions are less than the SER. Therefore, no analysis is required.

EGLE-AQD has requested that a quantitative dispersion modeling analysis be completed for the project for both NO_2 and $PM_{2.5}$, pursuant to the AQD-022 modeling policy and standard USEPA modeling guidance for regulated pollutants.

8.2.1 NO_X Specific Modeling Parameters

EPA guidance for modeling of NO_2 describes three tiers of analysis. Tier 1 assumes that 100% of the NO_X emitted from sources is converted to NO_2. Tier 2 methods include the use of an ambient ratio, whereby a percentage of the NO_X is said to be converted to NO_2. This is either 80% for the original ambient ration method, or a percentage from the Ambient Ratio Method 2 (ARM2) which is based upon NO_X and NO_2 data from the EPA's Air Quality System. Tier 3 analyses use either the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM) which take into account the effect of the ratio of NO_X to NO_2 in the exhaust stack of a process, as well as the ground level ozone concentration's role in the conversion of NO_X to NO_2.

To avoid overly conservative impact predictions, a Tier 3 analysis for the evaluation of NO_2 impacts from the proposed changes to JNAP was completed using PVMRM.

As indicated above, there are additional variables taken into account when completing an impact analysis using PVMRM. The first is the ground level ozone concentration. The ozone concentration values can be entered as an annual value (i.e., assumes the same hourly value for each hour of the year), or it can be varied by time of day, season, or even each hour for each year of meteorological data evaluated.

Based upon discussions with the EGLE, measured hourly ground level ozone values were incorporated into the PVMRM modeling analysis. The values used were recorded at the nearest EPA monitor (number 26163019) located on 7 Mile Road in Detroit. The values were recorded from 2014 through 2018 and match the 5-year meteorological data set used for the NO_X modeling.

Another variable specific to Tier 3 NO_X modeling is the ratio of NO_2 to NO_X found in the exhaust stack of the process, known as the 'in stack ratio' (ISR). To determine an appropriate ISR for the proposed JNAP facility, the EPA Support for Regulatory Atmospheric Modeling (SCRAM) NO_2/NO_X ISR Database was reviewed.

The ISR Database contains actual measured NO_2 to NO_X ratios for a variety of sources, submitted via a formal collection process initiated by the Office of Air Quality Planning and Standards (OAQPS) as well as data collected by various regional, state, and local air permitting offices prior to the formal OAQPS collection process. FCA identified information on ISR for seven different processes similar to the proposed combustion units at JNAP (i.e., natural gas fired ASH, low NO_X technology, no post combustion controls). Some of these sources contained many test values, while others had only a few. The average ISR values from these tests range from a low of 0.068 to a high of 0.155. The individual hourly ISR from these tests range from a low of 0.0198 to a high of 0.1711. The average of all the tests combined is 0.0642. FCA conservatively set the ISR for the JNAP to 0.1 based upon review of the available data.

8.2.2 Meteorological Data

As recommended by the Guideline, five years of meteorological data was used for the NO_X and $PM_{2.5}$ modeling analysis. The meteorological data was recorded at Station IDs 14822 and 4830. As indicated above, the data was recorded from 2014-2018.

The raw meteorological data measurements are processed using AERMET. One of the variables that is calculated by AERMET is friction velocity (u*, or u-star) which is used in turn to calculate other variables such as mixing height and initial horizontal and vertical dispersion. It has been determined that during periods of low wind speeds, the performance of AERMOD could be improved. Accordingly, optional meteorological data incorporating the modified u-star values was used. The meteorological data was processed by the MDEGLE.

8.2.3 NO_X Annual NAAQS

In addition to using Tier 3 modeling to compare the ambient air impacts of NO_2 to the 1-hour NO_2 NAAQS, dispersion modeling using default AERMOD settings was completed for comparison to the annual NO_2 NAAQS.

8.2.4 Single Source NO_X and $PM_{2.5}$ Modeling Results

The Significant Impact Level (SIL) for NO_2 is 7.5 µg/m^3 for the 1-hour standard and is 1 µg/m^3 for the annual standard. The SIL for $PM_{2.5}$ is 1.2 µg/m^3 for the 24-hour standard and 0.2 µg/m^3 or the annual standard. Sources with maximum impacts below the SIL are said to not cause or contribute to predicted exceedances of the NAAQS. The table below presents the results of the NO_X and $PM_{2.5}$ modeling and shows that the maximum impact for certain averaging periods are above their respective SILs. Therefore, a cumulative modeling analysis was required, and is discussed in the following section.

Table 8.1 - NO_x and $PM_{2.5}$ Impacts

Pollutant	Averaging Period	SIL (µg/m^3)	Project Impacts (µg/m^3)
NO_2	1-hr	7.5	59.8
	Annual	1.0	1.61
$PM_{2.5}$	24-hr	1.2	4.31
	Annual	0.2	0.94

The area of significant impact for both NO_2 and $PM_{2.5}$ from the proposed tutone project is localized to an area no more the 860m and 465m, respectively. Figures 8-1 and 8-2 show the area of significant impact for NO_2 and $PM_{2.5}$. Appendix D provides an electronic copy of the dispersion modeling files associated with the NO_X and $PM_{2.5}$ analyses.

8.2.5 Cumulative Modeling

Because the maximum impacts of NO_2 and $PM_{2.5}$ from the proposed processes at JNAP are greater than the applicable SILs, cumulative modeling analyses, which include not only the proposed project, but also other nearby sources of applicable criteria pollutants, as well as a measured ambient background concentration was completed.

As with the single source analysis described above, the cumulative modeling analysis was completed using Tier 3 PVMRM and measured hourly ground level ozone concentrations for NO_2. The NO_2/NO_X ISR for JNAP was maintained at 0.1.

8.2.5.1 Ambient Background

For a cumulative modeling analysis and comparison to the NAAQS, a measured ambient background concentration is included. In the absence of site-specific data, background concentrations are typically obtained from local monitoring sites. The nearest monitor that has been operating and recording ambient NO_2 and $PM_{2.5}$ concentrations for at least three years is located on East 7 Mile Road in Detroit (station ID 26163019).

The average of the most recent three years (2016-2018) of measurements indicates an ambient 1-hr concentration of NO_2 of 79.8 µg/m^3. For $PM_{2.5}$, the monitor averages are 19.7 µg/m^3 for the 24-hour averaging time, and 8.1 µg/m^3 for the annual averaging time. These background concentrations were included in the cumulative modeling analyses for comparison to the NAAQS.

8.2.5.2 Nearby Sources of NO_2 and $PM_{2.5}$

In addition to the potential emissions from the proposed source and ambient background, the cumulative modeling analysis must include actual emissions from other nearby sources of the regulated pollutant. The term 'nearby' is not defined in the Guideline, or federal regulations. This is by design, as which sources should be included in a NAAQS modeling demonstration is determined on a case by case basis by the reviewing authority. In general, off-site sources whose emissions result in a significant impact gradient within the Significant Impact Area of subject facility are included.

Michigan Rule R336.1240 requires modeling demonstrations for comparison to the NAAQS and PSD Increments be made in accordance with the procedures in 40 CFR51.160 and Appendix W to 40CFR51, Guideline on Air Quality Models (or the "Guideline") which are adopted by reference in Michigan Rule R336.1902. Therefore, emissions from nearby sources of NO_2 and $PM_{2.5}$ were incorporated in accordance with the process presented in the Guideline.

Guideline Section 8.2.2 Requirements indicates that "*For purposes of demonstrating compliance in a PSD assessment, the regulatory modeling of inert pollutants shall use the emission input data shown in Table 8-2 for short and long-term NAAQS*." Table 8.2 indicates that the term "nearby" includes existing sources at the facility that are not affected by the modification and indicates that emissions of nearby sources be based upon temporally representative emissions when actually operating, reflective of the most recent two years. In addition, on August 3, 2017, the US EPA's, Office of Air Quality Planning & Standards presented guidance in the form of a webinar entitled "Appendix W - Section 8, Modeling Domain, Source Data and Background Concentrations". The content of that presentation includes an explanation stating that: "For the 'few' nearby sources to be explicitly modeled, typical/representative actual emissions (adjusted by operating level) should be used." FCA included the nearby sources in the modeling consistent with the Guideline's 8.2.2 Requirements and Table 8-2 instructions.

The existing sources of NO_X and $PM_{2.5}$ at JNAP that will not be affected by the proposed sustainment and tutone project include general building heat, existing boiler operations, and existing coating operations.

Temporally representative emissions of NO_X and $PM_{2.5}$ from natural gas combustion related to general building heat was determined based upon actual natural gas usage over the most recent two years, as well as the actual hours that building heat was utilized. Since the hours of operation of space heating is not tracked directly, it was determined based upon the hours during which the outside ambient temperature falls below 65 °F (an established metric used in the energy/heating industry). In order to determine the actual hours of operation of the heating units, FCA analyzed meteorological data for the most recent two years of the nearest NWS station (DET Station 14822). This data (actual fuel consumption and heating hours) was used to determine the actual operating level ($MMft^3/hr$) for the building heat.

Appendix H provides the calculations of both the heating hours based upon meteorological data, and the temporally representative emission rates of the building heat for JNAP.

For each of the four existing boilers at the JNAP powerhouse, fuel usage data (natural gas) is available. Since the operation data is based upon daily use (rather than hourly use), FCA conservatively used the 75th percentile of daily actual operating capacity to calculate a temporally representative hourly emission rate from each existing boiler."

The remainder of emissions from existing processes at JNAP are tied directly to the production rate (e.g., $PM_{2.5}$ emissions from existing topcoat operations are directly related to production). Therefore, temporally representative emissions from these processes were based upon the actual emissions from the most recent two years as well as actual production hours.

The emissions from the proposed tutone coating line, as well as other new equipment associated with the proposed changes to the JNAP facility (e.g., natural gas combustion space heaters) were included in the modeling analyses based upon proposed maximum allowable emissions. Since many of the processes at MAP were recently permitted, these nearby processes were also incorporated into the modeling analyses based upon permitted capacity.

The building space heat at MAP, which is located directly north of the JNAP facility, is the only existing process at that nearby facility that will be incorporated into the modeling based upon temporally representative actual emissions. The emission rates will be based upon actual natural gas usage rates and ambient temperature as described above. Appendix H also provides calculations of temporally representative emission rates for the existing building heat at MAP.

8.2.5.3 Secondarily Formed $PM_{2.5}$

In addition to directly emitted $PM_{2.5}$, the emissions of other pollutants (e.g., NO_X and SO_2) have the potential to act as precursors for the formation of secondary $PM_{2.5}$.

The combined NO_X and SO_2 emission rates from the proposed sustainment and tutone operations will be well below their respective SERs of 40 TPY. U.S EPA's Guidance for $PM_{2.5}$ Permit Modeling (EPA-454/B-14-001) indicates that for instances where a source has direct emissions exceeding the SER, but precursor NO_X and SO_2 emissions are below the SERs, only direct emissions need to be evaluated. FCA believes that due to limited precursor emissions, secondarily formed $PM_{2.5}$ from the proposed operations will have little to no effect on ambient air quality, and that measured $PM_{2.5}$ monitor values will sufficiently account for secondarily formed $PM_{2.5}$ in the area.

8.2.5.4 Results of Cumulative NO_2 and $PM_{2.5}$ Modeling

As presented in the table below, emissions from the proposed JNAP changes, in conjunction with emissions from nearby sources and a measured ambient background concentration result in ambient air impacts less than the applicable NAAQS.

Table 8.2 - Cumulative NO_x Impacts and NAAQS

Pollutant	Averaging Period	Project Impacts (μg/m^3)	Ambient Background (μg/m^3)	Total * Impact (μg/m^3)	NAAQS (μg/m^3)
NO_2	Annual	1.61	19.2	30.29	100
	1 hr	59.8	79.6	176.1	188
$PM_{2.5}$	Annual	0.94	8.1	10.8	12
	24 hr	4.31	19.2	33.2	35

*Includes nearby source impacts

9.0 ADDITIONAL IMPACT ANALYSES

In accordance with AQD-022, the impacts of air, ground and water pollution on soils, vegetation and visibility caused by an increase in emissions of any regulated pollutant from the source and associated growth must be assessed. This section presents an analysis of the anticipated impact the JNAP sustainment activity's air pollutant emissions and growth are likely to have to the area's soil, vegetation, and visibility.

9.1 CONSTRUCTION AND GROWTH IMPACTS

The construction activities that will be performed at the plant are not anticipated to have any adverse effects on human health or welfare. The addition of the new equipment (e.g., tutone operations) at the plant should not result in any noticeable residential growth in the area. Commercial growth is anticipated to occur at a gradual rate in the future.

9.2 IMPACT ON SOIL AND VEGETATION

Predicted concentrations of criteria pollutants resulting from the proposed project do not cause or contribute to a violation of applicable NAAQS, and the MERPs demonstration indicates no significant impact to ozone concentrations. Thus, no impact on local or regional soil and vegetation is anticipated to occur from this project.

9.3 ANALYSIS OF THREATENED AND ENDANGERED SPECIES

The threatened and endangered species in Wayne County, Michigan are typically found in small stream corridors with well-developed riparian woods and upland forests. The activities to be performed at the JNAP location is not anticipated to change air quality in the areas typically occupied by these endangered species. As such, no adverse impacts are anticipated to occur to the threatened and endangered species.

9.4 IMPACT ON VISIBILITY – CLASS I AREAS

Assessment of the potential impact to visibility (regional haze analysis) is required if the source is located within 100 km of a Class I area. An evaluation may be requested if the source is within 200 km of a Class I area. The nearest Class I Area to the existing JNAP site is the Seney Wildlife Refuge which is greater than 200 kilometers north of the Southeast Michigan area. It is anticipated that impacts (concentrations and visibility) at this Class I Area will not be significant because the distance between the project site and the wildlife refuge is greater than 200 kilometers. In addition, the traditional air pollutants that affect visibility are sulfates, nitrates and particulates. The sustainment activities being proposed by FCA will not result in a significant emission increase of these visibility impairment air pollutants.

10.0 CONCLUSION

FCA is requesting that a PTI be issued to allow for implementation of the described sustainment activities at the JNAP facility. FCA has developed emission estimates and a regulatory analysis that supports the incorporation of the new tutone operation and the proposed VOC control system into the existing FPI applicable to the JNAP facility. The FPI levels can be retained based upon the BACT analysis for both new and existing sources of VOCs and the estimated annual emission levels. The proposed changes are also supported by an appropriate demonstration that the facility will comply with the provisions of State and Federal air quality regulations. Although the FPI limits are appropriate as they currently exist, FCA is proposing adjustments to the FPI limits such that the allowable emission levels will be reduced for the non-attainment pollutants of VOC and NOx, and for CO. FCA is also proposing a reduction in the allowable natural gas consumption amount.

FIGURES

Figure 1 - FCA JNAP Tutone Project Significant Impact Area – NO2
March 2020

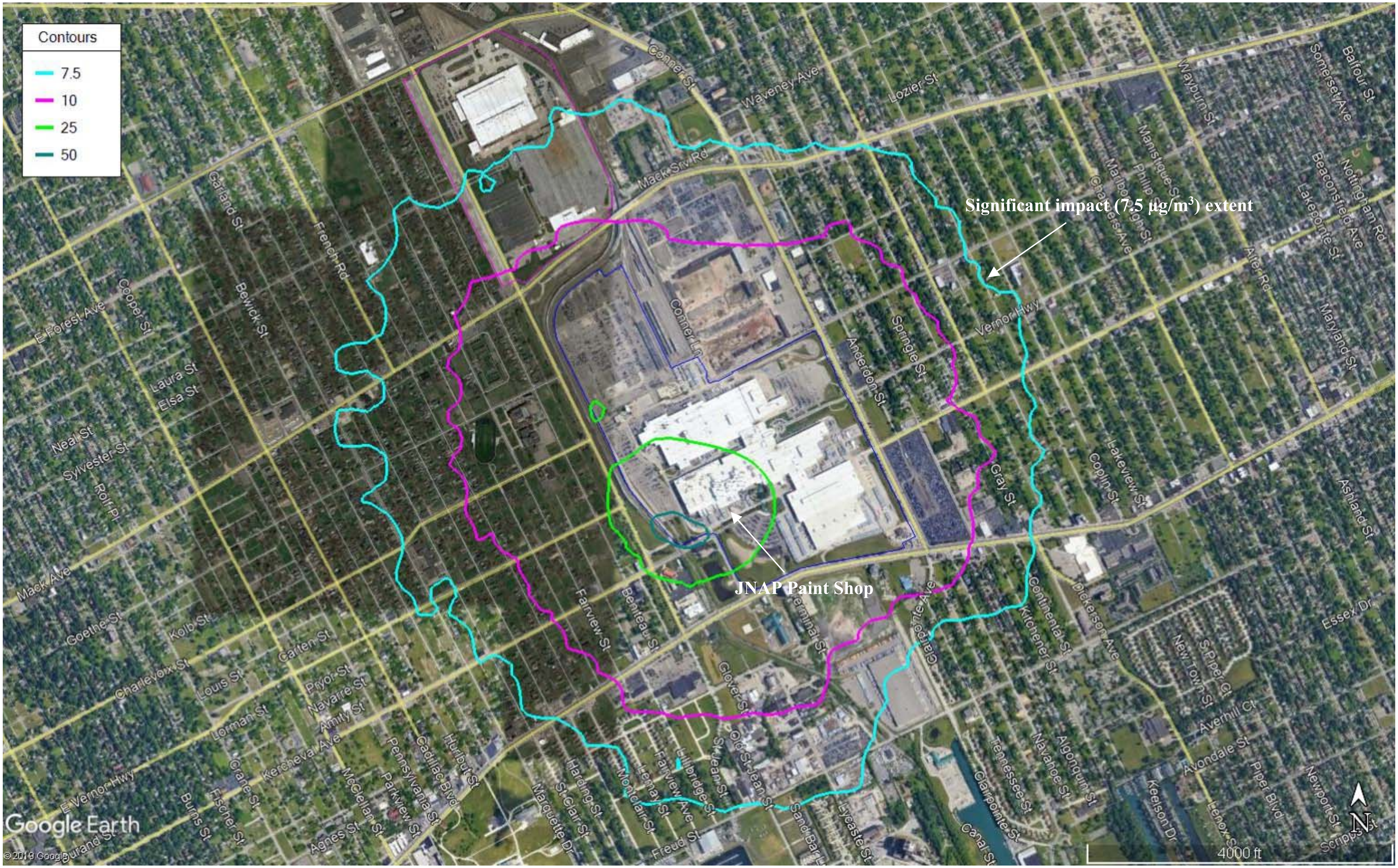
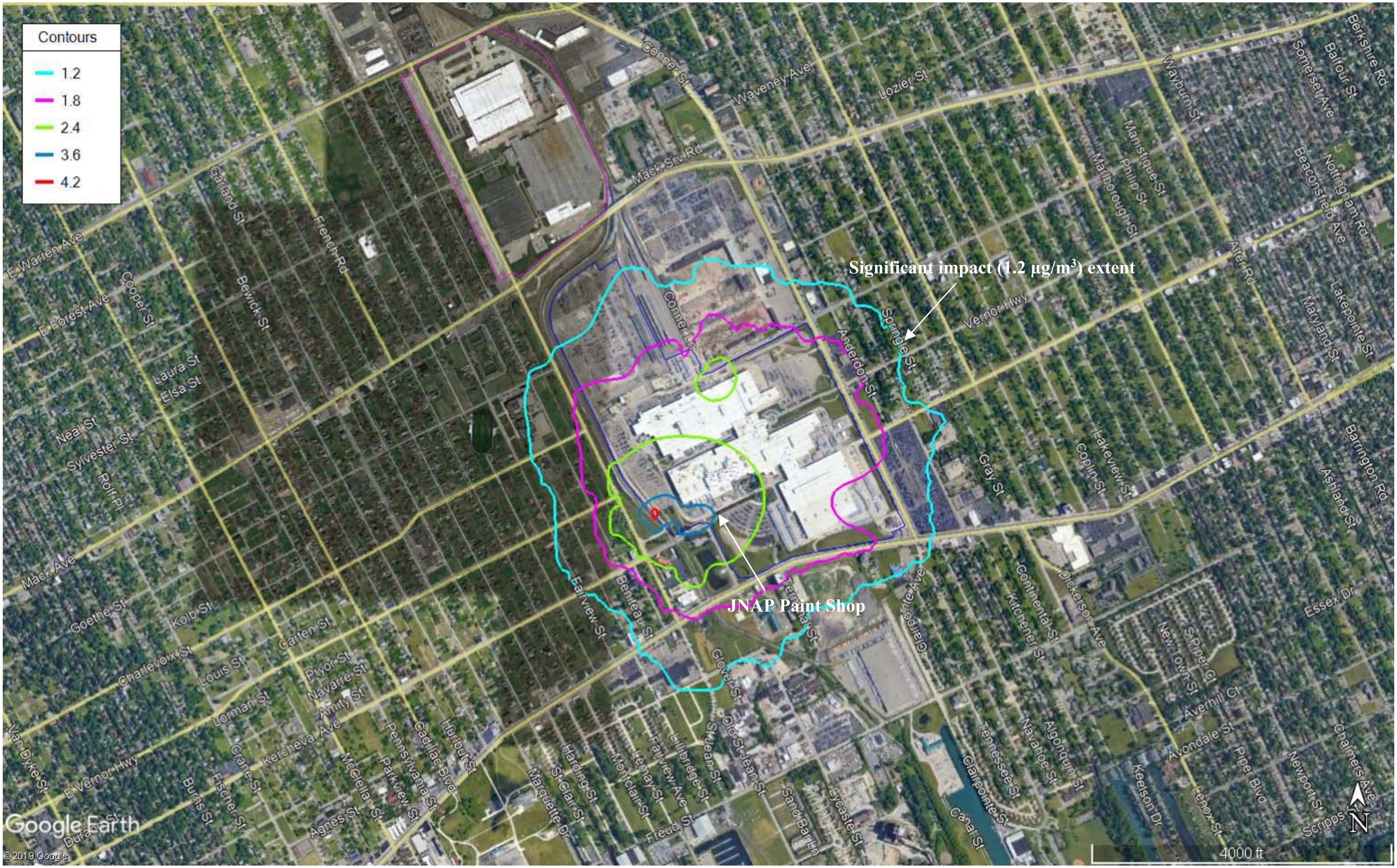


Figure 2 - FCA JNAP Tutone Project Significant Impact Area – $PM_{2.5}$
March 2020



APPENDIX A

PERMIT TO INSTALL APPLICATION FORM

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - AIR QUALITY DIVISION

PERMIT TO INSTALL APPLICATION

For authority to install, construct, reconstruct, relocate, or modify process, fuel-burning or refuse burning equipment and/or control equipment. Permits to install are required by administrative rules pursuant to Section 5505 of 1994 PA 451, as

FOR DEQ USE
APPLICATION NUMBER

Please type or print clearly. The "Application Instructions" and "Information Required for an Administratively Complete Permit to Install Application" are available on the Air Quality Division (AQD) Permit Web Page at http://www.deq.state.mi.us/aps. Please call the AQD at 517-373-7023 if you have not been contacted within 15 days of your application submittal.

1. FACILITY CODES: State Registration Number (SRN) and North American Industry Classification System (NAICS)
   SRN: N 2 1 5 5 NAICS:

2. APPLICANT NAME: (Business License Name of Corporation, Partnership, Individual Owner, Government Agency)
   FCA US LLC

3. APPLICANT ADDRESS: (Number and Street)
   800 Chrysler Drive
   MAIL CODE:

CITY: (City, Village or Township)	STATE:	ZIP CODE:	COUNTY:
Auburn Hills	MI	48326	Oakland

4. EQUIPMENT OR PROCESS LOCATION: (Number and Street – if different than Item 3)
   2101 Conner Avenue

CITY: (City, Village or Township)	ZIP CODE:	COUNTY:
Detroit	48215	Wayne

5. GENERAL NATURE OF BUSINESS:
   Automobile and Light Duty Truck Manufacturing

6. EQUIPMENT OR PROCESS DESCRIPTION: (A Description MUST Be Provided Here. Include Emission Unit IDs. Attach additional sheets if necessary; number and date each page of the submittal.)
   The Jefferson North Assembly Plant will undergo sustainment activities which will include refurbishment of certain equipment and adding a new tutone booth/oven and relocation of the rapid repair operations. This application addresses the sustainment activities and the existing Flexible Permitting Initiative (FPI) applicable to the facility.

7. REASON FOR APPLICATION: (Check all that apply.)
   - ☒ INSTALLATION / CONSTRUCTION OF NEW EQUIPMENT OR PROCESS
   - ☒ RECONSTRUCTION / MODIFICATION / RELOCATION OF EXISTING EQUIPMENT OR PROCESS – **DATE INSTALLED:**
   - ☐ OTHER – DESCRIBE

8. IF THE EQUIPMENT OR PROCESS THAT WILL BE COVERED BY THIS PERMIT TO INSTALL (PTI) IS CURRENTLY COVERED BY ANY ACTIVE PERMITS, LIST THE PTI NUMBER(S):

9. DOES THIS FACILITY HAVE AN EXISTING RENEWABLE OPERATING PERMIT (ROP)? ☐ NOT APPLICABLE ☐ PENDING APPLICATION ☒ YES
   PENDING APPLICATION OR ROP NUMBER: MI-ROP-N2155-2017

10. AUTHORIZED EMPLOYEE:	TITLE:	PHONE NUMBER: (Include Area Code)
Tyree Minner	Plant Manager	313-252-6599
SIGNATURE: Tyree Minner	DATE: 2-23-20	E-MAIL ADDRESS: Tyree.Minner@fcagroup

11. CONTACT: (If different than Authorized Employee. The person to contact with questions regarding this application)	PHONE NUMBER: (Include Area Code)
Sandra Walker	248-512-1143
CONTACT AFFILIATION: FCA Air Compliance Engineer	E-MAIL ADDRESS: Sandra.Walker@fcagroup.com

12. IS THE CONTACT PERSON AUTHORIZED TO NEGOTIATE THE TERMS AND CONDITIONS OF THE PERMIT TO INSTALL? ☒ YES ☐ NO

FOR DEQ USE ONLY - DO NOT WRITE BELOW

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203:

DATE PERMIT TO INSTALL APPROVED:	SIGNATURE:
DATE APPLICATION / PTI VOIDED:	SIGNATURE:
DATE APPLICATION DENIED:	SIGNATURE:

A PERMIT CERTIFICATE WILL BE ISSUED UPON APPROVAL OF A PERMIT TO INSTALL

APPENDIX B

EMISSION CALCULATIONS

Criteria Pollutant Emission Calculations
FCA JNAP Sustainment - March 2020

B-1 Facility VOC Summary

Production 163800 veh/yr

Emission Unit	VOCs (TPY)
Tutone	20.9
Rapid Repair	0.86
Tutone Purge/Clean	7.7
Natural Gas	2.81
Subtotal:	32.18
Reduction of BC&CC in Color	10.07
Total net change:	**22.11 tpy**

Criteria Pollutant Emission Calculations
FCA JNAP Sustainment - March 2020

B-2 Tutone Booth

	Coating Usage[3]	VOC (lbs/gal)[4]		TE[6]	"OSL" % Carryover @100%TE[1]			
Coating Family	Gals/vehicle	Formula	Analytical	%	Booth	"Observation"	Flash-off Zone	Bake Oven
Basecoat (black DX8)	0.153	3.74	4.14	71.9%	81.4%	5.6%	5.3%	7.7%
Clearcoat	0.191	3.70	3.91	77.5%	66.7%	8.8%	0.0%	24.5%

	Capture Efficiency (%)				Control Efficiency (%) RTO[2]				Control Efficiency (%) Concentrator			
	Booth	"Observation"	Flash-off	Oven	Booth	"Observation"	Flash-off	Oven	Booth	"Observation"	Flash-off	Oven
New Paintshop												
Basecoat	100%	100%	100%	100%	95.0%	0.0%	95.0%	95.0%	90.0%	0.0%	90.0%	0.0%
Clearcoat	100%	100%	100%	100%	95.0%	0.0%	0.0%	95.0%	90.0%	0.0%	90.0%	0.0%

Production Rate (Jobs/year)[5] 170,352

	Coating	VOC Generated (lbs)						VOC Controlled (lbs)					VOC Emitted (lbs)					VOC (lbs)	VOC (tons)
Coating Family	Gals	Booth - Formula	Booth - Analytical	Observation	Flash-off Zone	Bake Oven	Total	Booth-Formula	Booth-Analytical	Observation	Flash-off Zone	Bake Oven	Booth-Formula - via Conc/RTO	Booth-Analytical via Conc/RTO	Observation	Flash-off Zone via Conc/RTO	Bake Oven via RTO	TOTAL	TOTAL
Basecoat	26,064	27,392	63,153	4,345	4,112	5,974	104,975	23,420	53,996	0	3,516	5,675	3,972	9,157	4,345	596	299	18,369	9.2
Clearcoat	32,537	27,087	65,763	8,676	0	24,156	125,683	23,160	56,228	0	0	22,948	3,928	9,536	8,676	0	1,208	23,348	11.7
TOTALS:													7,899	18,693	13,021	596	1,506	41,716	**20.9**

Notes:

1 - OSL generated from JNAP test data for Color line 2 (June 5, 2018 Stack Test) for exterior application (controlled zones) since roof is all exterior

2- Control Efficiency assumed to be 90% or 95% minimum for each device

3- BC and CC Usage based upon 12-4-19 powerpoint file from Tracy Moorer with worst case estimates

4 - VOC Content for BC and CC from PPG EDS

5- Production Rate for tutone includes 4% reprocess rate

6 - TE from JNAP 2018 VOC Report - BC is average of three tests (70.1, 70.1 and 75.5)

Coating Family	Material Usage Gallons Per veh[1]	VOC (lbs/gal) Formula[2]	Booth[4]	"observation"	Flash-off	Bake Oven
Purge	0.031	7.25	20.0%	0.0%	0.0%	0.0%
Cleaning Solvents Tutone[3]	0.017	5.000	100.0%	0.0%	0.0%	0.0%

	Capture Efficiency (%)				Control Efficiency (%) Concentrator/RTO			
New Tutone	Booth	"observation"	Flash-off	Oven	Booth	"observation"	Flash-off	Oven
Purge	95.0%	0%	0%	0%	85.50%	0.0%	0.0%	95.0%
Cleaning Solvents Tutone[3]	0%	0%	0%	0%	0.0%	0.0%	0.0%	95.0%

Production Rate (Jobs/year) 163,800

Emissions	Material	VOC Generated (lbs)					VOC Controlled (lbs)				VOC Emitted (lbs)				VOC (lbs)	VOC (tons)
Coating Family	Gals	Booth	"observation"	Flash-off	Bake Oven	Total	Booth	"observation"	Flash-off	Bake Oven	Booth	"observation"	Flash-off	Bake Oven via RTO	TOTAL	TOTAL
Purge	5,078	7,363	0	0	0	7,363	5,980	0	0	0	1,382	0	0	0	1,382	0.7
Cleaning Solvents Tutone	2,785	13,923	0	0	0	13,923	0	0	0	0	13,923	0	0	0	13,923	7.0
																0.0
																0.0
TOTALS:											15,305	0	0	0	15,305	7.7

1 - Usage per vehicle from paint operations

2 - VOC content from VOC report Information for Gage Purge

3 - Assumes that 100% of the cleaning materials will be emitted in the booths and will not be subject to controls

4 - Assumes 80% purge capture rate and 20% emitted in controlled portion of booth with 95% capture based upon no uncontrolled spray zone

Criteria Pollutant Emission Calculations **B-4 Rapid Repair**

FCA JNAP Sustainment - March 2020

	Coating Usage	VOC content	Volatility	B/O Split	
Coating Family	Gals/Vehicle1	lb/gal	%	Booth	Bake Oven
Repair Coatings	0.0150	4.800	100.0%	100.0%	0.0%

	Capture Efficiency (%)		Control Efficiency (%)	
	Booth	Oven	Booth	Oven
New Paintshop Repair Coatings	100%	100%	0.0%	0.0%
	100%	100%	0.0%	0.0%

Production Rate (Jobs/year) 24,000

Emissions	VOC Generated (lbs)				VOC Controlled (lbs)		VOC Emitted (lbs)			
Coating Family	Gals	Booth	Bake Oven	Total	Booth-Analytical	Bake Oven	Booth-Analytical	Bake Oven	TOTAL	TOTAL
Repair Coatings	360	1,728	0	1,728	0	0	1,728	0	1,728	0.86
TOTALS:									1,728	0.86

1 - Based upon JNAP 2018 Usage adjusted to account for

2 - Assume 400K vehicles per year maximum

3 - Assumes 4.8 lbs/gallon

Emission Unit/Group Identification	**Control Equipment Description** Emission Unit Description	Source Capacity/ Rating (MMBtu/hr)[1]	Source Operating Rate (MMcf/yr)	Annual Source Operating Basis[4]	Potential Hours of Operation	**CRITERIA POLLUTANTS** **PM-10** EF	EF Units	Removal Efficiency	Potential (lb/hr)	Potential (tpy)	**NO_x** EF[2]	EF Units	Potential (lb/hr)	Potential (tpy)
Paint Shop	**Combustion Equipment**													
RTO	Thermal Oxidizer	15.0	118.3	90%	8,760	7.6	lb/mmscf	-	0.114	0.45	50	lb/mmscf	0.75	2.96
Conc Desorp	Desorption Heater	5.0	39.4	90%	8,760	7.6	lb/mmscf	-	0.038	0.150	50	lb/mmscf	0.25	0.99
Tutone Oven	Oven (12,8 and 12) - includes incin	32.0	252.3	90%	8,760	7.6	lb/mmscf	-	0.243	0.96	36	lb/mmscf	1.15	4.54
Building Addition - Rapid Reprocess[3]	ASH	28.4	124.4	50%	8,760	7.6	lb/mmscf	-	0.216	0.47	36	lb/mmscf	1.02	2.24
Bldg Addition - CTVV and Water Test[5]	ASH	12.9	56.5	50%	8760	7.6	lb/mmscf	-	0.098	0.21	36	lb/mmscf	0.46	1.02
Tutone ASH 1,2,3,4 and Heated Flash[6]	ASH, Heated flash	78.3	343.0	50%	8760	7.6	lb/mmscf		0.595	1.30	36	lb/mmscf	2.82	6.17
Building AHU #39 & #40[7]	Support Powder & Bldg	20.0	87.6	50%	8760	7.6	lb/mmscf		0.152	0.33	36	lb/mmscf	0.72	1.58
	Total New Equipment - (tpy)	191.6	1,021						**1.46**	**3.88**			**3.64**	**19.49**

CO EF	EF Units	Potential (lb/hr)	Potential (tpy)	**VOCs** EF	EF Units	Potential (lb/hr)	Potential (tpy)	**SO_2** EF	EF Units	Potential (lb/hr)	Potential (tpy)	**GREENHOUSE GASES** **CO_2** EF (lbs / mmBtu)	**CH_4**	**N_2O**	**CO_2e** Potential (tpy)
84	lb/mmscf	1.26	4.97	5.5	lb/mmscf	0.08	0.33	0.6	lb/mmscf	0.01	0.04	116.89	0.0022	0.00022	3,844
84	lb/mmscf	0.42	1.66	5.5	lb/mmscf	0.03	0.11	0.6	lb/mmscf	0.00	0.01	116.89	0.0022	0.00022	1,281
84	lb/mmscf	2.69	10.60	5.5	lb/mmscf	0.18	0.69	0.6	lb/mmscf	0.02	0.08	116.89	0.0022	0.00022	8,200
84	lb/mmscf	2.39	5.22	5.5	lb/mmscf	0.16	0.34	0.6	lb/mmscf	0.02	0.04	116.89	0.0022	0.00022	7,277
84	lb/mmscf	6.58	2.37	5.5	lb/mmscf	0.07	0.16	0.6	lb/mmscf	0.01	0.02	116.89	0.0022	0.00022	3,305
84	lb/mmscf	1.68	14.40	5.5	lb/mmscf	0.43	0.94	0.6	lb/mmscf	0.05	0.10	116.89	0.0022	0.00022	20,064
84	lb/mmscf	1.68	3.68	5.5	lb/mmscf	0.11	0.24	0.6	lb/mmscf	0.01	0.03	116.89	0.0022	0.00022	5,125
		15.01	**42.90**			**0.94**	**2.81**			**0.10**	**0.31**				**49,096**

Notes

1 - Based upon total heat input information from Paint and Building Groups
2 - NOx Emission Factors for low Nox
3 - Source: Q Matrix #55, 3-27-19
4 - Based on information from heat load estimates
5 - Source: Facilities spreadsheet 10-19-19 and email of 10-17-19
6 - Source: FGragnaniello email 11/01/19

Particulate Matter (all PM assumed to be PM-10 and PM2.5)

Combustion Equipment[1]

	MMBtu/hr	Fuel		Tons/yr
RTO	15	Nat Gas		0.45
Desorp	5	Nat Gas		0.15
Tutone Oven	32	Nat Gas		0.96
Building Addition - Rapid Reprocess	28.4	Nat Gas		0.47
Bldg Addition - CTVV and Water Test	12.9	Nat Gas		0.21
Tutone ASH 1,2,3,4 and Heated Flash	78.3	Nat Gas		1.30
Building AHU #39 & #40	20	Nat Gas		0.33
			Subtotal	**3.88**

Coating Equipment

	# of EU	gr/dscf	cfm	lbs/hr/line	hrs/yr	Tons/yr
Tutone Black (Observation Zone)	1	0.0004	25,000	0.09	8,760	**0.38**
					Subtotal	**0.38**

Tutone - booth routed to concentrator then to an RTO[3]

Conversion to lbs/hr					
(grains/1000 cf)	apply 98% for baghouse (filter box) (grns/1000 cf)	Booth Air Exhaust to Concentrator (cfm)	grains/min	lbs/min (7000 grains/lb)	lbs/hr
1.5	0.03	161487	4.8	0.0007	0.042
	0.042 lbs/hr	8760 hrs/yr	2000 lbs/ton		0.18 tons/yr
			Coating Subtotal		**0.18**

Rapid Repair

	# of EU	lbs/hr/EU	hrs/yr	lbs/yr	tpy
Repair Total PM (Ib/hr/ station)	2	0.026	8760	456	**0.23**

(repair estimates based upon stack test EFs)

4.67 **Tons/year $PM_{2.5}$**

1 - Combustion Emissions based upon AP-42 factors and annual utilization heat input capacity for each type of combustion unit.

2 - Observation zone PM emission rates from 2014 stack test on similar observation zone and booth.

3 - Grains/dscf used for coating Booths based upon 1.5 grain/1000 cf with 98% additional filtration/controls for recirculation - assumes all PM emitted makes it through the RTO

VOC Emisssions Reductions in Color Line From Roof Coating in Tutone

<u>Amount of paint sprayed is basis for calculation</u>

Projected BC & CC Total usage for roof (0.153+0.191)	0.344	gal/veh	(See tutone booth tab for usages)
Total vehicle projected usage (BC & CC) or monotone veh	2.22	gal/veh	(Data provided by Manufacturing Engineering Dept.)
Roof usage / Total Vehicle usage (ratio in terms of %)	15.5%	The percent of total coating attributable to the roof (This value based upon projected usages - JNAP actual usage would yield the roof being 23% of total usage)	

<u>Projected VOC emissions from roof coating in Color Line</u>

Actual topcoat VOC emissions in tons/year from JNAP VOC report	508.8	tpy	2017	
	550.6	tpy	2018	
VOC emissions associated w/Roof	78.84	tpy	2017	(based upon 444,462 veh/yr - painted)
(based upon % of usage and tons per year from Topcoat)	85.32	tpy	2018	(based upon 459,263 veh/yr - painted)
	0.35	lbs VOC per veh from roof		
	0.37	lbs VOC per veh from roof		
	0.36	avg lbs VOC from roof/veh (2017 & 2018)		
Projected VOCs in 'color Line from vehicles planned for tutone				
170,352 veh/yr in tutone line	30.93	tpy	VOCs that would have been emitted by coating roofs in current Color Line	
Projected Tutone Roof tons VOC/year	20.9	tpy	from proposed tutone	
Anticipated reduction moving from Color booths to tutone booth	10.07	tpy	reduction	

APPENDIX C

CRITERIA AND TAC IMPACT SUMMARY

Table C-1 - Exhaust Stack Parameters
FCA JNAP Tutone and Sustainment - March 2020

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Stack Height (ft)	Temperature (°F)	Exit Velocity (fps)	Stack Diameter (ft)	Flow Rate (acfm)
Point Sources								
JNAP Tutone Stacks								
C12TTRTO	JNAP Color 1 Color 2 and TT Booth RTO Exhaust Stack	337,867	4,692,892	113	300	70.32	6.50	140,000
TT2	JNAP TT CC obs	337,896	4,692,996	113	70	36.68	9.00	140,000
TT1	JNAP TT BC obs	337,928	4,693,011	113	70	24.62	10.00	116,000
TTCONC	JNAP Concentrator exhaust for tutone line	337,843	4,692,879	113	90	48.00	7.83	138,784
TTOVRTO	Tutone oven RTO	337,819	4,692,954	70	300	40.00	2.00	7,540
RR1	Rapid Reprocess 1	337,758	4,692,884	70	75	56.02	5.00	66,000
RR2	Rapid reprocess 2	337,746	4,692,878	70	75	56.02	5.00	66,000
Nearby Existing Sources - JNAP								
ECRTO1	JNAP Ecoat RTO 1	337,906	4,693,057	69	542	130.36	1.30	10,380
ECRTO2	JNAP Ecoat RTO 2	337,895	4,693,052	69	542	29.78	3.30	15,282
L1BC1BTH	Line one Basecoat booth	337,968	4,693,034	91	70	32.68	10.00	154,000
L2BC1BTH	Line 2 BC Booth	337,977	4,693,015	91	70	32.68	10.00	154,000
L3BC1BTH	Line 3 BC Booth exhaust	337,986	4,692,992	125	70	35.44	10.00	167,000
L1CCBTH	line 1 CC booth exhaust	337,867	4,692,983	91	70	32.75	9.00	125,000
LINE2CCBTH	Line 2 CC Booth Exhaust	337,875	4,692,963	91	70	32.75	9.00	125,000
LINE3CCBTH	Line 3 CC Booth exhaust	337,882	4,692,943	125	70	32.89	10.00	155,000
C1CONC	Color 1 concentrator exhaust	337,873	4,692,895	113	90	40.00	7.33	101,369
C2CONC	JNAP Existing Color 2 Concentrator	337,886	4,692,900	113	90	40.00	7.33	101,369
C3CONC	Color 3 booth concentrator exhaust	337,830	4,692,872	113	90	40.00	9.00	152,681
C1OVRTO	JNAP Color 1 Oven RTO	337,811	4,692,944	91	798	92.51	2.20	21,102
C2OVRTO	JNAP Color 2 Oven RTO	337,817	4,692,933	94	798	92.51	2.20	21,100
C3OVRTO	JNAP Color 3 Oven RTO	337,828	4,692,918	125	798	35.89	3.10	16,253
C3BTRTO	Color 3 Booth RTO	337,819	4,692,868	113	600	25.76	4.59	25,611
JANPPWDR	JNAP powder Antichip Oven	337,766	4,693,024	87	80	34.63	7.00	79,959
N2155_1	FCA JNAP EUBOILER4	338,014	4,693,176	100	100	164.04	4.00	123,685
N2155_2	FCA JNAP EUBOILER3	338,020	4,693,161	75	100	164.04	4.00	123,685
N2155_4	FCA JNAP EUBOILER2	338,018	4,693,166	75	100	164.04	4.00	123,685
N2155_5	FCA JNAP EUBOILER1	338,016	4,693,171	75	100	164.04	4.00	123,685
LOWBAKE	Composite Stack of 5 low bake repair stations	337,838	4,693,211	58	70	40.00	2.83	15,132
JEFFPW	JNAP Emergency Fire Pump West	337,524	4,693,316	16	300	40.00	0.75	1,060
JEFFPE	JNAP Emergency Fire Pump East	338,427	4,693,141	16	300	40.00	0.75	1,060
Nearby Existing Sources - MAP								
PUMP1	MAP - PUMP1	337,270	4,693,960	15	300	81.76	0.62	1,505
PUMP2	MAP - PUMP2	337,049	4,694,745	15	300	81.76	0.62	1,505
PUMP3	MAP - PUMP3	337,044	4,694,747	15	300	81.76	0.62	1,505
PRMOBS	MAP Prime Obs	337,074	4,694,115	120	75	48.93	3.67	31,000
C1BCOBS	MAP Color 1 BC Obs	337,095	4,694,118	120	75	47.16	3.00	20,000
C1CCOBS	MAP Color 1 CC Obs	337,059	4,694,191	120	75	50.13	3.33	26,251
C2BCOBS	MAP Color 2 BC Obs	337,104	4,694,123	120	75	47.16	3.00	20,000
C2CCOBS	MAP Color 2 CC Obs	337,067	4,694,195	120	75	50.13	3.33	26,251
BOOTHCONC	MAP Booth Conc	337,043	4,694,169	130	90	48.83	7.00	112,750
RTO	MAP RTO	337,083	4,694,225	130	260	48.48	5.67	73,367
RPRCS	MAP Rapid Reprocess	337,049	4,694,209	120	70	41.18	6.50	81,995
SPOTPRM	MAP Spot Prime	337,103	4,694,053	120	70	40.79	4.17	33,374
HWG1	MAP HWG1	336,953	4,694,228	15	200	24.58	1.17	1,577
HWG2	MAP HWG2	336,953	4,694,227	15	200	24.58	1.17	1,577
HWG3	MAP HWG3	336,954	4,694,226	15	200	24.58	1.17	1,577
HWG4	MAP HWG4	337,007	4,694,118	15	200	24.58	1.17	1,577
HWG5	MAP HWG5	337,008	4,694,116	15	200	24.58	1.17	1,577

Table C-1 - Exhaust Stack Parameters
FCA JNAP Tutone and Sustainment - March 2020

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Stack Height (ft)	Temperature (°F)	Exit Velocity (fps)	Stack Diameter (ft)	Flow Rate (acfm)
HWG6	MAP HWG6	337,123	4,694,025	90	200	24.58	1.17	1,577
HWG7	MAP HWG7	337,125	4,694,026	90	200	24.58	1.17	1,577
HWG8	MAP HWG8	337,126	4,694,026	90	200	24.58	1.17	1,577
HWG9	MAP HWG9	337,128	4,694,027	90	200	24.58	1.17	1,577
GEN1A	MAP 350 hp NG Generator	336,975	4,694,625	10	200	170.47	0.62	3,138
GEN1B	MAP 350 hp NG Generator	337,137	4,694,260	10	200	170.47	0.62	3,138
GEN2	MAP 770 hp NG Generator	337,149	4,694,065	10	200	170.47	0.62	3,138
GEN3	MAP 770 hp NG Generator	337,096	4,694,010	10	200	170.47	0.62	3,138
PRMHT1	MAP Primer Oven 1 Heater Box	337,035	4,694,207	120	287	43.96	1.00	2,072
PRMHT2	MAP Primer Oven 2 Heater Box	337,043	4,694,211	120	287	43.96	1.00	2,072
C1OVHT	MAP Color 1 Oven Heater Box	337,030	4,694,170	120	282	53.22	0.83	1,728
C2OVHT	MAP Color 2 Oven Heater Box	337,038	4,694,174	120	282	53.22	0.83	1,728
Nearby Sources - EGLE Provided Off-Site								
A7809	U S STEEL GREAT LAKES WORKS	326,000	4,683,000	76	240	39.04	7.62	106,944
A9831	MARATHON PETROLEUM COMPANY LP	322,000	4,683,150	133	476	20.34	4.44	18,875
B2169	CARMEUSE LIME Inc, RIVER ROUGE OPERATION	324,525	4,682,560	71	450	4.79	23.80	127,859
B2810	DTE Electric Company - River Rouge Power Plant	325,800	4,682,000	425	320	524.46	12.83	4,068,238
N6631	DEARBORN INDUSTRIAL GENERATION	322,600	4,685,595	60	1073	482.94	17.75	7,170,184
P0408	EES COKE BATTERY LLC	326,126	4,683,543	187	783	85.63	17.41	1,222,871
B2814	DETROIT THERMAL BEACON HEATING PLANT	331,560	4,689,140	250	415	75.30	10.00	354,859
M4148	DETROIT RENEWABLE POWER, LLC	331,054	4,692,742	337	312	136.80	7.58	370,728
B3567	SAINT MARY'S CEMENT	323,850	4,683,450	40	70	32.81	1.000	1,546
Area Sources								
JNAP Tutone Processes		na	na	na	na	na	na	na
TTNG	Various NG combustion sources in paint associated with TT	na	na	na	na	na	na	na
RRADD	Rapid reprocess building addition ASH	na	na	na	na	na	na	na
CTVVNG	CTVV building addition NG combustion	na	na	na	na	na	na	na
Nearby Existing Sources - JNAP								
N2155_7	Area Source representing EU Heaters	na	na	na	na	na	na	na
Nearby Existing Sources - MAP								
PSROOF	Mack Assembly PS PH Vents	na	na	na	na	na	na	na
MAEP2NG	MAEP NG Combustion	na	na	na	na	na	na	na
MAEPEX	Existing MAEP NG heaters	na	na	na	na	na	na	na

Table C-2. TAC Emission Calculations from Basecoat.
FCA JNAP Tutone and Sustainment - March 2020

CAS	Pollutant	Solid Black	Max Hourly				Max Hourly - Annual Average			
		Percent by weight	Observation Emissions	Concentrator Emissions	Oven Oxidizer Emissions	Booth Oxidizer Emissions	Observation Emissions	Concentrator Emissions	Oven Oxidizer Emissions	Booth Oxidizer Emissions
	Color Code:	DX8								
	Supplier Code:									
			(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
64-17-5	Ethanol	2.5%	3.75E-02	8.43E-02	2.58E-03	3.79E-02	2.43E-02	5.46E-02	1.67E-03	2.46E-02
67-56-1	Methyl Alcohol	0.1%	1.50E-03	3.37E-03	1.03E-04	1.52E-03	9.73E-04	2.18E-03	6.69E-05	9.83E-04
67-63-0	Isopropyl Alcohol	0.6%	9.00E-03	2.02E-02	6.19E-04	9.10E-03	5.84E-03	1.31E-02	4.01E-04	5.90E-03
67-64-1	Acetone	0.1%	1.50E-03	3.37E-03	1.03E-04	1.52E-03	9.73E-04	2.18E-03	6.69E-05	9.83E-04
71-36-3	1-Butanol	0.1%	1.50E-03	3.37E-03	1.03E-04	1.52E-03	9.73E-04	2.18E-03	6.69E-05	9.83E-04
78-83-1	Isobutanol	1.5%	2.25E-02	5.06E-02	1.55E-03	2.28E-02	1.46E-02	3.28E-02	1.00E-03	1.47E-02
95-63-6	1,2,4-Trimethyl Benzene	0.3%	4.50E-03	1.01E-02	3.10E-04	4.55E-03	2.92E-03	6.55E-03	2.01E-04	2.95E-03
100-41-4	Ethylbenzene	0.3%	4.50E-03	1.01E-02	3.10E-04	4.55E-03	2.92E-03	6.55E-03	2.01E-04	2.95E-03
103-09-3	2-Ethylhexyl acetate	0.4%	6.00E-03	1.35E-02	4.13E-04	6.07E-03	3.89E-03	8.74E-03	2.68E-04	3.93E-03
108-65-6	1-Methoxy-2-Propyl Acetate	1.5%	2.25E-02	5.06E-02	1.55E-03	2.28E-02	1.46E-02	3.28E-02	1.00E-03	1.47E-02
108-83-4	2,6-Dimethylheptanone	8.6%	1.29E-01	2.90E-01	8.87E-03	1.30E-01	8.37E-02	1.88E-01	5.75E-03	8.46E-02
108-87-2	Methylcyclohexane	0.6%	9.00E-03	2.02E-02	6.19E-04	9.10E-03	5.84E-03	1.31E-02	4.01E-04	5.90E-03
108-88-3	Toluene	0.1%	1.50E-03	3.37E-03	1.03E-04	1.52E-03	9.73E-04	2.18E-03	6.69E-05	9.83E-04
123-86-4	N-BUTYL ACETATE	18.4%	2.76E-01	6.20E-01	1.90E-02	2.79E-01	1.79E-01	4.02E-01	1.23E-02	1.81E-01
141-78-6	Ethyl Acetate	0.1%	1.50E-03	3.37E-03	1.03E-04	1.52E-03	9.73E-04	2.18E-03	6.69E-05	9.83E-04
142-82-5	Heptane	1.3%	1.95E-02	4.38E-02	1.34E-03	1.97E-02	1.26E-02	2.84E-02	8.69E-04	1.28E-02
1330-20-7	Xylenes	1.2%	1.80E-02	4.04E-02	1.24E-03	1.82E-02	1.17E-02	2.62E-02	8.03E-04	1.18E-02
7732-18-5	Water	0.3%	4.50E-03	1.01E-02	3.10E-04	4.55E-03	2.92E-03	6.55E-03	2.01E-04	2.95E-03
8032-32-4	VM and P naphtha	3.2%	4.80E-02	1.08E-01	3.30E-03	4.85E-02	3.11E-02	6.99E-02	2.14E-03	3.15E-02
19549-80-5	4,6-Dimethyl-2Heptanone	1.2%	1.80E-02	4.04E-02	1.24E-03	1.82E-02	1.17E-02	2.62E-02	8.03E-04	1.18E-02
64741-66-8	Petroleum Distillates	1.4%	2.10E-02	4.72E-02	1.44E-03	2.12E-02	1.36E-02	3.06E-02	9.36E-04	1.38E-02
64742-48-9	naphtha (petroleum), hydrotreated heavy	0.1%	1.50E-03	3.37E-03	1.03E-04	1.52E-03	9.73E-04	2.18E-03	6.69E-05	9.83E-04
64742-49-0	naphtha (petroleum), hydrotreated light	1.2%	1.80E-02	4.04E-02	1.24E-03	1.82E-02	1.17E-02	2.62E-02	8.03E-04	1.18E-02
64742-95-6	SC 100 / Aromatic 100	0.7%	1.05E-02	2.36E-02	7.22E-04	1.06E-02	6.81E-03	1.53E-02	4.68E-04	6.88E-03
	Weight per Gallon (lb/gal):	8.12								

Max Production	170,352	veh/yr
Max Line Speed	30	veh/hr
BC Application	0.153	gal/veh
BC TE	0.719	(a)
OSL test - Booth, Flash	0.867	(b)
OSL test - Observation	0.056	(c)
OSL test - Oven	0.077	(d)
Fraction to Observation	0.040264	(a)*(c)
Fraction to Concentrator	0.9044	(1-a)+(a*b)
Fraction Direct to RTO	0.0554	(a)*(d)
Total	1.00	
Concentrator Capture	0.9	lb/lb
RTO Destruction Efficiency	0.95	lb/lb

Example Calculation: Emissions of Isobutanol

(1.5/100)*(8.12 lb/gal)*(30 veh/hr)*(0.153 gal/vel)=	5.59E-01	lb/hr used
(5.59E-01 lb/hr)(0.040264) =	2.25E-02	lb/hr emitted BC Observation
(5.59E-01 lb/hr)*(0.9044)*(1-0.90) =	5.06E-02	lb/hr emitted Concentrator
(5.59E-01 lb/hr)*(0.0554)*(1-0.95) =	1.55E-03	lb/hr emitted Oven RTO
(5.59E-01 lb/hr)*(0.9044)*(0.90)*(1-0.95) =	2.28E-02	lb/hr emitted Booth RTO

Table C-3. TAC Emission Calculations from Clearcoat.
FCA JNAP Tutone and Sustainment - March 2020

CAS	Chemical	Clearcoat CSRC8002R (% by wt.)	Max Hourly				Max Hourly - Annual Average			
			Observation (lb/hr)	Concentrator (lb/hr)	Oven Oxidizer (lb/hr)	Booth Oxidizer (lb/hr)	Observation (lb/hr)	Concentrator (lb/hr)	Oven Oxidizer (lb/hr)	Booth Oxidizer (lb/hr)
67-63-0	Isopropanol	1.30%	0.042	0.046	0.006	0.021	0.027	0.030	0.004	0.0134
78-83-1	Isobutanol[3]	0.60%	0.020	0.021	0.003	0.010	0.013	0.014	0.002	0.0062
95-63-6	1,2,4-Trimethyl Benzene	3.10%	0.101	0.110	0.014	0.049	0.065	0.071	0.009	0.0321
98-82-8	Cumene	0.10%	0.003	0.004	0.000	0.002	0.002	0.002	0.000	0.0010
100-41-4	Ethylbenzene	0.10%	0.003	0.004	0.000	0.002	0.002	0.002	0.000	0.0010
107-98-2	Propylene Gly. Mono-Methyl Ether	4.80%	0.156	0.170	0.022	0.077	0.101	0.110	0.014	0.0496
103-65-1	Propylbenzene	0.40%	0.013	0.014	0.002	0.006	0.008	0.009	0.001	0.0041
108-65-6	1-Methoxy 2-Propyl Acetate	11.00%	0.359	0.390	0.050	0.176	0.232	0.253	0.032	0.1138
108-67-8	1,3,5-Trimethylbenzene	0.60%	0.020	0.021	0.003	0.010	0.013	0.014	0.002	0.0062
526-73-8	1,2,3-Trimethylbenzene	0.30%	0.010	0.011	0.001	0.005	0.006	0.007	0.001	0.0031
624-54-4	Pentyl Propionate	7.80%	0.254	0.277	0.035	0.124	0.165	0.179	0.023	0.0807
1330-20-7	Xylene	0.50%	0.016	0.018	0.002	0.008	0.011	0.011	0.001	0.0052
7732-18-5	Water	0.20%	0.007	0.007	0.001	0.003	0.004	0.005	0.001	0.0021
34590-94-8	Dipropyl. Gly. Mono-Methyl Ether	4.10%	0.134	0.145	0.019	0.065	0.087	0.094	0.012	0.0424
64742-95-6	SC 100 / Aromatic 100	5.50%	0.179	0.195	0.025	0.088	0.116	0.126	0.016	0.0569
70657-70-4	2-Methoxy 1-propyl acetate	0.10%	0.003	0.004	0.000	0.002	0.002	0.002	0.000	0.0010
	Density (lb/gal)	8.34								

Ratio 1

Max Production	170,352	veh/yr
Max Line Speed	30	veh/hr
Total CC Application	0.191	gal/veh
CC TE	0.775	(a)
OSL test - Booth, Flash	0.667	(b)
OSL test - Observation	0.088	(c)
OSL test - Oven	0.245	(d)
Fraction to Observation	0.068	(a)*(c)
Fraction to Concentrator	0.742	(1-a)+(a*b)
Fraction direct to RTO	0.190	(a)*(d)
total	1.00	
Concentrator Capture	0.9	lb/lb
Oxidizer Destruction	0.95	lb/lb

Example Calculation: Emissions of Pentyl Propionate

(0.191 gal/veh)*(30 veh/hr)*(8.34 lb/gal)*(0.078) =	3.73	lb/hr used
(3.73 lb/hr)*(0.068) =	0.254	lb/hr emitted CC Observation
(3.73 lb/hr)*(0.742)*(1-0.90) =	0.277	lb/hr emitted Concentrator
(3.73)*(0.190)*(1-0.95) =	0.035	lb/hr emitted Oven RTO
(3.73 lb/hr)*(0.742)*(0.90)*(1-0.95) =	0.124	lb/hr emitted RTO

Table C-4. TAC Emission Calculations from Rapid Repair.
FCA JNAP Tutone and Sustainment - March 2020

CAS	Pollutant	JRM	GW7	JSC	JWD	RUW	KXJ	LAU	NRV	SHR	CC	Max Hourly	Max Hourly - Annual Average
		Percent by Weight											
												(lb/hr)	(lb/hr)
50-00-0	Formaldehyde (from Resin) [1]	1.251	1.001	1.251	1.251	1.251	1.251	1.251	1.001	1.251	1.30	0.0097	0.0009
64-17-5	Ethanol		1.90	2.16			2.3	1.8				0.0090	0.0008
67-56-1	Methyl Alcohol			0.12	0.12		0.1					0.0005	0.0000
67-63-0	Isopropanol	0.44	0.15	0.22	0.4	0.2	0.5	0.21	0.4	0.5	1.30	0.0067	0.0006
67-64-1	Acetone						0.2					0.0007	0.0001
71-36-3	n-Butanol			0.14			0.1	0.6	3.2			0.0120	0.0011
71-41-0	Amyl Alcohol	0.98		1.6		2.3				1.7		0.0086	0.0008
78-83-1	Isobutanol	1.95	1.32	1.50	0.64	1.2	1.9	1.05	1.1	2.1	0.58	0.0097	0.0009
80-62-6	Methyl Methacrylate	0.17							0.2			0.0008	0.0001
95-63-6	1,2,4-Trimethyl Benzene	0.18	2.90	0.50	0.34	0.5	0.3	0.20	0.1		3.35	0.0263	0.0024
98-82-8	Cumene										0.16	0.0006	0.0001
100-41-4	Ethyl Benzene		0.30	0.30		0.4	0.3	0.11	0.3	0.3	0.10	0.0019	0.0002
103-09-3	2-Ethylhexyl acetate						0.6	0.2				0.0022	0.0002
103-65-1	Propylbenzene		0.50								0.40	0.0039	0.0004
106-36-5	N-Propyl Propionate			0.12								0.0005	0.0000
108-10-1	Methyl Isobutyl Ketone	0.10	0.11	0.20			0.1	0				0.0008	0.0001
108-11-2	Methyl amyl alcohol			0.14				0				0.0005	0.0000
108-65-6	1-Methoxy 2-propyl acetate		0.9	2.04				0.50	0.6		10.99	0.0490	0.0045
108-67-8	1,3,5 Trimethylbenzene		0.5								0.60	0.0046	0.0004
108-82-7	2,6-Dimethyl-4-Heptanol			0.35			0.2	0.39	0			0.0014	0.0001
108-83-8	Diisobutyl Ketone		7.98	15.20			7.1	16.09	9.3			0.0583	0.0053
108-87-2	Methylcyclohexane		0.30	0.80			0.9	0.8	0.7			0.0033	0.0003
108-88-3	Toluene	0.00	0.66	0.50		0.2	0.2	0.13		0.5		0.0031	0.0003
110-97-4	Diisopropanolamine											0.0000	0.0000
123-86-4	n-Butyl Acetate		5.47	11.80			19.6	13.68	18.3			0.0710	0.0065
137-32-6	2-Methylbutan-1-ol			0.90								0.0034	0.0003
141-78-6	Ethyl Acetate			0.12			0.1					0.0005	0.0000
142-82-5	n-Heptane		1.35	1.60			4.5	3.91	3.5			0.0163	0.0015
526-73-8	1,2,3 Trimethylbenzene		0.40								0.30	0.0030	0.0003
590-01-2	Proprionic Acid, N-Butyl ester		5.71						0.8			0.0270	0.0025
872-50-4	N-Methyl-2-Pyrrolidone	0.00							0	0		0.0000	0.0000
1330-20-7	Xylene	0.35	1.40	1.20	0.4	1.8	1.2	0.6	1.1	1.3	0.54	0.0087	0.0008
8032-32-4	Naphtha	4.10	3.84	3.00	1.03	3.7	4.6	3.25	2.3	5.2		0.0186	0.0017
8052-41-3	Stoddard Solvent							0.2		0		0.0007	0.0001
19549-80-5	4 6-dimethyl 2-heptanone		1.25	2.28			1.1	2.52	1.3			0.0091	0.0008
25551-13-7	Trimethylbenzene			0.20								0.0008	0.0001
34590-94-8	Dipropyl. Gly. Mono-Methyl Ether						1.8		2.3		6.50	0.0330	0.0030
64741-66-8	Petroleum Distillates		0.64	3.14			2.2	3	1.5			0.0119	0.0011
64742-47-8	Distillates			0.10			0.1	0.1	0.1			0.0004	0.0000
64742-48-9	Naphtha	0.26				0.2	0.2	0.2	0.6			0.0023	0.0002
64742-49-0	Naphtha, hydrotreated light		0.60	1.50			1.7	1.6	1.3			0.0062	0.0006
64742-88-7	Mineral Spirits											0.0000	0.0000
64742-94-5	SC 150 / Aromatic 150			0.27								0.0010	0.0001
64742-95-6	SC 100 / Aromatic 100	0.30	5.10	0.94	0.67	0.9	0.5	0.41	0.3		6.65	0.0490	0.0045
	Weight per Gallon (lb/gal):	8.16	10.49	8.41	8.48	8.28	8.05	8.05	8.36	7.95	8.3400		
	Maximum Hourly Coating usage (gal/hr)	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450		
	imum Annual Average Hourly Coating Usage (gal/hr)	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041		

Notes: 1 - Formaldehyde may be emitted from topcoat during the curing of melamine resin in the ovens. To account for an annual average production of formaldehyde, the weighted average amount of resin was used, taking into account the expect color speciation, and conversion of 5% of the resin to formaldehyde.

Example Calculation: Emissions of Isopropanol

(1.9/100)*(8.05 lb/gal)*(0.045 gal/hr) = 0.0069 lb/hr Basecoat

(0.58/100)*(8.34 lb/gal)*(0.045 gal/hr) = 0.00218 lb/hr Clearcoat

0.0091 lb/hr total

Table C-5. TAC Emission Calculations from Paint Purge and Booth Cleaning Materials.
FCA JNAP Tutone and Sustainment - March 2020

CAS	Chemical	Gage S-712 Cleaner (% by wt)	Chemico 5131G Cleaner (% by wt)	CN-38185 Cleaner (% by wt)	Chemico 5100G Cleaner (% by wt)	Gage 30180 Purge Purge (% by wt)	Concentrator (lb/hr)	Oxidizer (lb/hr)	Concentrator (lb/hr)	Oxidizer (lb/hr)
67-56-1	Methyl Alcohol					1.00%	0.0293	0.0132	0.0183	0.0082
67-63-0	Isopropyl Alcohol					10.00%	0.2934	0.1320	0.1829	0.0823
67-64-1	Acetone					1.00%	0.0293	0.0132	0.0183	0.0082
71-36-3	n-Butanol					10.00%	0.2934	0.1320	0.1829	0.0823
78-83-1	Isobutanol					5.00%	0.1467	0.0660	0.0914	0.0411
78-93-3	Methyl Ethyl Ketone					1.00%	0.0293	0.0132	0.0183	0.0082
91-20-3	Naphthalene					0.50%	0.0147	0.0066	0.0091	0.0041
95-63-6	1,2,4-Trimethyl Benzene			20.0%		20.00%	0.6036	0.7737	0.3762	0.4823
97-85-8	Isobutyl isobutyrate					3.00%	0.0880	0.0396	0.0549	0.0247
98-82-8	Cumene			1.0%		5.40%	0.1593	0.0968	0.0993	0.0603
100-41-4	Ethylbenzene					26.80%	0.7864	0.3539	0.4901	0.2206
106-36-5	n-Propyl Propionate					5.00%	0.1467	0.0660	0.0914	0.0411
108-10-1	Methyl Isobutyl Ketone					10.00%	0.2934	0.1320	0.1829	0.0823
108-21-4	Isopropyl Acetate					10.00%	0.2934	0.1320	0.1829	0.0823
108-67-8	1,3,5 Trimethyl Benzene			5.0%		0.00%	0.0042	0.1274	0.0026	0.0794
108-88-3	Toluene					2.20%	0.0646	0.0290	0.0402	0.0181
111-76-2	2-Butoxy Ethanol		40.0%		25.0%	0.00%	0.0416	1.2654	0.0259	0.7887
112-34-5	2-(2-Butoxyethoxy) Ethanol	20.0%				0.00%	0.0215	0.6541	0.0134	0.4077
123-86-4	n-Butyl Acetate					20.00%	0.5868	0.2641	0.3658	0.1646
141-43-5	Monoethanolamine		2.0%			0.00%	0.0021	0.0633	0.0013	0.0394
526-73-8	1,3,5 Trimethyl Benzene			1.0%		0.00%	0.0008	0.0255	0.0005	0.0159
624-41-9	2-Methyl Butyl Acetate			20.0%		0.00%	0.0167	0.5096	0.0104	0.3177
628-63-7	n-Amyl Acetate			50.0%		0.00%	0.0418	1.2741	0.0261	0.7941
1330-20-7	Xylene					33.20%	0.9742	0.4384	0.6072	0.2732
5989-27-5	d-Limonene	10.0%				0.00%	0.0107	0.3270	0.0067	0.2038
60828-78-6	trimethylnonylphenoxy polyethylene	20.0%				0.00%	0.0215	0.6541	0.0134	0.4077
64742-94-5	Heavy Aromatic Naphtha					3.00%	0.0880	0.0396	0.0549	0.0247
64742-95-6	SC 100 / Aromatic 100			50.0%		20.00%	0.6287	1.5382	0.3919	0.9587

	Gage S-712	Chemico 5131G	CN-38185	Chemico 5100G	Gage 30180 Purge
VOC Formula (lb/gal)	**0.89**	**2.85**	**7.32**	**1.43**	**7.25**
Density (lb/gal)	**8.42**	**8.15**	**6.56**	**8.29**	**7.26**
Usage (gal/veh)	**0.017**	**0.017**	**0.017**	**0.017**	**0.337**
Usage (lb/veh)	**0.143**	**0.139**	**0.112**	**0.141**	**2.445**
Max. Usage (lb/hr)	**4.30**	**4.16**	**3.35**	**4.23**	**73.36**
Annualized Usage (lb/hr)	**2.68**	**2.59**	**2.09**	**2.64**	**45.72**

Cleaners
- RTO operating when cleaners are used (i.e., cleaners controlled)
- No carryover = No Obs Emissions

Purge
- Fraction reclaim for Prime, BC, and CC
- Control for Purge
- No Carryover = No Obs Emissions

Max Production	163,800	veh/yr
Max Line Speed	30	veh/hr
Cleaners Control fraction	0.25	lb/lb
Concentrator Capture	0.90	lb/lb
Oxidizer Destruction	0.95	lb/lb
Purge Reclaim	0.6	fraction reclaim

Example Calculation - Aromatic 100

controlled:

(0.112 lb/veh)*(30 veh/hr)*(0.50)*(0.25)*(1-0.9) =	0.0418 lb/hr Concentrator from Cleaner
(2.445 lb/veh)*(30 veh/hr)*(0.20)*(1-0.6)*(1-0.9) =	0.5868 lb/hr Concentrator from Purge
	0.6287 lb/hr Concentrator Total
(0.112 lb/veh)*(30 veh/hr)*(0.50)*(0.25)*(0.9)(1-.95) =	0.0188 lb/hr RTO from Cleaner
(2.445 lb/veh)*(30 veh/hr)*(0.20)*(1-.6)*(0.9)(1-.95) =	0.2641 lb/hr RTO from Purge

uncontrolled:

(0.112 lb/veh)*(30 veh/hr)*(0.50)*(1-0.25) =	1.2553 lb/hr RTO stack uncontolled Cleaner
	1.5382 lb/hr RTO Total

Table C-6. TAC Emission Calculations from Natural Gas Combustion.
FCA JNAP Tutone and Sustainment - March 2020

				Emission Rate					
CAS	Name	BC Obs Stack Max Hourly (lb/hr)	CC Obs Stack Max hourly (lb/hr)	Conc Stack Max hourly (lb/hr)	Building Addition RR ASH Max hourly (lb/hr)	Booth RTO Max hourly (lb/hr)	Oven RTO Max hourly (lb/hr)	Powder and Bldg Support Max hourly (lb/hr)	CTVV Max hourly (lb/hr)
50-00-0	Formaldehyde	1.47E-03	1.47E-03	2.94E-03	2.13E-03	1.50E-03	1.20E-04	1.50E-03	9.68E-04
50-32-8	Benzo(a)pyrene	2.35E-08	2.35E-08	4.70E-08	3.41E-08	2.40E-08	3.84E-08	2.40E-08	1.55E-08
53-70-3	Dibenzo(a,h)anthracene	2.58E-08	2.58E-08	5.17E-08	3.75E-08	2.64E-08	4.22E-08	2.64E-08	1.70E-08
56-49-5	3-Methylchloranthrene	2.01E-07	2.01E-07	4.02E-07	2.91E-07	2.05E-07	3.28E-07	2.05E-07	1.32E-07
56-55-3	Benz(a)anthracene	3.52E-09	3.52E-09	7.05E-09	5.11E-09	3.60E-09	5.76E-09	3.60E-09	2.32E-09
71-43-2	Benzene	4.11E-05	4.11E-05	8.22E-05	5.96E-05	4.20E-05	6.72E-05	4.20E-05	2.71E-05
83-32-9	Acenaphthene	3.52E-08	3.52E-08	7.05E-08	5.11E-08	3.60E-08	5.76E-08	3.60E-08	2.32E-08
85-01-8	Phenanathrene	3.33E-07	3.33E-07	6.66E-07	4.83E-07	3.40E-07	5.44E-07	3.40E-07	2.19E-07
86-73-7	Fluorene	5.48E-08	5.48E-08	1.10E-07	7.95E-08	5.60E-08	8.96E-08	5.60E-08	3.61E-08
91-20-3	Naphthalene	1.19E-05	1.19E-05	2.39E-05	1.73E-05	1.22E-05	1.95E-05	1.22E-05	7.87E-06
91-57-6	2-Methylnaphthalene	4.70E-07	4.70E-07	9.40E-07	6.82E-07	4.80E-07	7.68E-07	4.80E-07	3.10E-07
106-97-8	Butane	4.11E-02	4.11E-02	8.22E-02	5.96E-02	4.20E-02	6.72E-02	4.20E-02	2.71E-02
108-88-3	Toluene	6.66E-05	6.66E-05	1.33E-04	9.66E-05	6.80E-05	1.09E-04	6.80E-05	4.39E-05
109-66-0	Pentane	5.09E-02	5.09E-02	1.02E-01	7.38E-02	5.20E-02	8.32E-02	5.20E-02	3.35E-02
110-54-3	Hexane	3.52E-02	3.52E-02	7.05E-02	5.11E-02	3.60E-02	5.76E-02	3.60E-02	2.32E-02
120-12-7	Anthracene	4.70E-08	4.70E-08	9.40E-08	6.82E-08	4.80E-08	7.68E-08	4.80E-08	3.10E-08
129-00-0	Pyrene	9.79E-08	9.79E-08	1.96E-07	1.42E-07	1.00E-07	1.60E-07	1.00E-07	6.45E-08
191-24-2	Benzo(g,h,i)perylene	2.35E-08	2.35E-08	4.70E-08	3.41E-08	2.40E-08	3.84E-08	2.40E-08	1.55E-08
193-39-5	Indeno(1,2,3-cd)pyrene	3.52E-09	3.52E-09	7.05E-09	5.11E-09	3.60E-09	5.76E-09	3.60E-09	2.32E-09
208-96-8	Acenaphthylene	3.52E-08	3.52E-08	7.05E-08	5.11E-08	3.60E-08	5.76E-08	3.60E-08	2.32E-08
205-82-3	Benzo(k)fluoranthene	3.52E-09	3.52E-09	7.05E-09	5.11E-09	3.60E-09	5.76E-09	3.60E-09	2.32E-09
205-99-2	Benzo(b)fluoranthene	3.52E-09	3.52E-09	7.05E-09	5.11E-09	3.60E-09	5.76E-09	3.60E-09	2.32E-09
206-44-0	Fluoranthene	5.87E-08	5.87E-08	1.17E-07	8.52E-08	6.00E-08	9.60E-08	6.00E-08	3.87E-08
218-01-9	Chrysene	3.52E-10	3.52E-10	7.05E-10	5.11E-10	3.60E-10	5.76E-10	3.60E-10	2.32E-10
7439-96-5	Manganese	7.44E-06	7.44E-06	1.49E-05	1.08E-05	7.60E-06	1.22E-05	7.60E-06	4.90E-06
7439-97-6	Mercury	5.09E-06	5.09E-06	1.02E-05	7.38E-06	5.20E-06	8.32E-06	5.20E-06	3.35E-06
7439-98-7	Molybdenum	2.15E-05	2.15E-05	4.31E-05	3.12E-05	2.20E-05	3.52E-05	2.20E-05	1.42E-05
7440-02-0	Nickel	4.11E-05	4.11E-05	8.22E-05	5.96E-05	4.20E-05	6.72E-05	4.20E-05	2.71E-05
7440-38-2	Arsenic	3.92E-06	3.92E-06	7.83E-06	5.68E-06	4.00E-06	6.40E-06	4.00E-06	2.58E-06
7440-39-3	Barium	8.61E-05	8.61E-05	1.72E-04	1.25E-04	8.80E-05	1.41E-04	8.80E-05	5.68E-05
7440-41-7	Beryllium	2.35E-07	2.35E-07	4.70E-07	3.41E-07	2.40E-07	3.84E-07	2.40E-07	1.55E-07
7440-43-9	Cadmium	2.15E-05	2.15E-05	4.31E-05	3.12E-05	2.20E-05	3.52E-05	2.20E-05	1.42E-05
7440-48-4	Cobalt	1.64E-06	1.64E-06	3.29E-06	2.39E-06	1.68E-06	2.69E-06	1.68E-06	1.08E-06
7440-50-8	Copper	1.66E-05	1.66E-05	3.33E-05	2.41E-05	1.70E-05	2.72E-05	1.70E-05	1.10E-05
7782-49-2	Selenium	4.70E-07	4.70E-07	9.40E-07	6.82E-07	4.80E-07	7.68E-07	4.80E-07	3.10E-07
95-50-1	1,2 Dichlorobenzene [1]	2.35E-05	2.35E-05	4.70E-05	3.41E-05	2.40E-05	3.84E-05	2.40E-05	1.55E-05
541-73-1	1,3 Dichlorobenzene [1]	2.35E-05	2.35E-05	4.70E-05	3.41E-05	2.40E-05	3.84E-05	2.40E-05	1.55E-05
106-46-7	1,4 Dichlorobenzene [1]	2.35E-05	2.35E-05	4.70E-05	3.41E-05	2.40E-05	3.84E-05	2.40E-05	1.55E-05
na	7,12-Dimethylbenz(a)anthrace	2.04E-05	2.04E-05	4.07E-05	2.95E-05	2.08E-05	3.33E-05	2.08E-05	1.34E-05

NG Usage Rate		Max hourly		Annual Operating Basis	Max hourly - Annual Average	
New Paint Shop						
15	MMBtu/hr RTO	0.015	$MMft^3/hr$	0.9	0.0135	$MMft^3/hr$
5	MMBtu/hr Conc Desorp	0.0050	$MMft^3/hr$	0.9	0.0045	$MMft^3/hr$
32	MMBtu/hr Ovens (12,8 and 12)	0.032	$MMft^3/hr$	0.9	0.0288	$MMft^3/hr$
28.4	MMBtu/hr Building Addition RR ASH	0.0284	$MMft^3/hr$	0.5	0.0142	$MMft^3/hr$
78.3	MMBtu/hr ASH Heated flash	0.0783	$MMft^3/hr$	0.5	0.03915	$MMft^3/hr$
12.9	MMBtu/hr CTVV Water Test	0.013	$MMft^3/hr$	0.5	0.00645	$MMft^3/hr$
20.0	MMBtu Support Powder and Bldg	0.020	MMft3/hr	0.5	0.01	MMft3/hr
191.60	MMBtu/hr TOTAL	0.192	$MMft^3/hr$		0.1066	$MMft^3/hr$

Table C-6. TAC Emission Calculations from Natural Gas Combustion.
FCA JNAP Tutone and Sustainment - March 2020

		Emission Rate							
CAS	Name	BC Obs Stack Max Hourly (lb/hr)	CC Obs Stack Max hourly (lb/hr)	Conc Stack Hourly Ann Avg (lb/hr)	Building Addition RR ASH Hourly Ann Avg (lb/hr)	Booth RTO Hourly Ann Avg Hourly Ann Avg	Oven RTO Hourly Ann Avg Hourly Ann Avg	Powder and Bldg Support Hourly Ann Avg (lb/hr)	CTVV Hourly Ann Avg (lb/hr)
50-00-0	Formaldehyde	7.34E-04	7.34E-04	1.47E-03	1.07E-03	1.35E-03	1.08E-04	7.50E-04	4.84E-04
50-32-8	Benzo(a)pyrene	1.17E-08	1.17E-08	2.35E-08	1.70E-08	2.16E-08	3.46E-08	1.20E-08	7.74E-09
53-70-3	Dibenzo(a,h)anthracene	1.29E-08	1.29E-08	2.58E-08	1.87E-08	2.38E-08	3.80E-08	1.32E-08	8.51E-09
56-49-5	3-Methylchloranthrene	1.00E-07	1.00E-07	2.01E-07	1.46E-07	1.85E-07	2.95E-07	1.03E-07	6.62E-08
56-55-3	Benz(a)anthracene	1.76E-09	1.76E-09	3.52E-09	2.56E-09	3.24E-09	5.18E-09	1.80E-09	1.16E-09
71-43-2	Benzene	2.06E-05	2.06E-05	4.11E-05	2.98E-05	3.78E-05	6.05E-05	2.10E-05	1.35E-05
83-32-9	Acenaphthene	1.76E-08	1.76E-08	3.52E-08	2.56E-08	3.24E-08	5.18E-08	1.80E-08	1.16E-08
85-01-8	Phenanathrene	1.66E-07	1.66E-07	3.33E-07	2.41E-07	3.06E-07	4.90E-07	1.70E-07	1.10E-07
86-73-7	Fluorene	2.74E-08	2.74E-08	5.48E-08	3.98E-08	5.04E-08	8.06E-08	2.80E-08	1.81E-08
91-20-3	Naphthalene	5.97E-06	5.97E-06	1.19E-05	8.66E-06	1.10E-05	1.76E-05	6.10E-06	3.93E-06
91-57-6	2-Methylnaphthalene	2.35E-07	2.35E-07	4.70E-07	3.41E-07	4.32E-07	6.91E-07	2.40E-07	1.55E-07
106-97-8	Butane	2.06E-02	2.06E-02	4.11E-02	2.98E-02	3.78E-02	6.05E-02	2.10E-02	1.35E-02
108-88-3	Toluene	3.33E-05	3.33E-05	6.66E-05	4.83E-05	6.12E-05	9.79E-05	3.40E-05	2.19E-05
109-66-0	Pentane	2.54E-02	2.54E-02	5.09E-02	3.69E-02	4.68E-02	7.49E-02	2.60E-02	1.68E-02
110-54-3	Hexane	1.76E-02	1.76E-02	3.52E-02	2.56E-02	3.24E-02	5.18E-02	1.80E-02	1.16E-02
120-12-7	Anthracene	2.35E-08	2.35E-08	4.70E-08	3.41E-08	4.32E-08	6.91E-08	2.40E-08	1.55E-08
129-00-0	Pyrene	4.89E-08	4.89E-08	9.79E-08	7.10E-08	9.00E-08	1.44E-07	5.00E-08	3.23E-08
191-24-2	Benzo(g,h,i)perylene	1.17E-08	1.17E-08	2.35E-08	1.70E-08	2.16E-08	3.46E-08	1.20E-08	7.74E-09
193-39-5	Indeno(1,2,3-cd)pyrene	1.76E-09	1.76E-09	3.52E-09	2.56E-09	3.24E-09	5.18E-09	1.80E-09	1.16E-09
208-96-8	Acenaphthylene	1.76E-08	1.76E-08	3.52E-08	2.56E-08	3.24E-08	5.18E-08	1.80E-08	1.16E-08
205-82-3	Benzo(k)fluoranthene	1.76E-09	1.76E-09	3.52E-09	2.56E-09	3.24E-09	5.18E-09	1.80E-09	1.16E-09
205-99-2	Benzo(b)fluoranthene	1.76E-09	1.76E-09	3.52E-09	2.56E-09	3.24E-09	5.18E-09	1.80E-09	1.16E-09
206-44-0	Fluoranthene	2.94E-08	2.94E-08	5.87E-08	4.26E-08	5.40E-08	8.64E-08	3.00E-08	1.94E-08
218-01-9	Chrysene	1.76E-10	1.76E-10	3.52E-10	2.56E-10	3.24E-10	5.18E-10	1.80E-10	1.16E-10
7439-96-5	Manganese	3.72E-06	3.72E-06	7.44E-06	5.40E-06	6.84E-06	1.09E-05	3.80E-06	2.45E-06
7439-97-6	Mercury	2.54E-06	2.54E-06	5.09E-06	3.69E-06	4.68E-06	7.49E-06	2.60E-06	1.68E-06
7439-98-7	Molybdenum	1.08E-05	1.08E-05	2.15E-05	1.56E-05	1.98E-05	3.17E-05	1.10E-05	7.10E-06
7440-02-0	Nickel	2.06E-05	2.06E-05	4.11E-05	2.98E-05	3.78E-05	6.05E-05	2.10E-05	1.35E-05
7440-38-2	Arsenic	1.96E-06	1.96E-06	3.92E-06	2.84E-06	3.60E-06	5.76E-06	2.00E-06	1.29E-06
7440-39-3	Barium	4.31E-05	4.31E-05	8.61E-05	6.25E-05	7.92E-05	1.27E-04	4.40E-05	2.84E-05
7440-41-7	Beryllium	1.17E-07	1.17E-07	2.35E-07	1.70E-07	2.16E-07	3.46E-07	1.20E-07	7.74E-08
7440-43-9	Cadmium	1.08E-05	1.08E-05	2.15E-05	1.56E-05	1.98E-05	3.17E-05	1.10E-05	7.10E-06
7440-48-4	Cobalt	8.22E-07	8.22E-07	1.64E-06	1.19E-06	1.51E-06	2.42E-06	8.40E-07	5.42E-07
7440-50-8	Copper	8.32E-06	8.32E-06	1.66E-05	1.21E-05	1.53E-05	2.45E-05	8.50E-06	5.48E-06
7782-49-2	Selenium	2.35E-07	2.35E-07	4.70E-07	3.41E-07	4.32E-07	6.91E-07	2.40E-07	1.55E-07
95-50-1	1,2 Dichlorobenzene [1]	1.17E-05	1.17E-05	2.35E-05	1.70E-05	2.16E-05	3.46E-05	1.20E-05	7.74E-06
541-73-1	1,3 Dichlorobenzene [1]	1.17E-05	1.17E-05	2.35E-05	1.70E-05	2.16E-05	3.46E-05	1.20E-05	7.74E-06
106-46-7	1,4 Dichlorobenzene [1]	1.17E-05	1.17E-05	2.35E-05	1.70E-05	2.16E-05	3.46E-05	1.20E-05	7.74E-06
na	7,12-Dimethylbenz(a)anthrace	1.02E-05	1.02E-05	2.04E-05	1.48E-05	1.87E-05	3.00E-05	1.04E-05	6.71E-06

Table C-7. TAC Emissions Summary and Ambient Air Impact Concentrations.
FCA JNAP Tutone and Sustainment - March 2020

CAS	Chemical	BC1 Obs (lb/hr)	CC1 Obs (lb/hr)	Oven RTO (lb/hr)	Concentrator (lb/hr)	Booth RTO (lb/hr)	Rapid Repair 1 (lb/hr)	Rapid Repair 2 (lb/hr)	Rapid Repair NG (lb/hr)	TT NG (lb/hr)	CTVV NG (lb/hr)	Total Emission Rate (lb/hr)	Max Impact (μg/m^3)	ITSL (μg/m^3)	Averaging Time	ITSL 2 (μg/m^3)	Averaging Time	IRSL (μg/m^3)	Notes
50-00-0	formaldehyde	1.47E-03	1.47E-03	1.20E-04	2.94E-03	1.50E-03	4.83E-03	4.83E-03	2.13E-03	1.50E-03	9.68E-04	2.174E-02	0.078	30	24 hr	-	-		-
50-00-0	formaldehyde	7.34E-04	7.34E-04	1.35E-03	1.47E-03	1.35E-03	4.41E-04	4.41E-04	1.07E-03	7.50E-04	4.84E-04	8.816E-03	0.005		annual	-	-	.08	-
50-32-8	benzo(a)pyrene	2.35E-08	2.35E-08	3.84E-08	4.70E-08	2.40E-08	-	-	3.41E-08	2.40E-08	1.55E-08	2.299E-07	0.000	0.002	24 hr	-	-		5
50-32-8	benzo(a)pyrene	2.35E-08	2.35E-08	3.84E-08	4.70E-08	2.40E-08	-	-	3.41E-08	2.40E-08	1.55E-08	2.299E-07	0.000			-	-	.001	5
53-70-3	Dibenzo(a,h)anthracene	1.29E-08	1.29E-08	2.38E-08	2.58E-08	2.38E-08	-	-	1.87E-08	1.32E-08	8.51E-09	1.397E-07	0.000		annual	-	-	.001	5
56-49-5	3-Methylchloranthrene	1.00E-07	1.00E-07	1.85E-07	2.01E-07	1.85E-07	-	-	1.46E-07	1.03E-07	6.62E-08	1.086E-06	0.000		annual	-	-	.001	5
56-55-3	Benz(a)anthracene	1.76E-09	1.76E-09	3.24E-09	3.52E-09	3.24E-09	-	-	2.56E-09	1.80E-09	1.16E-09	1.904E-08	0.000		annual	-	-	.001	5
57-97-6	7,12-Dimethylbenz(a)anthracene	1.02E-05	1.02E-05	1.87E-05	2.04E-05	1.87E-05	-	-	1.48E-05	1.04E-05	6.71E-06	1.100E-04	0.000		annual			.001	5
64-17-5	ethyl alcohol	3.75E-02	-	2.58E-03	8.43E-02	2.58E-03	4.48E-03	4.48E-03	-	-	-	1.359E-01	0.645	19000	1 hr	-	-	-	-
67-56-1	methanol	1.50E-03	-	1.03E-04	3.27E-02	1.33E-02	2.29E-04	2.29E-04	-	-	-	4.808E-02	0.056	20000	24 hr			-	-
67-56-1	methanol	1.50E-03	-	1.03E-04	3.27E-02	1.33E-02	2.29E-04	2.29E-04	-	-	-	4.808E-02	0.132		1 hr	28000.	1 hr	-	-
67-63-0	isopropyl alcohol	-	2.75E-02	4.22E-03	2.19E-01	1.09E-01	3.05E-04	3.05E-04	-	-	-	3.689E-01	0.052	220	annual	-	-	-	-
67-64-1	acetone	-	-	1.03E-04	3.27E-02	1.33E-02	3.62E-04	3.62E-04	-	-	-	4.835E-02	0.071	5900	8 hr	-	-	-	-
71-36-3	n-butanol	-	-	6.69E-05	1.84E-01	8.45E-02	5.50E-04	5.50E-04	-	-	-	2.710E-01	0.034	350	annual	-	-	-	-
71-41-0	amyl alcohol	-	-	-	-	-	3.91E-04	3.91E-04	-	-	-	7.826E-04	0.000	120	annual	-	-	-	-
71-43-2	benzene	2.06E-05	2.06E-05	3.78E-05	4.11E-05	3.78E-05	-	-	2.98E-05	2.10E-05	1.35E-05	2.222E-04	0.000	30	annual				-
71-43-2	benzene	4.11E-05	4.11E-05	6.72E-05	8.22E-05	4.20E-05	-	-	5.96E-05	4.20E-05	2.71E-05	4.024E-04	0.002			30.	24 hr		-
71-43-2	benzene	2.06E-05	2.06E-05	3.78E-05	4.11E-05	3.78E-05	-	-	2.98E-05	2.10E-05	1.35E-05	2.222E-04	0.000		annual			.1	-
78-83-1	isobutyl alcohol	2.25E-02	1.96E-02	4.27E-03	2.19E-01	7.71E-02	4.84E-03	4.84E-03	-	-	-	3.517E-01	0.610	1500	8 hr	-	-	-	-
78-93-3	methyl ethyl ketone	-	-	-	2.93E-02	1.32E-02	-	-	-	-	-	4.255E-02	0.046	5000	24 hr	-	-	-	-
80-62-6	Methyl Methacrylate	-	-	-	-	-	3.44E-05	3.44E-05	-	-	-	6.871E-05	0.000	700	annual	-	-	-	-
83-32-9	Acenaphthene	1.76E-08	1.76E-08	3.24E-08	3.52E-08	3.24E-08	-	-	2.56E-08	1.80E-08	1.16E-08	1.904E-07	0.000	210	annual	-	-	-	-
85-01-8	Phenanathrene	1.66E-07	1.66E-07	3.06E-07	3.33E-07	3.06E-07	-	-	2.41E-07	1.70E-07	1.10E-07	1.799E-06	0.000	0.1	annual	-	-	-	-
86-73-7	Fluorene	2.74E-08	2.74E-08	5.04E-08	5.48E-08	5.04E-08	-	-	3.98E-08	2.80E-08	1.81E-08	2.962E-07	0.000	140	annual	-	-	-	-
91-20-3	naphthalene	5.97E-06	5.97E-06	1.10E-05	9.16E-03	4.13E-03	-	-	8.66E-06	6.10E-06	3.93E-06	1.332E-02	0.002	3	annual				-
91-20-3	naphthalene	1.19E-05	1.19E-05	1.95E-05	1.47E-02	6.61E-03	-	-	1.73E-05	1.22E-05	7.87E-06	2.139E-02	0.029			520.	8 hr		-
91-20-3	naphthalene	5.97E-06	5.97E-06	1.10E-05	9.16E-03	4.13E-03	-	-	8.66E-06	6.10E-06	3.93E-06	1.332E-02	0.002		annual			.08	-
91-57-6	2-Methylnaphthalene	2.35E-07	2.35E-07	4.32E-07	4.70E-07	4.32E-07	-	-	3.41E-07	2.40E-07	1.55E-07	2.539E-06	0.000	10	annual	-	-	-	-
95-50-1	1,2 Dichlorobenzene 1	1.17E-05	1.17E-05	2.16E-05	2.35E-05	2.16E-05	-	-	1.70E-05	1.20E-05	7.74E-06	1.270E-04	0.000	300	annual	-	-	-	-
95-63-6	1,2,4-trimethylbenzene	4.55E-03	6.55E-02	9.32E-03	4.50E-01	5.21E-01	1.20E-03	1.20E-03	-	-	-	1.053E+00	0.131	185	annual			-	14
95-63-6	1,2,4-trimethylbenzene	4.50E-03	1.01E-01	1.44E-02	7.24E-01	8.23E-01	1.31E-02	1.31E-02	-	-	-	1.693E+00	2.416			1200.	8 hr	-	14
97-85-8	Isobutyl isobutyrate	-	-	-	5.49E-02	2.47E-02	-	-	-	-	-	7.956E-02	0.010	300	annual	-	-	-	-
98-82-8	cumene	-	2.11E-03	2.94E-04	1.02E-01	6.14E-02	2.74E-05	2.74E-05	-	-	-	1.654E-01	0.020	400	annual	-	-		-
98-82-8	cumene	-	2.11E-03	2.94E-04	1.02E-01	6.14E-02	2.74E-05	2.74E-05	-	-	-	1.654E-01	0.020		annual	-	-	.1	-
100-41-4	ethylbenzene	4.50E-03	3.26E-03	7.63E-04	8.00E-01	3.56E-01	9.33E-04	9.33E-04	-	-	-	1.166E+00	1.277	1000	24 hr	-	-		-
100-41-4	ethylbenzene	4.55E-03	2.11E-03	4.95E-04	4.95E-01	2.28E-01	8.52E-05	8.52E-05	-	-	-	7.308E-01	0.091		annual	-	-	.4	-
103-09-3	2-ethylhexyl acetate	-	-	2.68E-04	3.89E-03	8.74E-03	9.92E-05	9.92E-05	-	-	-	1.916E-02	0.003	15	annual	-	-	-	-
103-65-1	Propylbenzene	-	8.45E-03	1.18E-03	9.19E-03	4.14E-03	1.76E-04	1.76E-04	-	-	-	2.331E-02	0.004	20	annual	-	-	-	-
106-36-5	N-Propyl Propionate	-	-	-	9.14E-02	4.11E-02	2.07E-05	2.07E-05	-	-	-	1.326E-01	0.016	84	annual	-	-	-	-
106-46-7	1,4 Dichlorobenzene 1	1.17E-05	1.17E-05	2.16E-05	2.35E-05	2.16E-05	-	-	1.70E-05	1.20E-05	7.74E-06	1.270E-04	0.000	800	annual	-	-		-
106-46-7	1,4 Dichlorobenzene 1	1.17E-05	1.17E-05	2.16E-05	2.35E-05	2.16E-05	-	-	1.70E-05	1.20E-05	7.74E-06	1.270E-04	0.000		annual	-	-	.25	-
106-97-8	butane	4.11E-02	4.11E-02	6.72E-02	8.22E-02	4.20E-02	-	-	5.96E-02	4.20E-02	2.71E-02	4.024E-01	3.493	23800	8 hr	-	-	-	22
107-98-2	propylene glycol monomethyl ether	-	1.56E-01	2.18E-02	1.70E-01	7.66E-02	-	-	-	-	-	4.250E-01	1.572	3700	1 hr	-	-	-	-
108-10-1	methyl isobutyl ketone	-	-	-	2.93E-01	1.32E-01	3.78E-04	3.78E-04	-	-	-	4.262E-01	0.564	820	8 hr	-	-		-
108-11-2	Methyl amyl alcohol	-	-	-	-	-	2.65E-04	2.65E-04	-	-	-	5.298E-04	0.003	1000	8 hr	-	-		-
108-21-4	isopropyl acetate	-	-	-	2.93E-01	1.32E-01	-	-	-	-	-	4.255E-01	0.560	4200	8 hr	-	-	-	-
108-65-6	1-Methoxy-2-propyl Acetate	-	3.59E-01	5.15E-02	4.41E-01	1.77E-01	2.45E-02	2.45E-02	-	-	-	1.099E+00	4.276	5400	1 hr	-	-	-	-
108-67-8	1,3,5-Trimethylbenzene	-	1.27E-02	1.76E-03	1.64E-02	8.56E-02	2.11E-04	2.11E-04	-	-	-	1.169E-01	0.014	185	annual			-	14
108-67-8	1,3,5-Trimethylbenzene	-	1.96E-02	2.72E-03	2.55E-02	1.37E-01	2.31E-03	2.31E-03	-	-	-	1.893E-01	0.273			1200.	8 hr	-	14
108-82-7	2,6-Dimethyl-4-Heptanol	-	-	-	-	-	6.45E-05	6.45E-05	-	-	-	1.290E-04	0.000	30	annual	-	-	-	-
108-83-4	2,6-Dimethylheptanone	-	-	8.87E-03	.29	.00887272	-	-	-	-	-	4.367E-01	0.971	1450	8 hr				
108-83-8	Diisobutyl Ketone	-	-	-	-	-	2.91E-02	2.91E-02	-	-	-	5.829E-02	0.277	1500	8 hr	-	-	-	-
108-87-2	Methylcyclohexane	-	-	6.19E-04	.02	6.19E-04	1.63E-03	1.63E-03	-	-	-	3.373E-02	0.083	16000	8 hr	-	-	-	-
108-88-3	toluene	1.57E-03	6.66E-05	2.12E-04	6.81E-02	2.92E-02	1.56E-03	1.56E-03	9.66E-05	6.80E-05	4.39E-05	1.024E-01	0.122	5000	24 hr	-	-	-	-
109-66-0	pentane	5.09E-02	5.09E-02	8.32E-02	1.02E-01	5.20E-02	-	-	7.38E-02	5.20E-02	3.35E-02	4.982E-01	4.325	17700	8 hr	-	-	-	-
110-54-3	hexane	1.76E-02	1.76E-02	3.24E-02	3.52E-02	3.24E-02	-	-	2.56E-02	1.80E-02	1.16E-02	1.904E-01	0.121	700	annual	-	-	-	-
111-76-2	2-butoxyethanol	-	-	-	2.59E-02	7.89E-01	-	-	-	-	-	8.146E-01	0.070	1600	annual	-	-	-	10
120-12-7	Anthracene	2.35E-08	2.35E-08	4.32E-08	4.70E-08	4.32E-08	-	-	3.41E-08	2.40E-08	1.55E-08	2.539E-07	0.000	1000	annual	-	-	-	-
112-34-5	butyl carbitol	-	-	-	1.34E-02	4.08E-01	-	-	-	-	-	4.211E-01	0.036	1	annual	-	-	-	-

Table C-7. TAC Emissions Summary and Ambient Air Impact Concentrations.
FCA JNAP Tutone and Sustainment - March 2020

CAS	Chemical	BC1 Obs (lb/hr)	CC1 Obs (lb/hr)	Oven RTO (lb/hr)	Concentrator (lb/hr)	Booth RTO (lb/hr)	Rapid Repair 1 (lb/hr)	Rapid Repair 2 (lb/hr)	Rapid Repair NG (lb/hr)	TT NG (lb/hr)	CTVV NG (lb/hr)	Total Emission Rate (lb/hr)	Max Impact (µg/m³)	ITSL (µg/m³)	Averaging Time	ITSL 2 (µg/m³)	Averaging Time	IRSL (µg/m³)	Notes
123-86-4	n-butyl acetate	-	-	1.90E-02	1.21E+00	2.83E-01	3.55E-02	3.55E-02	-	-	-	1.856E+00	3.535	2400	8 hr	-	-	-	15
129-00-0	Pyrene	4.89E-08	4.89E-08	9.00E-08	9.79E-08	9.00E-08	-	-	7.10E-08	5.00E-08	3.23E-08	5.290E-07	0.000	100	annual	-	-	-	-
137-32-6	2-Methyl-1-butanol	-	-	-	-	-	1.56E-04	1.56E-04	-	-	-	3.111E-04	0.000	13	annual	-	-	-	-
141-43-5	Monoethanolamine	-	-	-	2.08E-03	6.33E-02	-	-	-	-	-	6.535E-02	0.067	80	8 hr	-	-	-	-
141-78-6	Ethyl Acetate	-	-	6.69E-05	9.73E-04	2.18E-03	2.07E-05	2.07E-05	-	-	-	4.783E-03	0.001	3200	annual	-	-	-	-
142-82-5	Heptane	-	-	1.34E-03	4.38E-02	1.34E-03	8.15E-03	8.15E-03	-	-	-	8.231E-02	0.224	3500	8 hr	-	-	-	-
191-24-2	Benzo(g,h,i)perylene	1.17E-08	1.17E-08	2.16E-08	2.35E-08	2.16E-08	-	-	1.70E-08	1.20E-08	7.74E-09	1.270E-07	0.000	13	annual	-	-	-	-
193-39-5	Indeno(1,2,3-cd)pyrene	1.76E-09	1.76E-09	3.24E-09	3.52E-09	3.24E-09	-	-	2.56E-09	1.80E-09	1.16E-09	1.904E-08	0.000	0	annual	-	-	.001	5
205-82-3	Benzo(k)fluoranthene	1.76E-09	1.76E-09	3.24E-09	3.52E-09	3.24E-09	-	-	2.56E-09	1.80E-09	1.16E-09	1.904E-08	0.000	0	annual	-	-	.001	5
205-99-2	Benzo(b)fluoranthene	1.76E-09	1.76E-09	3.24E-09	3.52E-09	3.24E-09	-	-	2.56E-09	1.80E-09	1.16E-09	1.904E-08	0.000	0	annual	-	-	.001	5
206-44-0	Fluoranthene	2.94E-08	2.94E-08	5.40E-08	5.87E-08	5.40E-08	-	-	4.26E-08	3.00E-08	1.94E-08	3.174E-07	0.000	140	annual	-	-	-	-
208-96-8	Acenaphthylene	1.76E-08	1.76E-08	3.24E-08	3.52E-08	3.24E-08	-	-	2.56E-08	1.80E-08	1.16E-08	1.904E-07	0.000	35	annual	-	-	-	-
218-01-9	Chrysene	1.76E-10	1.76E-10	3.24E-10	3.52E-10	3.24E-10	-	-	2.56E-10	1.80E-10	1.16E-10	1.904E-09	0.000	0	annual	-	-	.001	5
526-73-8	1,2,3-Trimethylbenzene	-	6.34E-03	8.82E-04	7.42E-03	1.90E-02	1.38E-04	1.38E-04	-	-	-	3.390E-02	0.005	185	annual			-	14
526-73-8	1,2,3-Trimethylbenzene	-	9.78E-03	1.36E-03	1.15E-02	3.03E-02	1.51E-03	1.51E-03	-	-	-	5.589E-02	0.099			1200.	8 hr	-	14
541-73-1	1,3 Dichlorobenzene 1	1.17E-05	1.17E-05	2.16E-05	2.35E-05	2.16E-05	-	-	1.70E-05	1.20E-05	7.74E-06	1.270E-04	0.000	3	annual	-	-	-	-
590-01-2	Proprionic Acid, N-Butyl ester	-	-	-	-	-	1.23E-03	1.23E-03	-	-	-	2.462E-03	0.001	102	annual	-	-	-	-
624-41-9	2-Methyl Butyl Acetate	-	-	-	1.04E-02	3.18E-01	-	-	-	-	-	3.281E-01	0.028	1100	annual	-	-	-	-
624-54-4	n-pentyl proprionate	-	1.65E-01	2.29E-02	1.79E-01	8.07E-02	-	-	-	-	-	4.477E-01	0.085	21	annual	-	-	-	-
628-63-7	n-Amyl Acetate	-	-	-	2.61E-02	7.94E-01	-	-	-	-	-	8.202E-01	0.071	1100	annual	-	-	-	-
1330-20-7	mixed xylenes	-	1.06E-02	2.27E-03	6.30E-01	3.05E-01	3.99E-04	3.99E-04	-	-	-	9.668E-01	0.124	390	annual	-	-	-	2
5989-27-5	d-Limonene	-	-	-	6.69E-03	2.04E-01	-	-	-	-	-	2.105E-01	0.018	6250	annual	-	-	-	-
7439-96-5	Manganese	3.72E-06	3.72E-06	6.84E-06	7.44E-06	6.84E-06	-	-	5.40E-06	3.80E-06	2.45E-06	4.020E-05	0.000	0.3	annual	-	-	-	29
7439-97-6	Mercury	2.54E-06	2.54E-06	4.68E-06	5.09E-06	4.68E-06	-	-	3.69E-06	2.60E-06	1.68E-06	2.751E-05	0.000	0.3	annual			-	7
7439-97-6	Mercury	5.09E-06	5.09E-06	8.32E-06	1.02E-05	5.20E-06	-	-	7.38E-06	5.20E-06	3.35E-06	4.982E-05	0.000			1.	24 hr	-	7
7439-98-7	Molybdenum	2.15E-05	2.15E-05	3.52E-05	4.31E-05	2.20E-05	-	-	3.12E-05	2.20E-05	1.42E-05	2.108E-04	0.002	30	8 hr	-	-	-	-
7440-02-0	nickel	4.11E-05	4.11E-05	6.72E-05	8.22E-05	4.20E-05	-	-	5.96E-05	4.20E-05	2.71E-05	4.024E-04	0.000	0	-	-	-	.006	-
7440-38-2	arsenic	3.92E-06	3.92E-06	6.40E-06	7.83E-06	4.00E-06	-	-	5.68E-06	4.00E-06	2.58E-06	3.832E-05	0.000	0	-	-	-	.	-
7440-39-3	Barium	8.61E-05	8.61E-05	1.41E-04	1.72E-04	8.80E-05	-	-	1.25E-04	8.80E-05	5.68E-05	8.430E-04	0.007	5	8 hr	-	-	-	35
7440-41-7	berylium	2.35E-07	2.35E-07	3.84E-07	4.70E-07	2.40E-07	-	-	3.41E-07	2.40E-07	1.55E-07	2.299E-06	0.000	0.02	24 hr	-	-		-
7440-41-7	berylium	1.17E-07	1.17E-07	2.16E-07	2.35E-07	2.16E-07	-	-	1.70E-07	1.20E-07	7.74E-08	1.270E-06	0.000		annual	-	-	.0004	-
7440-43-9	cadmium	2.15E-05	2.15E-05	3.52E-05	4.31E-05	2.20E-05	-	-	3.12E-05	2.20E-05	1.42E-05	2.108E-04	0.000	0	-	-	-	.0006	-
7440-48-4	Cobalt	1.64E-06	1.64E-06	2.69E-06	3.29E-06	1.68E-06	-	-	2.39E-06	1.68E-06	1.08E-06	1.609E-05	0.000	0.2	8 hr	-	-	.	42
7440-50-8	Copper	1.66E-05	1.66E-05	2.72E-05	3.33E-05	1.70E-05	-	-	2.41E-05	1.70E-05	1.10E-05	1.629E-04	0.001	2	8 hr	-	-	-	-
7782-49-2	Selenium	4.70E-07	4.70E-07	7.68E-07	9.40E-07	4.80E-07	-	-	6.82E-07	4.80E-07	3.10E-07	4.598E-06	0.000	2	8 hr	-	-	-	34
8032-32-4	VM&P Naphtha	4.80E-02	-	3.30E-03	1.08E-01	3.30E-03	9.30E-03	9.30E-03	-	-	-	1.811E-01	0.450	3500	8 hr	-	-	-	1
8052-41-3	Stoddard Solvent	-	-	-	-	-	3.62E-04	3.62E-04	-	-	-	7.245E-04	0.003	3500	8 hr	-	-	-	1
19549-80-5	4,6-Dimethyl-2Heptanone	-	-	8.03E-04	1.17E-02	2.62E-02	4.17E-04	4.17E-04	-	-	-	5.773E-02	0.010	0.1	annual	-	-	-	19
25551-13-7	Trimethylbenzene	-	-	-	-	-	3.46E-05	3.46E-05	-	-	-	6.912E-05	0.000	185	annual			-	14
25551-13-7	Trimethylbenzene	-	-	-	-	-	3.78E-04	3.78E-04	-	-	-	7.569E-04	0.004			1200.	8 hr	-	14
34590-94-8	dipropylene glycol methyl ether	-	8.66E-02	1.21E-02	9.42E-02	4.24E-02	1.51E-03	1.51E-03	-	-	-	2.383E-01	0.045	720	annual	-	-	-	-
60828-78-6	trimethylnonylphenoxy polyethylene oxyethanol	-	-	-	1.34E-02	4.08E-01	-	-	-	-	-	4.211E-01	0.036	0.1	annual				
64741-66-8	Petroleum Distillates	-	-	9.36E-04	1.36E-02	3.06E-02	5.43E-04	5.43E-04	-	-	-	6.746E-02	0.012	138	annual	-	-	-	-
64742-47-8	Hydrotreated Light Distillate	-	-	-	-	-	1.73E-05	1.73E-05	-	-	-	3.456E-05	0.000	24	annual	-	-	-	-
64742-48-9	hydrotreated heavy napht	-	-	1.03E-04	3.37E-03	1.03E-04	1.13E-03	1.13E-03	-	-	-	7.335E-03	0.022	3500	8 hr	-	-	-	1
64742-49-0	Naphtha, hydrotreated light	1.80E-02	-	1.24E-03	4.04E-02	1.24E-03	3.08E-03	3.08E-03	-	-	-	6.709E-02	0.165	3500	8 hr	-	-	-	1
64742-94-5	Heavy Aromatic Naphtha	-	-	-	5.49E-02	2.47E-02	4.67E-05	4.67E-05	-	-	-	7.965E-02	0.010	70	annual	-	-	-	1
64742-95-6	light aromatic solvent naphtha (petroleum)	1.06E-02	1.16E-01	1.66E-02	5.25E-01	1.03E+00	2.24E-03	2.24E-03	-	-	-	1.704E+00	0.203	100	annual	-	-	-	1
70657-70-4	2-Methoxy-1-propyl Acetate	-	3.26E-03	4.54E-04	3.55E-03	1.60E-03	-	-	-	-	-	8.854E-03	0.016	500	24 hr	-	-	-	-
	Sum of Petroleum Hydrocarbon (Footnote 1)	7.81E-02	1.16E-01	2.13E-02	7.32E-01	1.06E+00	1.62E-02	1.62E-02	0.00E+00	0.00E+00	0.00E+00	2.040E+00	3.062	3500	8 hr				1
	Sum of PAH (Footnote 5)	1.03E-05	1.03E-05	1.90E-05	2.06E-05	1.90E-05	-	-	1.50E-05	1.05E-05	6.80E-06	1.116E-04	0.00006	0.001	annual			.001	
	Sum of Trimethylbenene (Footnote 14)	4.50E-03	1.30E-01	1.85E-02	7.61E-01	9.91E-01	1.73E-02	1.73E-02	0.00E+00	0.00E+00	0.00E+00	1.939E+00	2.792	1200	8 hr				
	Sum of Trimethylbenene (Footnote 14)	4.55E-03	8.45E-02	1.20E-02	4.74E-01	6.25E-01	1.58E-03	1.58E-03	0.00E+00	0.00E+00	0.00E+00	1.204E+00	0.149	185	annual				

Table C-8. TAC Emission Calculations from Natural Gas Combustion.
FCA JNAP Tutone and Sustainment - March 2020

					Emission Rate					
Pollutant	**RTO NG Combustion Emission Factor (lb/MMcf)**	**Other NG Combustion Emission Factor (lb/MMcf)**	**BC Obs Stack[1] Max Hourly (lb/hr)**	**CC Obs Stack[1] Max Hourly (lb/hr)**	**Conc Stack[1] Max Hourly (lb/hr)**	**Building Addition RR ASH Max Hourly (lb/hr)**	**Booth RTO Max Hourly (lb/hr)**	**Oven RTO Max Hourly (lb/hr)**	**Powder and Bldg Support Max Hourly (lb/hr)**	**CTVV Max Hourly (lb/hr)**
NO_X	50	36	0.705	7.05E-01	1.41E+00	1.02E+00	1.00E+00	1.15E+00	7.20E-01	4.64E-01
PM	7.6	7.6	1.49E-01	1.49E-01	2.98E-01	2.16E-01	3.80E-02	2.43E-01	1.52E-01	9.80E-02

1 - ASH combustion Emissions are modeled at 50% through the observation stacks (25% BC, 25% CC) and 50% through the Concentrator stack.

					Emission Rate					
Pollutant	**RTO NG Combustion Emission Factor (lb/MMcf)**	**Other NG Combustion Emission Factor (lb/MMcf)**	**BC Obs Stack Max Hourly AA (lb/hr)**	**CC Obs Stack Max Hourly AA (lb/hr)**	**Conc Stack Hourly Ann Avg (lb/hr)**	**Building Addition RR ASH Hourly Ann Avg (lb/hr)**	**Booth RTO Hourly Ann Avg (lb/hr)**	**Oven RTO Hourly Ann Avg (lb/hr)**	**Powder and Bldg Support Hourly Ann Avg (lb/hr)**	**CTVV Hourly Ann Avg (lb/hr)**
NO_X	50	36	3.52E-01	3.52E-01	7.05E-01	5.11E-01	9.00E-01	1.04E+00	3.60E-01	2.32E-01
PM	7.6	7.6	7.44E-02	7.44E-02	1.49E-01	1.08E-01	3.42E-02	2.19E-01	7.60E-02	4.90E-02

NG Usage Rate		**Max hourly**		**Annual Operating Basis**	**Max hourly - Annual Average**	
New Paint Shop						
15	MMBtu/hr RTO	0.015	$MMft^3/hr$	0.9	0.0135	$MMft^3/hr$
5	MMBtu/hr Conc Desorb	0.0050	$MMft^3/hr$	0.9	0.0045	$MMft^3/hr$
32	MMBtu/hr Ovens (12,8 and 12)	0.032	$MMft^3/hr$	0.9	0.0288	$MMft^3/hr$
28.4	MMBtu/hr Building Addition RR ASH	0.0284	$MMft^3/hr$	0.5	0.0142	$MMft^3/hr$
78.3	MMBtu/hr ASH Heated flash	0.0783	$MMft^3/hr$	0.5	0.03915	$MMft^3/hr$
12.9	MMBtu/hr CTVV Water Test	0.013	$MMft^3/hr$	0.5	0.00645	$MMft^3/hr$
20.0	MMBtu Support Powder and Bldg	0.020	MMft3/hr	0.5	0.01	MMft3/hr
191.60	MMBtu/hr TOTAL	0.192	$MMft^3/hr$		0.1066	$MMft^3/hr$

Table C-9. NOX and $PM_{2.5}$ Emission Calculations from Existing JNAP Processes.
FCA JNAP Tutone and Sustainment - March 2020

Hours of Operation	2017	2018
Production Hours	5,743	5,855
Heating Hours	6183	6006

NG Combustion Emissions

Source/Stack	Notes	NG Usage 2017 ($MMft^3$/yr)	2018 ($MMft^3$/yr)	2017 ($MMft^3$/hr)	2018 ($MMft^3$/hr)	2 Year Average ($MMft^3$/hr)	Emissions NO_X (lb/hr)	$PM_{2.5}$ (lb/hr)	$PM_{2.5}$ (TPY) [1]
Building Heat	Modeled as area source	450.348	481.137	7.28E-02	8.01E-02	7.65E-02	7.647	0.5812	1.7698
Ecoat Incinerator A	Ecoat Oven Burners + Ecoat Incinerator A	32.25	34.46	5.62E-03	5.89E-03	5.75E-03	0.575	0.0437	0.1267
Ecoat Incinerator B	Ecoat Oven Burners + Ecoat Incinerator B	47.12	50.34	8.20E-03	8.60E-03	8.40E-03	0.840	0.0638	0.1852
Color 1 Concentrator	Color 1 Air Supply House NG	34.31	36.66	5.97E-03	6.26E-03	6.12E-03	0.612	0.0465	0.1348
Color 2 Concentrator	Color 2 Air Supply House NG	102.93	109.97	1.79E-02	1.88E-02	1.84E-02	1.835	0.1395	0.4045
Color 3 Concentrator	Color 3 Air Supply House NG	216.61	231.42	3.77E-02	3.95E-02	3.86E-02	3.862	0.2935	0.8513
Color 1, 2, TT Booth RTO	Existing C1 and C2 emissions	41.17	43.99	7.17E-03	7.51E-03	7.34E-03	0.734	0.0558	0.1618
Color 3 Booth RTO		36.14	38.61	6.29E-03	6.59E-03	6.44E-03	0.644	0.0490	0.1420
Color 1 Oven RTO	Oven and RTO Burners	38.89	41.54	6.77E-03	7.10E-03	6.93E-03	0.693	0.0527	0.1528
Color 2 Oven RTO	Oven and RTO Burners	38.89	41.54	6.77E-03	7.10E-03	6.93E-03	0.693	0.0527	0.1528
Color 3 Oven RTO	Oven and RTO Burners	66.33	70.87	1.15E-02	1.21E-02	1.18E-02	1.183	0.0899	0.2607
Sealer Oven	Exhausted via Ecoat B Stack	20.59	21.99	3.58E-03	3.76E-03	3.67E-03	0.367	0.0279	0.0809
Powder Oven		131.52	140.52	2.29E-02	2.40E-02	2.34E-02	2.345	0.1782	0.5169

1 - TPY Emisions of $PM_{2.5}$ based upon actual annual operating factor

Production Related PM Emissions

Source/Stack	Notes	Production Paint 2017 (Veh/yr)	2018 (Veh/yr)	Emissions 2017 (lb/hr)	2018 (lb/hr)	2 Year Average Emissions (lb/hr)	(TPY) [1]
Color 1 Booth	0.133 lb PM/vehicle painted (2 Exhaust Stacks)	148,786	158,730	3.445	3.606	3.526	10.225
Color 2 Booth	0.133 lb PM/vehicle painted (2 Exhaust Stacks)	155,436	159,130	3.599	3.615	3.607	10.459
Color 3 Booth	0.137 lb PM/vehicle painted (2 Exhaust Stacks)	140,240	141,403	3.345	3.309	3.327	9.365
Sanding Grinding Operations	0.04 lb PM/hr per station, 10 stations. No exhaust stacks, modeled as an area source.	-	-	-	-	0.40	1.16
Low Bake Repair	0.026 lb PM/hr per station, 5 stations. Modeled all emissions from representative merged stack.	-	-	-	-	0.13	0.38

1 - TPY Emisions based upon actual annual operating factor

Existing NG Combustion Emissions at MAP

Source/Stack	Notes	NG Usage 2017 ($MMft^3$/yr)	2018 ($MMft^3$/yr)	2017 ($MMft^3$/hr)	2018 ($MMft^3$/hr)	2 Year Average ($MMft^3$/hr)	Emissions NO_X (lb/hr)	$PM_{2.5}$ (lb/hr)	$PM_{2.5}$ (TPY) [1]
Existing Building Heat	Modeled as area source	128.735	143.450	2.08E-02	2.39E-02	2.24E-02	2.235	0.1699	0.5172

1 - TPY Emisions based upon actual annual operating factor

Table C-10. JNAP Boiler Emissions.
FCA JNAP Tutone and Sustainment - March 2020

Daily Boiler NG Usage 2017 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
1-Jan			207	
2-Jan			342	
3-Jan			444	
4-Jan		235	484	
5-Jan		434	432	
6-Jan		430	430	
7-Jan		410	413	
8-Jan		397	396	
9-Jan		338	338	
10-Jan		378	107	
11-Jan		453		
12-Jan		466		
13-Jan		548	120	
14-Jan		307	306	
15-Jan		119	340	
16-Jan			407	
17-Jan			462	
18-Jan			428	
19-Jan			504	
20-Jan			464	
21-Jan			344	
22-Jan			344	
23-Jan			373	
24-Jan			443	
25-Jan			432	
26-Jan			480	
27-Jan		84	478	
28-Jan		285	285	
29-Jan		210	224	
30-Jan		344	344	
31-Jan		285	285	
1-Feb		260	260	
2-Feb		340	340	
3-Feb		382		187
4-Feb		728		347
5-Feb		320		174
6-Feb		493		
7-Feb		435		
8-Feb		471		84
9-Feb		392		394
10-Feb		354		355
11-Feb		343		128
12-Feb		432		
13-Feb		466		
14-Feb		447		102
15-Feb		316	210	105
16-Feb		336	247	87
17-Feb		277		279
18-Feb		180		81
19-Feb		114		139
20-Feb				452

Daily Boiler NG Usage 2018 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
1-Jan		419	419	
2-Jan		439	439	
3-Jan		432	432	
4-Jan		484	484	
5-Jan		532	532	
6-Jan		506	506	
7-Jan		402	402	
8-Jan		280	278	
9-Jan		291	291	
10-Jan		107	447	
11-Jan			296	
12-Jan		234	419	
13-Jan		453	453	
14-Jan		391	388	
15-Jan		320	329	
16-Jan		411	411	
17-Jan		407	408	
18-Jan		346	347	
19-Jan		293	293	
20-Jan		424	55	
21-Jan		452		
22-Jan		368		
23-Jan		534		
24-Jan		389	386	
25-Jan		344	345	
26-Jan		320	168	
27-Jan		382	12	
28-Jan		61	368	
29-Jan		377	378	
30-Jan		437	438	
31-Jan		294	295	
1-Feb		303	306	
2-Feb		441	443	
3-Feb		370	372	
4-Feb		272	274	
5-Feb		393	394	
6-Feb		385	386	
7-Feb		371	373	
8-Feb		377	378	
9-Feb		362	363	
10-Feb		356	358	
11-Feb		314	315	
12-Feb		324	325	
13-Feb		352	353	
14-Feb		251	251	
15-Feb		36	337	
16-Feb		48	487	
17-Feb		291	292	
18-Feb		319	75	
19-Feb		381		
20-Feb		198		

Table C-10. JNAP Boiler Emissions.
FCA JNAP Tutone and Sustainment - March 2020

Daily Boiler NG Usage 2017 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
21-Feb	233	99		102
22-Feb	290			
23-Feb	301			
24-Feb	364			
25-Feb	463	91		
26-Feb	250	284	2	
27-Feb	390	1	1	
28-Feb	401			
1-Mar	371			
2-Mar	612	96		
3-Mar	355	356		
4-Mar	379	381		
5-Mar	313	311		
6-Mar	246	76		
7-Mar	298			
8-Mar	411			
9-Mar	473	68		
10-Mar	361	360		
11-Mar	423	422		
12-Mar	383	382		
13-Mar	410	409		
14-Mar	435	434		
15-Mar	422	421		
16-Mar	331	331		
17-Mar	319	318		
18-Mar	277	276		
19-Mar	279	187		
20-Mar	464			
21-Mar	459			
22-Mar	443	252		
23-Mar	305	305		
24-Mar	273	56		
25-Mar	428			
26-Mar	377			
27-Mar	237			
28-Mar	409			
29-Mar	424			
30-Mar	510			
31-Mar	492			
1-Apr	420			
2-Apr	270			
3-Apr	349			
4-Apr	303			
5-Apr	390			
6-Apr	456			
7-Apr	523			
8-Apr	367			
9-Apr	243			
10-Apr	187			
11-Apr	237			
12-Apr	333			

Daily Boiler NG Usage 2018 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
21-Feb		392	386	
22-Feb		269	269	
23-Feb		184	193	
24-Feb		233	233	
25-Feb		57	309	
26-Feb			399	
27-Feb			335	
28-Feb			328	
1-Mar		101	456	
2-Mar		100	456	
3-Mar		508		
4-Mar		537		
5-Mar		246	287	
6-Mar		270	269	
7-Mar		276	280	
8-Mar		301	302	
9-Mar		282	284	
10-Mar		291	292	
11-Mar		103	344	
12-Mar		300	300	
13-Mar		306	308	
14-Mar		277	277	
15-Mar		270	271	
16-Mar		319	320	
17-Mar		258	260	
18-Mar		131	244	
19-Mar			488	
20-Mar		231	348	
21-Mar		274	274	
22-Mar		274	274	
23-Mar		284	284	
24-Mar		301	301	
25-Mar		299	263	
26-Mar		429		
27-Mar		377		
28-Mar		415		
29-Mar		439		
30-Mar		453		
31-Mar		407		
1-Apr		303		
2-Apr		539		
3-Apr		483		
4-Apr		473	97	
5-Apr		279	280	
6-Apr		259	272	
7-Apr		310	311	
8-Apr		257	258	
9-Apr		298	298	
10-Apr		263	263	
11-Apr		260	142	
12-Apr		290		

Table C-10. JNAP Boiler Emissions.
FCA JNAP Tutone and Sustainment - March 2020

Daily Boiler NG Usage 2017 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
13-Apr	374			
14-Apr	286			
15-Apr	206			
16-Apr	77			
17-Apr	254			
18-Apr	287			
19-Apr	203			
20-Apr	167			
21-Apr	165			
22-Apr	167			
23-Apr	144			
24-Apr	136			
25-Apr	166			
26-Apr	166			
27-Apr	159			
28-Apr	121	29		
29-Apr		94		
30-Apr		106		
1-May		105		
2-May		97		
3-May		96		
4-May		96		
5-May		103		
6-May		170		
7-May		263		
8-May		241		
9-May		299		
10-May		205		
11-May		88		
12-May	30	78		
13-May	173			
14-May	130			
15-May	139			
16-May	170			
17-May	155			
18-May	157			
19-May	170			
20-May	169			
21-May	124			
22-May	161			
23-May	160			
24-May	82			75
25-May				138
26-May				142
27-May				139
28-May				114
29-May				56
30-May				137
31-May				133
1-Jun				131
2-Jun				132

Daily Boiler NG Usage 2018 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
13-Apr		368		
14-Apr		503		
15-Apr		499		
16-Apr		472		
17-Apr		582		
18-Apr		565		
19-Apr		468		
20-Apr		417		
21-Apr		373		
22-Apr		289		
23-Apr		241		
24-Apr		251		
25-Apr		305		
26-Apr		310		
27-Apr		309		
28-Apr		464		
29-Apr		154		
30-Apr		254		
1-May				156
2-May				156
3-May				148
4-May				160
5-May				152
6-May				127
7-May		26		203
8-May				182
9-May				169
10-May				162
11-May				173
12-May				164
13-May				130
14-May				138
15-May				138
16-May				144
17-May				138
18-May				145
19-May				135
20-May				111
21-May				141
22-May				138
23-May				128
24-May				136
25-May				144
26-May				150
27-May				110
28-May				117
29-May				147
30-May				149
31-May				140
1-Jun				151
2-Jun				148

Table C-10. JNAP Boiler Emissions.
FCA JNAP Tutone and Sustainment - March 2020

Daily Boiler NG Usage 2017 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
3-Jun				127
4-Jun				112
5-Jun				114
6-Jun				140
7-Jun				133
8-Jun				134
9-Jun				126
10-Jun				125
11-Jun				86
12-Jun				119
13-Jun				121
14-Jun				120
15-Jun				119
16-Jun				118
17-Jun				114
18-Jun				102
19-Jun				117
20-Jun				122
21-Jun				129
22-Jun				123
23-Jun				116
24-Jun				120
25-Jun				112
26-Jun				121
27-Jun				115
28-Jun				127
29-Jun				119
30-Jun				118
1-Jul				116
2-Jul				112
3-Jul				122
4-Jul				110
5-Jul				119
6-Jul				123
7-Jul				118
8-Jul				124
9-Jul				110
10-Jul				118
11-Jul				104
12-Jul				109
13-Jul				107
14-Jul				111
15-Jul				111
16-Jul				88
17-Jul				57
18-Jul				28
19-Jul				20
20-Jul				26
21-Jul				55
22-Jul				51
23-Jul				100

Daily Boiler NG Usage 2018 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
3-Jun				121
4-Jun				147
5-Jun				160
6-Jun				156
7-Jun				149
8-Jun				153
9-Jun				153
10-Jun				122
11-Jun				156
12-Jun				150
13-Jun				130
14-Jun				165
15-Jun				144
16-Jun				147
17-Jun				114
18-Jun				130
19-Jun				140
20-Jun				145
21-Jun				149
22-Jun				156
23-Jun				147
24-Jun				122
25-Jun				144
26-Jun				144
27-Jun				141
28-Jun				145
29-Jun				144
30-Jun				137
1-Jul				104
2-Jul				135
3-Jul				136
4-Jul				76
5-Jul				117
6-Jul				128
7-Jul				140
8-Jul				117
9-Jul				126
10-Jul				131
11-Jul				137
12-Jul				138
13-Jul				129
14-Jul				123
15-Jul				106
16-Jul				105
17-Jul				131
18-Jul				144
19-Jul				143
20-Jul				142
21-Jul				136
22-Jul				119
23-Jul				139

Table C-10. JNAP Boiler Emissions.
FCA JNAP Tutone and Sustainment - March 2020

Daily Boiler NG Usage 2017 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
24-Jul				132
25-Jul				142
26-Jul				137
27-Jul				130
28-Jul				130
29-Jul				133
30-Jul				111
31-Jul				114
1-Aug				127
2-Aug				124
3-Aug				122
4-Aug				126
5-Aug				126
6-Aug				55
7-Aug				122
8-Aug				127
9-Aug				127
10-Aug				127
11-Aug				127
12-Aug				128
13-Aug				111
14-Aug				129
15-Aug				127
16-Aug				127
17-Aug				123
18-Aug	77			55
19-Aug	141			
20-Aug				114
21-Aug	2			123
22-Aug				124
23-Aug				134
24-Aug				135
25-Aug				145
26-Aug				136
27-Aug				124
28-Aug		16		98
29-Aug				128
30-Aug				122
31-Aug				126
1-Sep				127
2-Sep				129
3-Sep				57
4-Sep				88
5-Sep				120
6-Sep				124
7-Sep				124
8-Sep				130
9-Sep				130
10-Sep				101
11-Sep				127
12-Sep				123

Daily Boiler NG Usage 2018 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
24-Jul				136
25-Jul				126
26-Jul				129
27-Jul				128
28-Jul				130
29-Jul				107
30-Jul				125
31-Jul				129
1-Aug				126
2-Aug				125
3-Aug				121
4-Aug				122
5-Aug				110
6-Aug				113
7-Aug				124
8-Aug				123
9-Aug				126
10-Aug				122
11-Aug				127
12-Aug				68
13-Aug				119
14-Aug				122
15-Aug				121
16-Aug				116
17-Aug				116
18-Aug				119
19-Aug				94
20-Aug				122
21-Aug				119
22-Aug				130
23-Aug				131
24-Aug				122
25-Aug				120
26-Aug				105
27-Aug				112
28-Aug				119
29-Aug				119
30-Aug				125
31-Aug				130
1-Sep				119
2-Sep				65
3-Sep				53
4-Sep				105
5-Sep				102
6-Sep				119
7-Sep				127
8-Sep				128
9-Sep				114
10-Sep				114
11-Sep				126
12-Sep				127

Table C-10. JNAP Boiler Emissions.
FCA JNAP Tutone and Sustainment - March 2020

Daily Boiler NG Usage 2017 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
13-Sep				124
14-Sep				125
15-Sep				122
16-Sep				120
17-Sep				70
18-Sep				106
19-Sep				135
20-Sep				124
21-Sep				118
22-Sep				117
23-Sep				126
24-Sep				110
25-Sep			83	34
26-Sep			122	
27-Sep			124	
28-Sep			123	
29-Sep			124	
30-Sep	108		10	
1-Oct	107			
2-Oct	113			
3-Oct	142			
4-Oct	139			
5-Oct	141			
6-Oct	144			
7-Oct	140			
8-Oct	127			
9-Oct	136			
10-Oct	140			
11-Oct	144			
12-Oct	157			
13-Oct	152			
14-Oct	149			
15-Oct	127			
16-Oct	273			
17-Oct	153			
18-Oct	155			
19-Oct	153			
20-Oct	153			
21-Oct	148			
22-Oct	107			
23-Oct	145			
24-Oct	156			
25-Oct	312			
26-Oct	480			
27-Oct	322			
28-Oct	439			
29-Oct	430			
30-Oct	413			
31-Oct	459			
1-Nov	464			
2-Nov	304			

Daily Boiler NG Usage 2018 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
13-Sep				119
14-Sep				124
15-Sep				103
16-Sep				85
17-Sep				107
18-Sep	6			107
19-Sep				125
20-Sep	31			91
21-Sep				104
22-Sep				119
23-Sep	58			50
24-Sep	117			
25-Sep	116			
26-Sep	121			
27-Sep	129			
28-Sep	125			
29-Sep	126			
30-Sep	111			
1-Oct	123			
2-Oct	133			
3-Oct	132			
4-Oct	132			
5-Oct	132			
6-Oct	93	36		
7-Oct	115	3		
8-Oct	129			
9-Oct	124			
10-Oct	122			
11-Oct	147			
12-Oct	146			
13-Oct	150			
14-Oct	110			54
15-Oct				135
16-Oct				342
17-Oct				448
18-Oct			210	258
19-Oct			244	
20-Oct			384	
21-Oct			442	
22-Oct			346	
23-Oct			371	
24-Oct			463	
25-Oct			227	
26-Oct			303	
27-Oct			445	
28-Oct		358		
29-Oct		380		
30-Oct		347		
31-Oct		250		
1-Nov		363		
2-Nov		373		

Table C-10. JNAP Boiler Emissions.
FCA JNAP Tutone and Sustainment - March 2020

Daily Boiler NG Usage 2017 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
3-Nov	377			
4-Nov	386			
5-Nov	86			125
6-Nov				418
7-Nov				461
8-Nov				509
9-Nov				548
10-Nov			383	383
11-Nov			304	302
12-Nov			264	264
13-Nov			241	242
14-Nov	244			212
15-Nov	455			
16-Nov	511			
17-Nov	539			
18-Nov	469			
19-Nov	519			
20-Nov	511			
21-Nov	45	10	600	
22-Nov		310	311	
23-Nov		237	52	
24-Nov		277		
25-Nov		376		
26-Nov		510		
27-Nov		461		
28-Nov		266		
29-Nov		403		
30-Nov		420		
1-Dec		472		
2-Dec		431		
3-Dec		390		
4-Dec		322		
5-Dec		365	70	
6-Dec		273	272	
7-Dec		326	325	
8-Dec		340	340	
9-Dec		340	340	
10-Dec		310	310	
11-Dec		335	334	
12-Dec		410	410	
13-Dec		392	392	
14-Dec		397	397	
15-Dec		358	357	
16-Dec		337	337	
17-Dec		231	233	
18-Dec		247	248	
19-Dec		229	230	
20-Dec		311	310	
21-Dec		311	311	
22-Dec		297	297	
23-Dec		253	60	

Daily Boiler NG Usage 2018 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
3-Nov		386		
4-Nov		287		
5-Nov		254		
6-Nov		200		
7-Nov		200		122
8-Nov	150			312
9-Nov	248	122	123	
10-Nov		270	270	
11-Nov		280	285	
12-Nov	208	179		
13-Nov	302	301		
14-Nov	312	312		
15-Nov	278	277		
16-Nov	239	238		
17-Nov	267	267		
18-Nov	351	95	13	
19-Nov	179	276	95	
20-Nov	299	298		
21-Nov	315	314		
22-Nov	308	95		
23-Nov	229			
24-Nov	388			
25-Nov	394			
26-Nov	554	28		
27-Nov	331	330		
28-Nov	344	343		
29-Nov	345	344		
30-Nov	295	294		
1-Dec	273	273		
2-Dec	210	73		
3-Dec	432	97		
4-Dec	325	324		
5-Dec	317	316		
6-Dec	320	321		
7-Dec	239	239		
8-Dec	376	375		
9-Dec	710	332		
10-Dec	372	702		
11-Dec	329	328		
12-Dec	309	308		
13-Dec	281	281		
14-Dec	234	232		
15-Dec	261	261		
16-Dec	221	210		
17-Dec	335	227		
18-Dec	320	319		
19-Dec	274	273		
20-Dec	254	253		
21-Dec	245	244		
22-Dec	380	69		
23-Dec	518			

Table C-10. JNAP Boiler Emissions.
FCA JNAP Tutone and Sustainment - March 2020

Daily Boiler NG Usage 2017 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
24-Dec		365		
25-Dec		424		
26-Dec		504	501	
27-Dec		579	279	
28-Dec		294	294	
29-Dec		295	294	
30-Dec		291	290	
31-Dec		375	375	
Total Usage	35,181	34,885	22,063	20,624

Daily Boiler NG Usage 2018 (1,000 ft^3)				
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
24-Dec	507			
25-Dec	284			
26-Dec	431			
27-Dec	495			
28-Dec	412			
29-Dec	383	23		
30-Dec		244		
31-Dec		119		
Total Usage	19,111	52,873	31,877	20,524

	75th Percentile Usage (1000 ft^3)				75th Percentile Usage (1000 ft^3)			
Daily	392.8	393.3	396.0	130.0	330.5	377.0	386.0	144.0
Hourly [1]	16.36	16.39	16.50	5.42	13.77	15.71	16.08	6.00
2 yr Av hrly	15.07	16.05	16.29	5.71				

1 - Hourly emission rate based on 24 hours of operation per day

	Emissions (lb/hr) [1]			
	Boiler #1	Boiler #2	Boiler #3	Boiler #4
NO_X	1.605	1.709	1.735	0.608
$PM_{2.5}$	0.115	0.122	0.124	0.043

1 - Emissions based on 106.5 lb $NO_X/MMft^3$, and 7.6 lb $PM_{2.5}/MMft^3$

Table C-11. NO_X and $PM_{2.5}$ Emission Calculations from Natural Gas Combustion at MAP.
FCA JNAP Tutone and Sustainment - March 2020

Pollutant	RTO Natural Gas Combustion Emission Factor (lb/MMBtu)	Other Natural Gas Combustion Emission Factor (lb/MMcf)	Emission Rate							
			Primer Obs Max hourly (lb/hr)	BC Obs Max hourly (lb/hr)	CC Obs Max hourly (lb/hr)	Indirect Fire Oven Max hourly (lb/hr)	RTO Max hourly (lb/hr)	HWG[1] Max hourly (lb/hr)	PH Vents Max hourly (lb/hr)	Mack 2 NG Max hourly (lb/hr)
NO_X	50	36	0.432	0.648	0.648	0.864	6.693	1.62	3.888	1.3833
Number of stacks			1	2	2	4	1	9	1	1
Emission Rate per stack (lb/hr)			0.432	0.324	0.324	0.216	6.693	0.18	3.888	1.3833
PM	7.6	7.6	0.0912	0.1368	0.1368	0.1824	1.3642	0.342	0.8208	0.29203
Number of stacks			1	2	2	4	1	10	1	1
Emission Rate per stack (lb/hr)			0.0912	0.0684	0.0684	0.0456	1.3642	0.0342	0.8208	0.2920

NG Usage Rate		Max hourly		Annual Operating Basis	Max hourly - Annual Average	
New Paint Shop						
45	MMBtu/hr HWG (total)	0.045	$MMft^3/hr$	0.5	0.0225	$MMft^3/hr$
21.5	MMBtu/hr RTO	0.0215	$MMft^3/hr$	1	0.0215	$MMft^3/hr$
158	Direct Fire Oven Burners	0.158	$MMft^3/hr$	0.5	0.079	$MMft^3/hr$
24	Indirect Fire Oven Burners	0.024	$MMft^3/hr$	0.5	0.012	$MMft^3/hr$
12	MMBtu/hr Primer ASH	0.0120	$MMft^3/hr$	0.33	0.00396	$MMft^3/hr$
18	MMBtu/hr BC ASH	0.0180	$MMft^3/hr$	0.33	0.00594	$MMft^3/hr$
18	MMBtu/hr CC ASH	0.0180	$MMft^3/hr$	0.33	0.00594	$MMft^3/hr$
108.0	MMBtu/hr Misc PH vent	0.1080	$MMft^3/hr$	0.33	0.03564	$MMft^3/hr$
Additions to Existing Buildings						
38.425	MMBtu/hr Mack 2 Additional Capacity	0.038	$MMft^3/hr$	0.33	0.01268025	$MMft^3/hr$
442.9	MMBtu/hr TOTAL					

Table C-11. NO_X and $PM_{2.5}$ Emission Calculations from Natural Gas Combustion at MAP.
FCA JNAP Tutone and Sustainment - March 2020

	Emission Rate							
Pollutant	**Primer Obs Max hourly (lb/hr)**	**BC Obs Max hourly (lb/hr)**	**CC Obs Max hourly (lb/hr)**	**Indirect Fire Oven Max hourly (lb/hr)**	**RTO Max hourly (lb/hr)**	**HWG[1] Max hourly (lb/hr)**	**PH Vents Max hourly (lb/hr)**	**Mack 2 NG Max hourly (lb/hr)**
NO_X	0.14256	0.21384	0.21384	0.432	3.849	0.81	1.28304	0.456
Number of stacks	1	2	2	4	1	10	1	1
Emission Rate per stack (lb/hr)	0.14256	0.10692	0.10692	0.108	3.849	0.081	1.28304	0.456
PM	0.0301	0.045144	0.045144	0.0912	0.7638	0.171	0.270864	0.0964
Number of stacks	1	2	2	4	1	10	1	1
Emission Rate per stack (lb/hr)	0.0301	0.0226	0.0226	0.0228	0.7638	0.0171	0.2709	0.0964

Table C-12. NO_X and $PM_{2.5}$ Emission Calculations from Natural Gas Combustion in Emergency Generators at MAP.
FCA JNAP Tutone and Sustainment - March 2020

Pollutant	Natural Gas Combustion Emission Factor (g/hp-hr)	Gen 1A and 1B Hourly Ann Avg (each) (lb/hr)	Gen 2 Hourly Ann Avg (lb/hr)	Gen 3 Hourly Ann Avg (lb/hr)
NO_X	2	0.0881	0.1938	0.1938

Engine Size		Annual Operating Basis
350	hp Life Safety (2 units)	0.057
770	hp Generator	0.057
770	hp Life Safety	0.057

Pollutant	Natural Gas Combustion Emission Factor (lb/MMBtu)	Gen 1A and 1B Hourly Ann Avg (each) (lb/hr)	Gen 2 Hourly Ann Avg (lb/hr)	Gen 3 Hourly Ann Avg (lb/hr)
PM2.5	0.0194	0.0109	0.0240	0.0240

Engine Size (hp)		(MMBtu/hr) [1]
350	hp Life Safety (2 units)	254.5
770	hp Generator	560.0
770	hp Life Safety	560.0

1 - MMBtu/hr input based upon 35% thermal efficiency and hp output

Table C-13. NO_X and $PM_{2.5}$ Emission Calculations from Diesel Fired Emergency Engines at MAP.

FCA JNAP Tutone and Sustainment - March 2020

Pollutant	Diesel Combustion Emission Factor (g/hp-hr)	Hourly Ann Avg (each) (lb/hr)
NO_X	3	0.132
$PM_{2.5}$	0.15	0.039

Engine Size		Annual Operating Basis (NO_X)	Daily Operating Basis ($PM_{2.5}$)
350	hp Fire Pump Engine (each)	0.057	0.333

Table C-14. Inventory of Off-site Nearby Sources Provided By EGLE.
FCA JNAP Tutone and Sustainment - March 2020

			Facility Emissions							Stack Information					
SRN	COMPANY	POL	(pph)	(tpy)	Other	EMISSION UNIT	ZONE	UTM EAST	UTM NORTH	Hgt. (ft)	Dia (inches)	Temp (deg F)	Flow (ACFM)	Velocity (m/s)	Discharge Type
Nearby NO_2 Sources															
A7809	U S STEEL GREAT LAKES WORKS	NO2	126.4	517.4	PSD/NAAQS	COMPOSITE	17	326000	4683000	53.7	29.9	105.4	34,834	10.90	
A9831	MARATHON PETROLEUM COMPANY LP	NOx	146.5	642	PSD/NAAQS	FGDHOUPANNUAL	17	322000	4683150	133.4	53.3	476.0	18,567	6.16	V
B2169	CARMEUSE LIME Inc, RIVER ROUGE OPERATION	NO2	107.5	470.6	PSD/NAAQS	RG-Kiln#1&#2	17	324525	4682560	71.0	285.6	450.0	128,000	1.46	Horizontal
B2810	DTE Electric Company - River Rouge Power Plant	NO2	491.2	1461.8	PSD/NAAQS	EU-BOILER#3	17	325800	4682000	425.0	154.0	320.0	1,240,000	159.86	Vertical
B2814	DETROIT THERMAL BEACON HEATING PLANT	NO2	37.0	162.1	PSD/NAAQS	COMPOSITE	17	331560	4689140	250.0	120.0	414.6	354,884	22.95	Vertical
M4148	DETROIT RENEWABLE POWER, LLC	NO2	69.1	302.8	PSD/NAAQS	EUBOILER012	17	331054	4692742	337.5	91.0	312.0	370,728	41.70	Vertical
N6631	DEARBORN INDUSTRIAL GENERATION	NOx	214.0	815	PSD/NAAQS	FGTURBINES	17	322513	4685652	60.0	213.0	1073.0	2,297,909	147.18	V
P0408	EES COKE BATTERY LLC	NO2	314.9	1411.0	PSD/NAAQS	COMPOSITE		326126	4683543	172.5	162.0	652.1	288,650	8.32	
Nearby $PM_{2.5}$ Sources															
A7809	U S STEEL GREAT LAKES WORKS	PM25	38.6	52.3	NAAQS	COMPOSITE	17	326000	4683000	42.2	21.1	70.5	18,268	10.23	
A9831	MARATHON PETROLEUM COMPANY LP	PM25	17.4	75.4	NAAQS	COMPOSITE	17	322000	4683150	187.0	79.1	510.9	108,607	17.53	
B2169	CARMEUSE LIME, INC	PM2.5	1.3	5.6	PSD	FG-KILNS1&2	17	324525	4682560	120.0	108.0	300.0	255,376	20.45	V
B2169	CARMEUSE LIME, INC	PM2.5	23.45	103.0	NAAQS	FG-KILNS1&2	17	324525	4682560	120.0	108.0	300.0	255,376	20.45	V
B3567	SAINT MARY'S CEMENT	PM2.5	0.0	0.0	PSD	FGFACILITY	17	323850	4683450	40.0	12.0	70.0	1,550	10.00	Upward
B3567	SAINT MARY'S CEMENT	PM2.5	20.5	89.9	NAAQS	FGFACILITY	17	323850	4683450	40.0	12.0	70.0	1,550	10.00	Upward
N6631	DEARBORN INDUSTRIAL GENERATION	PM25	17.6	51.6	NAAQS	COMPOSITE	17	322513	4685652	162.4	180.2	276.4	893,330	22.37	Vertical
P0408	EES COKE BATTERY LLC	PM25	35.9	157.1	NAAQS	COMPOSITE		326126	4683543	196.0	239.2	867.7	457,484	7.73	

NAAQS MODELING BACKGROUND SUMMARY

NO2		PM-2.5	
79.6	**19.2**	**19.2**	**8.1**
ug/m3	ug/m3	**ug/m3**	**ug/m3**

Table C-15. NO_2 Impacts Summary.
FCA JNAP Tutone and Sustainment - March 2020

Pollutant	Averaging Period	Maximum Impact of Proposed Project (µg/m^3)	Significant Impact Level (µg/m^3)	Project Plus Existing Nearby Source Impacts[1] (µg/m^3)	Background Concentration[2] (µg/m^3)	Total Impact (µg/m^3)	NAAQS (µg/m^3)
NO_2	1 hour	59.8	7.5	96.5	79.6	176.1	188
	Annual	1.61	1.0	11.09	19.2	30.29	100

Notes:

1 - Pursuant to USEPA guidance, the 1 hour impact concentrations are the 1st high averaged over 5 years of meteorological data for comparison to the SIL, and the design value (98th percentile, or 8th highest daily one hour average, averaged over 5 years) for comparison to the NAAQS. The annual threshold is compared to the average over the 5 years of meteorological data.

For comparison to the NAAQS, all proposed sources associated with JNAP tutone refurbishment, as well as existing nearby sources, are included.

2 - The background concentration is the average of the design value over three years (2016-2018) of data measured at Site ID 261630019 in Wayne County Michigan (closest monitor to facility).

Table C-16. $PM_{2.5}$ Impacts Summary.
FCA JNAP Tutone and Sustainment - March 2020

Pollutant	Averaging Period	Project Impacts ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)	Project Plus Existing Source Impacts[1] ($\mu g/m^3$)	Background Concentration[2] ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
$PM_{2.5}$	24 hour	4.31	1.2	14.00	19.2	33.2	35
	Annual	0.94	0.2	2.71	8.10	10.8	12

Notes:

1 - Pursuant to USEPA guidance, the 24 hour impact concentrations are the 1st high averaged over 5 years of meteorological data for comparison to the SIL, and the design value (98th percentile, or 8th highest averaged over 5 years) for comparison to the NAAQS. The annual threshold is compared to the average over the 5 years of meteorological data.

For comparison to the NAAQS, all proposed new sources associated with the JNAP tutone, as well as existing nearby sources, are included.

2 - The background concentration is the average of the design value over three years (2016-2018) of data measured at Site ID 261630019 in Wayne County Michigan (closest monitor to facility).

Pollutant	Averaging Period	Impacts of Increment Consuming Sources[1] ($\mu g/m^3$)	PSD Increment ($\mu g/m^3$)
$PM_{2.5}$	24 hour	7.23	9.0
	Annual	1.69	4.0

Notes:

1 - The 24 hour impact concentration for comparison to the PSD increment is the highest 2nd high value over the 5 years of meteorological data. The annual threshold is the highest annual average value. All increment consuming sources are included.

APPENDIX D

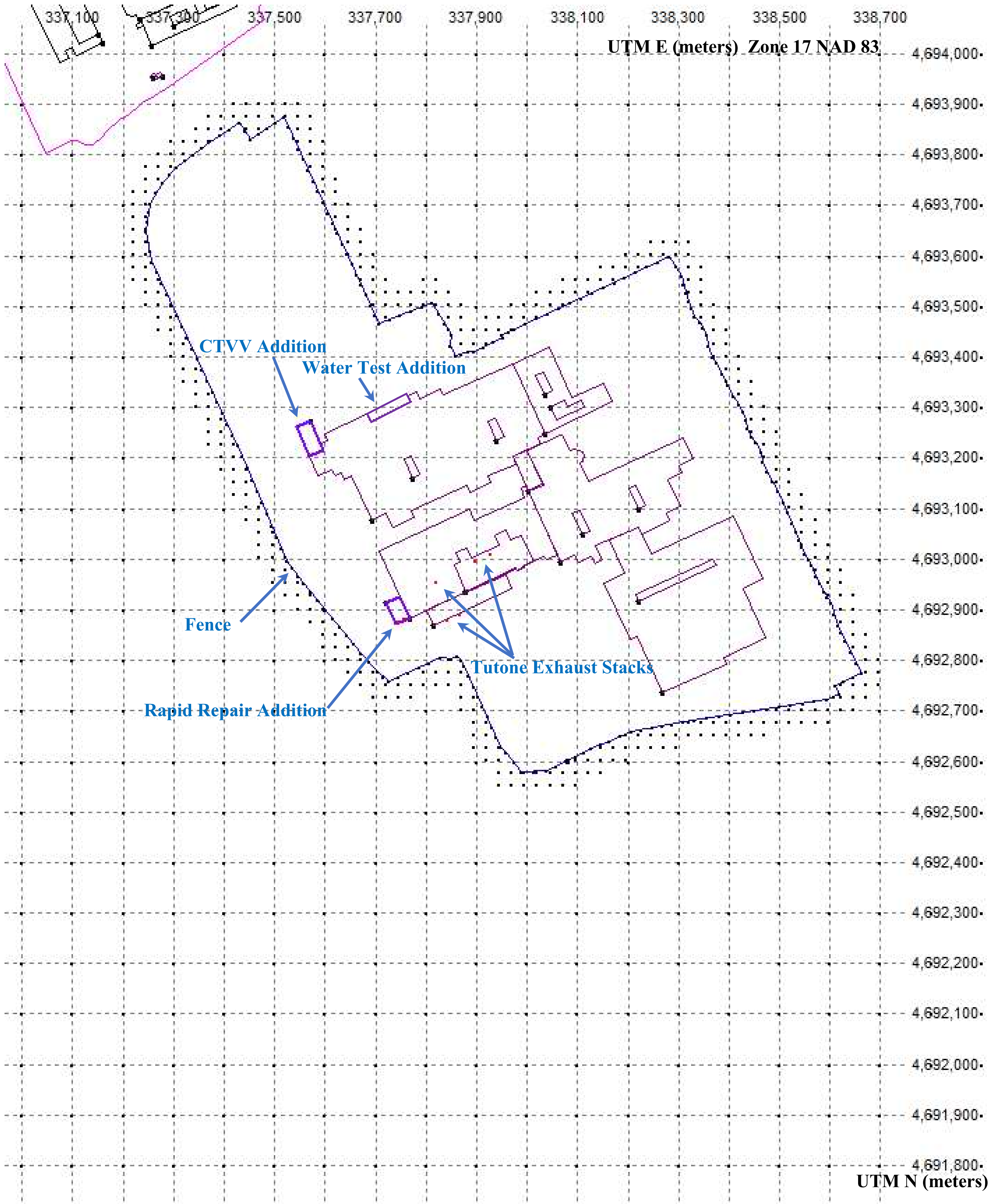
DISPERSION MODELING INPUT/OUTPUT FILES

Flash Drive of Files are Included in Original Copy of Submittal

APPENDIX E

SITE LAYOUT

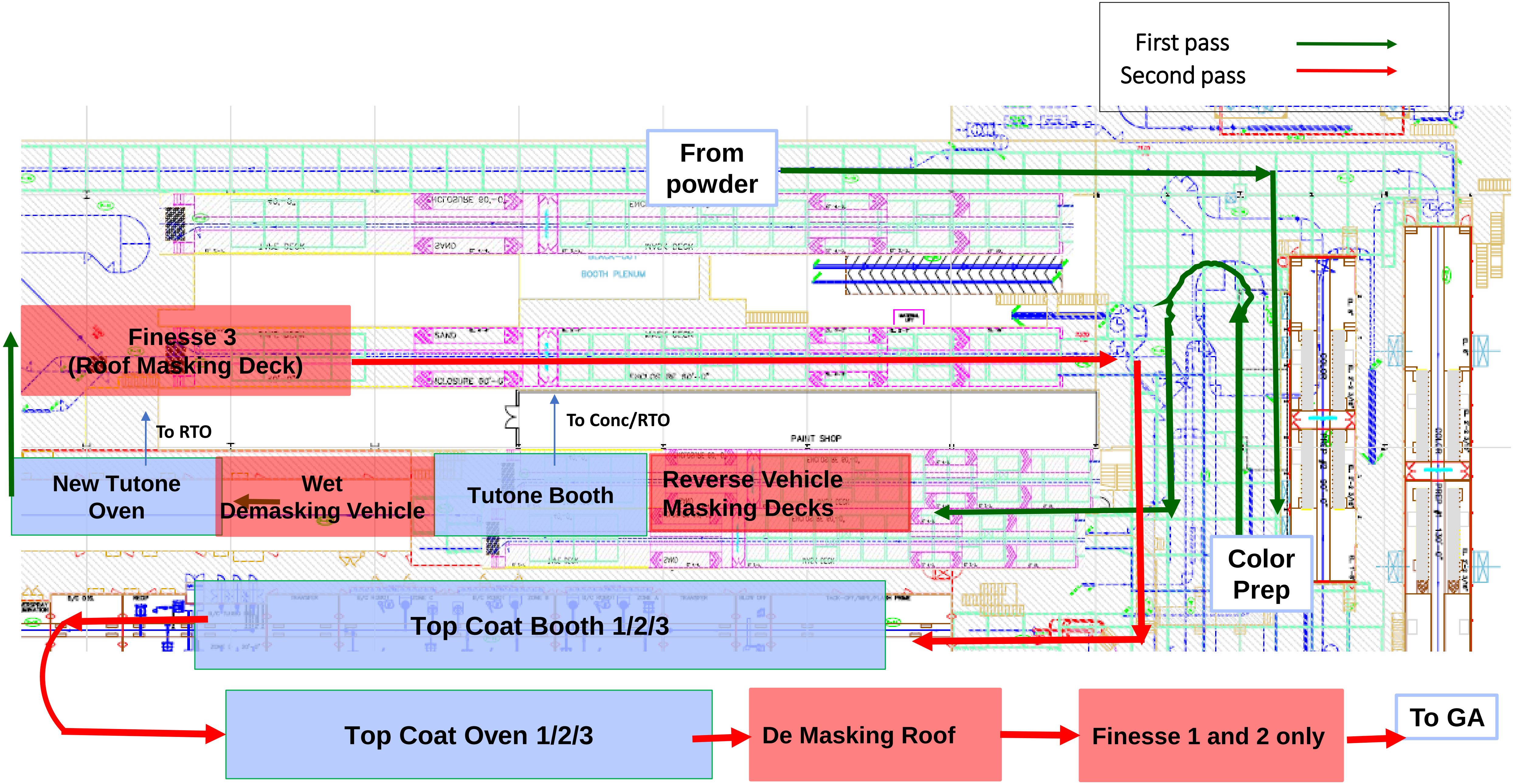
Figure E.1. FCA JNAP Tutone Project Site Layout
March 2020



APPENDIX F

PROCESS FLOW DIAGRAM

Jefferson North Assembly Plant
Tutone Process Flow – March 2020



APPENDIX G

MATERIAL SDS/EDSs

PPG Industries, Inc.

Environmental Data Sheet

Tuesday, March 19, 2019

Customer: Corbin Leininger

Product: CSRC8002R DODGE CITY CLEAR

PRODUCT PHYSICAL CHARACTERISTICS:

WEIGHT PER GALLON:		8.34 lb/gal
DENSITY OF ORGANIC SOLVENT BLEND:		7.37 lb/gal
	Weight	Volume
NON-VOLATILE:	51.6%	45.3%
VOLATILE:	48.4%	54.7%
PERCENT OF WATER:	0.2%	0.2%
PERCENT OF EXEMPTS:	0.1%	0.1%

VOC INFORMATION:

VOC/GAL LESS WATER (LESS EXEMPTS):	4.02 lb/gal	482 g/L
ACTUAL VOC/GAL (WITH WATER WITH EXEMPTS):	4.01 lb/gal	481 g/L
VOC PER GALLON OF SOLIDS:	8.86 lb/gal	1061 g/L
VOC PER POUND OF SOLIDS:	0.93 lb/lb	

Product is photochemically reactive as per SCAQMD rule 102

VOLATILE COMPOSITION: PERCENT OF TOTAL FORMULA:

Component	Name	Weight	Volume
108-65-6	1-METHOXY-2-PROPYL ACETATE	11.0	11.4
624-54-4	PENTYL PROPIONATE	7.8	9.0
64742-95-6	SOLVENT NAPHTHA (PETROLEUM), LIGHT AROMATIC	5.5	6.3
107-98-2	PROPYLENE GLYCOL MONOMETHYL ETHER	4.8	5.2
34590-94-8	DIPROPYLENE GLYCOL MONOMETHYL ETHER	4.1	4.3
95-63-6	1,2,4-TRIMETHYLBENZENE	3.1	3.5
67-63-0	ISOPROPYL ALCOHOL	1.3	1.6
78-83-1	ISOBUTYL ALCOHOL	0.6	0.8
108-67-8	1,3,5-TRIMETHYLBENZENE	0.6	0.7
1330-20-7	XYLENES	0.5	0.5
103-65-1	Propylbenzene	0.4	0.5

526-73-8	1,2,3-TRIMETHYLBENZENE	0.3	0.3
7732-18-5	WATER	0.2	0.2
70657-70-4	2-METHOXY-1-PROPYL ACETATE	0.1	0.1
98-82-8	CUMENE	0.1	0.1
100-41-4	ETHYLBENZENE	0.1	0.1
	TOTAL OF REMAINING VOLATILES < 0.1%	0.1	0.2

REGULATORY INFORMATION BASED ON 100 GALLONS DEFAULT

Component	Name	lb	kg	HAPS	SARA
100-41-4	ETHYLBENZENE	0.89	0.40	Yes	Yes
95-63-6	1,2,4-TRIMETHYLBENZENE	25.46	11.55	No	Yes
98-82-8	CUMENE	0.95	0.43	Yes	No

POUND OF ORGANIC HAPS PER POUND OF SOLIDS: 0.00
POUND OF ORGANIC HAPS PER GALLON OF SOLIDS: 0.04
POUND OF ORGANIC HAPS PER GALLON OF PRODUCT: 0.02
PERCENT OF ORGANIC HAPS (VHAP): 0.2%

DISCLAIMER

This Environmental Data Sheet is not intended to replace the product's Material Safety Data Sheet.

The data contained in this Environmental Data Sheet is based on information provided to PPG by its suppliers and PPG's knowledge of PPG product formulations. PPG makes no representation or warranty regarding the accuracy of supplier furnished information or that this information or data will not change.

The information in this Environmental Data Sheet is not intended to and does not create legal rights or obligations. This information is provided for the sole use of PPG customers and is not for disclosure to competitors of PPG. PPG customers have an independent obligation to determine proper use of the information and that their use of the information is consistent with federal, state and local laws, rules and regulations.

Trace constituents present at levels less than 0.01 lb or kg are not included in the Regulatory Information section of this Environmental Data Sheet. Volatile HAPS present at levels less than 0.1% by weight for carcinogens and 1.0% for non-carcinogens will not be shown or will be indicated by a "No" in the Regulatory Section (under HAPS) of this Environmental Data Sheet.

Trace volatiles present at levels less than 0.1% are not listed individually in the volatile section of this EDS. Total trace volatiles is reported as "Total of remaining volatiles < 0.1%".

Chemical compounds generated as a result of the curing process of this coating are not included on this Environmental Data Sheet.

The USEPA listing of VOC exempt compounds [40CFR51.000(s)] is used in calculating VOC values.

PPG Industries, Inc.

Environmental Data Sheet

Friday, March 15, 2019

Customer: Corbin Leininger

Product: NHU9517R BLACK AY95-DX8

PRODUCT PHYSICAL CHARACTERISTICS:

WEIGHT PER GALLON:		8.12 lb/gal
DENSITY OF ORGANIC SOLVENT BLEND:		6.92 lb/gal
	Weight	Volume
NON-VOLATILE:	53.5%	45.6%
VOLATILE:	46.5%	54.4%
PERCENT OF WATER:	0.3%	0.3%
PERCENT OF EXEMPTS:	0.1%	0.1%

VOC INFORMATION:

VOC/GAL LESS WATER (LESS EXEMPTS):	3.76 lb/gal	450 g/L
ACTUAL VOC/GAL (WITH WATER WITH EXEMPTS):	3.74 lb/gal	448 g/L
VOC PER GALLON OF SOLIDS:	8.21 lb/gal	983 g/L
VOC PER POUND OF SOLIDS:	0.86 lb/lb	

Product is photochemically reactive as per SCAQMD rule 102

VOLATILE COMPOSITION: PERCENT OF TOTAL FORMULA:

Component	Name	Weight	Volume
123-86-4	N-BUTYL ACETATE	18.4	20.3
108-83-8	2,6-DIMETHYLHEPTANONE	8.6	10.4
8032-32-4	VM and P naphtha	3.2	4.3
64-17-5	ETHYL ALCOHOL	2.5	3.0
108-65-6	1-METHOXY-2-PROPYL ACETATE	1.5	1.5
78-83-1	ISOBUTYL ALCOHOL	1.5	1.8
64741-66-8	PETROLEUM DISTILLATES	1.4	1.5
142-82-5	HEPTANE	1.3	1.8
64742-49-0	naphtha (petroleum), hydrotreated light	1.2	1.6
19549-80-5	4,6-DIMETHYL-2-HEPTANONE	1.2	1.4
1330-20-7	XYLENES	1.2	1.3
64742-95-6	SOLVENT NAPHTHA (PETROLEUM), LIGHT AROMATIC	0.7	0.7

108-87-2	METHYLCYCLOHEXANE	0.6	0.8
67-63-0	ISOPROPYL ALCOHOL	0.6	0.7
103-09-3	2-Ethylhexyl acetate	0.4	0.4
95-63-6	1,2,4-TRIMETHYLBENZENE	0.3	0.4
100-41-4	ETHYLBENZENE	0.3	0.3
7732-18-5	WATER	0.3	0.3
141-78-6	ETHYL ACETATE	0.1	0.1
67-56-1	METHYL ALCOHOL	0.1	0.2
64742-48-9	NAPHTHA (PETROLEUM); HYDROTREATED HEAVY	0.1	0.2
67-64-1	ACETONE	0.1	0.1
71-36-3	1-BUTANOL	0.1	0.1
108-88-3	TOLUENE	0.1	0.1
	TOTAL OF REMAINING VOLATILES < 0.1%	0.3	0.3

REGULATORY INFORMATION BASED ON 100 GALLONS DEFAULT

Component	Name	lb	kg	HAPS	SARA
100-41-4	ETHYLBENZENE	2.54	1.15	Yes	Yes
1330-20-7	XYLENES	9.38	4.26	Yes	Yes

POUND OF ORGANIC HAPS PER POUND OF SOLIDS: 0.03
POUND OF ORGANIC HAPS PER GALLON OF SOLIDS: 0.26
POUND OF ORGANIC HAPS PER GALLON OF PRODUCT: 0.12
PERCENT OF ORGANIC HAPS (VHAP): 1.5%

DISCLAIMER

This Environmental Data Sheet is not intended to replace the product's Material Safety Data Sheet.

The data contained in this Environmental Data Sheet is based on information provided to PPG by its suppliers and PPG's knowledge of PPG product formulations. PPG makes no representation or warranty regarding the accuracy of supplier furnished information or that this information or data will not change.

The information in this Environmental Data Sheet is not intended to and does not create legal rights or obligations. This information is provided for the sole use of PPG customers and is not for disclosure to competitors of PPG. PPG customers have an independent obligation to determine proper use of the information and that their use of the information is consistent with federal, state and local laws, rules and regulations.

Trace constituents present at levels less than 0.01 lb or kg are not included in the Regulatory Information section of this Environmental Data Sheet. Volatile HAPS present at levels less than 0.1% by weight for carcinogens and 1.0% for non-carcinogens will not be shown or will be indicated by a "No" in the Regulatory Section (under HAPS) of this Environmental Data Sheet.

Trace volatiles present at levels less than 0.1% are not listed individually in the volatile section of this EDS. Total trace volatiles is reported as "Total of remaining volatiles < 0.1%".

Chemical compounds generated as a result of the curing process of this coating are not included on this Environmental Data Sheet.

The USEPA listing of VOC exempt compounds [40CFR51.000(s)] is used in calculating VOC values.

APPENDIX H

BACT DEVELOPMENT AND COST SPREADSHEETS

BACT Cost Development – Jefferson North Assembly Plant

<u>EU-ECOAT</u>

The current E-coat system at JNAP consists of the E-coat tank followed by a natural gas-fired curing oven. The oven exhaust is routed to two thermal oxidizers, each of which is sized to accommodate a corresponding proportion of the exhaust. The tank air is not exhausted through a stack nor utilizes any emission controls. VOC emissions from the E-coat operation have been in the range of 10-20 tons per year (20.11 tpy in 2018) and 1.5% to 2.5% of total actual VOC emissions from the facility.

FCA evaluated the potential to control the E-coat tank as part of the BACT analysis requested by EGLE-AQD. In order to evaluate this process from a cost perspective, an estimate of potential emissions was needed to form the basis of the analysis. Based upon the historical actual emissions, FCA ratioed the E-coat emissions to the current allowable VOC tons per year in the FPI. Presently the FPI limit for the facility is 1,085.8 tons VOC per year. Based upon this limit and the percentage of VOCs that E-coat tank has represented on an actual emissions basis (2.45%), FCA calculated the potential emissions available from the E-coat tanks as follows:

1085.8 tons/year * 2.45% = 26.6 tons per year

COST ESTIMATE for CONTROLS

FCA considered two options for controlling the tank emissions. One was to route the tank emissions to the existing oven, which is then routed to an oxidizer. The other option was to route the tank emissions separately to an oxidizer.

With respect to the first option, FCA's Ecoat system relies upon both the oven burners and heat from the existing oxidizers to de-humidify the air in the curing oven. Based upon past experience, adding additional moisture from the tank system to the oven air will result in humidification, drying and curing problems. FCA professionals responsible for the E-coat operation have indicated that this option is not technically feasible. Furthermore, this option would result in significant production downtime at the facility to modify the existing exhaust systems on both the tank and the oven.

For the second option, FCA confirmed that neither of the two existing oxidizers have the air flow capacity to accommodate the Ecoat tank exhaust air. Therefore, FCA considered installing a completely new oxidizer that would address emissions from the tank. Due to the low level of VOC emissions from E-coat, FCA does not believe a concentrator would be an effective method to capture/concentrate emissions prior to oxidation. Therefore, controlling the tank exhaust directly to an oxidizer was the basis for the cost analysis included in the cost spreadsheets provided with the application.

Air flow rates from the tank exhaust were determined to be 14,600 cfm and FCA utilized the USEPA COSTAIR spreadsheets to determine the costs for control of the tank based upon installation of a new oxidizer. The annualized costs were based upon the following conservative metrics:

- Oxidizer capable of 95% destruction efficiency (control of 25.27 tpy)
- No inclusion of retrofitting or ductwork additional costs (under-estimating the cost)
- 20-year equipment life for RTO

- The annualized costs on this basis were estimated to be $344,439 per year and the cost per ton of VOC removed was $344,439/25.27 tons = $13,630 per ton.

EU-TOPCOAT 1-3

The current topcoat system at JNAP consists of three topcoat lines, each with a basecoat booth followed by a clearcoat booth and a topcoat oven. The system relies on solvent borne coating in both the basecoat and clearcoat sections. The current VOC control system includes booth controls in the form of concentrators followed by thermal oxidation. The ovens exhaust directly to a thermal oxidizer. For the booths, the zones that use reciprocating bell applicators are routed to the control devices. The zones in the booth that use robotic bell applicators (formerly manual applicator zones) are exhausted to the atmosphere.

FCA evaluated whether additional emission reduction techniques are available for the currently uncontrolled portions of the topcoat operations at JNAP, consistent with the BACT analysis process. The existing portions of the uncontrolled booths include 612,000 cfm of air that would require control. FCA evaluated JNAP's current booth infrastructure system, seeking opportunities to recirculate the air and reduce the volume of air requiring abatement. Due, in part, to the fact that the existing system includes concrete tunnels that cannot be expanded or modified, it was determined that there is no opportunity to recirculate/reduce booth air flows. Therefore, the current thermal oxidizers were evaluated to determine if they could accommodate an increase in air flow, and it was confirmed that the capacity of the existing oxidizers could not accommodate the air from the uncontrolled zones. This analysis also confirmed that the cost to retrofit the existing systems and the associated production down time were substantially higher than the costs to install new stand-alone control devices (on the roof or on a pad). Therefore, this analysis is based upon the costs associated with the installation of a new concentrator and RTO.

The VOC emissions from the entire topcoat operation (BC/CC booths and ovens) over the last several years have ranged from 473 to 550 tons per year, and averages about 67.8% of the total plant wide value. Since there is no topcoat specific emission limit, the potential emissions from topcoat used in the BACT analysis were determined by taking 67.8% of the FPI limit of 1085.8 tpy, which is 736 tpy. Of that total, FCA has determined, based upon past test results, that a reduction of approximately 60% may be realized with a concentrator/RTO system. The concentrator will control 90% of the emissions and the RTO is expected to control 95% of the VOC emissions, which results in 442 tons controlled in the system.

FCA utilized the USEPA COSTAIR spreadsheets to determine the costs for the installation of new roof mounted concentrators and a new ground mounted RTO. As noted in the application, the annualized costs were based upon the following conservative metrics:

- 12 individual roof mounted concentrators (4 per coating line) in order to distribute load correctly and locate units near the respective coating line.
- Concentrators capable of 90% control and routed to the ground-mounted RTO
- Ductwork connecting the booths to the 12, individual roof-mounted concentrators and then from the concentrators to the new RTO.
- RTO installation will include a control room and a separate concrete pad for mounting
- RTO capable of 95% destruction efficiency
- VOC emissions available for control do not include those after controls on booths or flash/oven
- 20-year equipment life for RTO; 15-year life for concentrators

- RTO and concentrator – annualized costs – RTO: $3,176,442 + CC: $4,377,895
- Total cost = $7,554,337/442 tons = $17,091/ton

In order to determine the costs per ton of VOC removed for the combined concentrator/RTO system, FCA used cost sheets for each control device and then combined the $/ton costs based upon a cost distribution. The Total Capital Investment costs were based upon plant-specific estimates provided by equipment and construction vendors.

FCA notes that there are currently no BACT cost sheets specific to the carousel style concentrator, so the analysis relied upon the costs for a bed-style carbon concentrator to estimate the costs. There are slight differences in the cost components for each, but the differences would not have a significant impact on the overall projected $/ton value. Below is the distribution of costs for the specific system:

Description	Capital Cost ($)	RTO-distribution (50/50)	Conc-distribution (50/50)
Engineering - Design	4,540,240	2,270,120	2,270,120
Contractor Activities	5,297,787	2,648,893.5	2,648,893.5
RTO	5,420,200	5,420,200	-
Concentrator	8,730,100	-	8,730,100
Concentrator Platform	6,097,875		6,097,875
Ductwork/Labor Booths to Concentrators: Concentrators to RTO (12 separate ducting systems)	10,990,103	5,495,051.5	5,495,051.5
Installation	13,410,455	6,705,227.5	6,705,227.5
		$22,539,492.5	**$31,947,267.5**

The above costs were incorporated into the BACT cost sheets included with the application and formed the basis for the total capital investment for each control device.

Topcoat - Carbon Concentrator

Data Inputs

Select the type of carbon adsorber system:	Fixed-Bed Carbon Adsorber with Steam Regeneration
For fixed-bed carbon adsorbers, provide the following information:	
Select the type of operation:	Continuous Operation
Select the type of material used to fabricate the carbon adsorber vessels:	Stainless Steel, 304
Select the orientation for the adsorber vessels:	Horizontal

Enter the design data for the proposed Fixed-Bed Carbon Adsorber with Steam Regeneration

Number of operating hours per year (Θ_s)	7,200	hours/year
Waste Gas Flow Rate (Q)	612,000	acfm (at atmospheric pressure and 77^{o}F)
VOC Emission Rate (m_{voc})	153.889	lbs/hour
Required VOC removal efficiency (E)	90	percent
Superficial Bed Velocity (v_b)	75.00	ft/min
Estimated equipment life of adsorber vessels and auxiliary Equipment (n)	15	Years*
Estimated Carbon life (n)	5	Years
Total Number of carbon beds (N_{total})	3	Beds*
Number of carbon beds adsorbing VOC when system is operating (N_A)	2	Beds*
Total time for adsorption (Θ_A)	12	hours*
Total time for desorption (Θ_D)	5	hours*
Estimated Carbon Replacement Rate (CRR)	379	lbs/hour*

Enter the Characteristics of the VOC/HAP:

Name of VOC/HAP	Toluene	
Partial Pressure of Toluene in waste gas stream	0.0104	psia
Parameter "k" for Toluene	0.551	**Note:**
Parameter "m" for Toluene	0.110	Typical values of "k" and "m" for some common VOCs are shown in Table A.

Topcoat - Carbon Concentrator

Enter the cost data for the carbon adsorber:

Desired dollar-year	2018			
CEPCI* for 2018	567.5	CEPCI value for 2018	390.6	1999
Annual Interest Rate (i)	5.5	percent (Current bank prime rate)		

* CEPCI is the Chemical Engineering Plant Cost Index. The use of CEPCI in this spreadsheet is not an endorsement of the index for purpose of cost escalation or de-escalation, but is there merely to allow for availability of a well-known cost index to spreadsheet users. Use of other well-known cost indexes (e.g., M&S) is acceptable.

Electricity (P_{elec})	$0.0762	per kWh
Steam (P_s)	$5.00	per 1,000 lbs*
Cooling Water (P_{cw})	$3.55	per 1,000 gallons of water*
Operator Labor Rate	$40.00	per hour
Maintenance Labor Rate	$44.00	per hour
Carbon Cost (CC)	$4.20	per lb
Re-Sale Value of Recovered VOC (P_{voc})	$0.33	per lb*
Disposal/Treatment Cost for Recovered VOC (D_{voc})	$0.00	per lb*

If known, enter any additional costs for site preparation and building construction/modification:

Site Preparation (SP) =	$0	* Default value. User should enter actual value, if known.
Buildings (Bldg) =	$0	* Default value. User should enter actual value, if known.
Equipment Costs for auxiliary equipment (e.g., ductwork, dampers, and stack) (EC_{aux}) =	$32,000	* Default value. User should enter actual value, if known.
Contingency Factor (CF)	10.0	percent*

Topcoat - Carbon Concentrator

Cost Estimate

Capital Costs

Estimated capital costs for a Fixed-Bed Carbon Adsorber with Steam Regeneration with the following characteristics:

VOC Controlled/Recovered =	Toluene
Adsorber Vessel Orientation =	Horizontal
Operating Schedule =	Continuous Operation

Total Capital Investment (TCI) (in 2018 dollars)

Parameter	Equation	Cost
Costs for Each Carbon Adsorber Vessel (C_v) =	$271 \times F_m \times S^{0.778}$ =	See TCI
Total Cost for All Carbon Adsorber Vessels and Carbon(	$5.82 \times Q^{-0.133} \times [C_c + (N_A + N_D) \times C_v]$ =	See TCI
Auxiliary Equipment (EC_{aux}) =	(Based on design costs or estimated using methods provided in Section 2)	See TCI
Total Purchased Equipment Costs for Carbon Adsorber = $EC_{Adsorb} + EC_{aux}$ =		
Instrumentation =	0.10 × A =	See TCI
Sales taxes =	0.03 × A =	See TCI
Freight =	0.05 × A =	See TCI
	Total Purchased Equipment Costs (B) =	#VALUE!

Direct Installation Costs (in 2018 dollars)

Parameter	Equation	Cost
Foundations and Supports =	0.08 × B =	See TCI
Handling and Erection =	0.14 × B =	See TCI
Electrical =	0.04 × B =	See TCI
Piping =	0.02 × B =	See TCI
Insulation =	0.01 × B =	See TCI
Painting =	0.01 × B =	See TCI
Site Preparation (SP) =		See TCI
Buildings (Bldg) =		See TCI
		See TCI
	Total Direct Costs (DC) = B + (0.3 × B) + SP + Bldg =	$0

Total Indirect Installation Costs (in 2018 dollars)

Parameter	Equation	Cost
Engineering =	0.10 × B =	See TCI
Construction and field expenses =	0.05 × B =	See TCI
Contractor fees =	0.10 × B =	See TCI
Start-up =	0.02 × B =	See TCI
Performance test =	0.01 × B =	See TCI
	Total Indirect Costs (IC) =	See TCI
Contingency Cost (C) =	CF(IC+DC)=	See TCI
Total Capital Investment (TCI) =	**DC + IC + C = (1.28 × B) + SP + Bldg. + C =**	**$31,947,268** in 2018 dollars

Topcoat - Carbon Concentrator

Cost Estimate

Annual Costs

Direct Annual Costs			
Parameter	**Equation**	**Cost**	
Annual Electricity Cost =	$Q_{Elec} \times P_{elec}$ =	$72,825	
Annual Steam Cost (C_s) =	3.50 x m_{voc} x Θ_s x P_s =	$19,390	
Annual Cooling Water Cost (C_{cs}) =	3.43 x C_s/P_s x P_{wc} =	$47,220	
Operating Labor Costs:	Operator = 0.5 hours/shift × Labor Rate × (Operating hours/8 hours/shift)	$18,000	
	Supervisor = 15% of Operator	$2,700	
Maintenance Costs:	Labor = 0.5 hours/shift × Labor Rate × (Operating Hours/8 hours/shift)	$19,800	
	Materials = 100% of maintenance labor	$19,800	
Carbon Replacement Costs:	Labor = CRF_{carbon} x (Labor Rate × M_c)/CRR =	$452	
	Carbon = CRF_{carbon} x CC x M_c x 1.08 =	$17,648	
Direct Annual Costs (DAC) =		**$217,835**	**in 2018 dollars**

Indirect Annual Costs			
Parameter	**Equation**	**Cost**	
Overhead	= 60% of sum of operator, supervisor, maintenance labor Plus maintenance materials	$36,180	
Administrative Charges	= 2% of TCI	$638,945	
Property Taxes	= 1% of TCI	$319,473	
Insurance	= 1% of TCI	$319,473	
Capital Recovery	= $CRF_{Adsorber}$ × (TCI - [(1.08 x CC x M_c) + (LR x M_c/CRR)] =	$3,175,065	
Indirect Annual Costs (IAC) =		**$4,489,136**	**in 2018 dollars**

Recovered Solvent Credit/Disposal Costs

Disposal Cost		
Parameter	**Equation**	**Cost**
VOC Disposal/Treatment Costs (*$Disposal_{cost}$*)	$= m_{voc} \times \Theta_s \times D_{voc} \times E =$	$0

VOC Recovery Credit			
Parameter	**Equation**	**Cost**	
Annual Recovery Credit for Condensate (RC)	$= m_{voc} \times \Theta_s \times P_{voc} \times E =$	$329,076	
Total Annual Cost (TAC) =	**DAC + IAC + C + $Disposal_{Cost}$ - RC =**	**$4,377,895**	**in 2018 dollars**

Topcoat - Carbon Concentrator

Cost Estimate

Cost Effectiveness

Cost Effectiveness			
Parameter	**Equation**	**Cost**	
Total Annual Cost =	TAC =	$4,377,895	per year in 2018 dollars
Annual Quantity of VOC Removed/Recovered =	$W_{voc} = m_{voc} \times \Theta_s \times E =$	465.3	tons/year
Cost Effectiveness =	Total Annual Cost (TAC) / Annual Quantity of VOC Removed/Recovered =	$9,409.57	per ton of pollutants removed/recovered in 2018 dollars

516.96

$7,554,337

$17,091.26 $/ton destroyed (combined with Topcoat RTO cost)

Topcoat - RTO

Data Inputs

Select the type of oxidizer: Regenerative Thermal Oxidizer

Enter the following information for your emission source:

Composition of Inlet Gas Stream				
Pollutant Name	Concentration (ppmv)	Lower Explosive Limit (LEL) (ppmv)*	Heat of Combustion (Btu/scf)	Molecular Weight
Toluene**	100.2	11,000	4,274	92.13

Note: The lower explosion limit (LEL), heat of combustion and molecular weight for some commonly used VOC/HAP are provided in the table below.

Enter the design data for the proposed oxidizer:

Number of operating hours/year	7,200	hours/year
Inlet volumetric flow rate(Q_{wi}) at 77°F and 1 atm.	61,200	scfm
Inlet volumetric flow rate(Q_{wi}) (actual conditions)	61,200	acfm
Pressure drop (ΔP)	23	inches of water*
Motor/Fan Efficiency (ε)	60	percent*
Inlet Waste Gas Temperature (T_{wi})	100	°F*
Operating Temperature (T_{fi})	1,450	°F
Destruction and Removal Efficiency (DRE)	95.0	percent
Estimated Equipment Life	20	Years*
Heat Loss (η)	1	percent*

Percent Energy Recovery (HR) = 0 percent

Enter the cost data:

Desired dollar-year	2018			
CEPCI* for 2018	603.1	Enter the CEPCI value for 2018	541.7	2016 CEPCI
Annual Interest Rate (i)	4.25	Percent		
Electricity ($Cost_{elect}$)	0.0762	\$/kWh		
Natural Gas Fuel Cost ($Cost_{fuel}$)	0.00605	\$/scf		
Operator Labor Rate	\$40.00	per hour		
Maintenance Labor rate	\$44.00	per hour		
Contingency Factor (CF)	10.0	Percent		

* CEPCI is the Chemical Engineering Plant Cost Escalation/De-escalation Index. The use of CEPCI in this spreadsheet is not an endorsement of the index for purposes of cost escalation or de-escalation, but is there merely to allow for availability of a well-known cost index to spreadsheet users. Use of other well-known cost indexes (e.g., M&S) is acceptable.

Topcoat - RTO

Cost Estimate

Direct Costs			
Total Purchased equipment costs (in 2018 dollars)			
Incinerator + auxiliary equipment[a] (A) =			
Equipment Costs (EC) for Regenerative Oxidizer	=[2.664 x 100,000 + (13.98 x Qtot)] x (2018 CEPI/2016 CEPCI) =	See TCI	in 2018 dollars
Instrumentation[b] =	0.10 × A =	See TCI	
Sales taxes =	0.03 × A =	See TCI	
Freight =	0.05 × A =	See TCI	
	Total Purchased equipment costs (B) =	$1,250,553	in 2018 dollars

Footnotes

a - Auxiliary equipment includes equipment (e.g., duct work) normally not included with unit furnished by incinerator vendor

b - Includes the instrumentation and controls furnished by the incinerator vendor.

Direct Installation Costs (in 2018 dollars)			
Foundations and Supports =	0.08 × B =	See TCI	
Handlong and Errection =	0.14 × B =	See TCI	
Electrical =	0.04 × B =	See TCI	
Piping =	0.02 × B =	See TCI	
Insulation for Ductwork =	0.01 × B =	See TCI	
Painting =	0.01 × B =	See TCI	
Site Preparation (SP) =		See TCI	
Buildings (Bldg) =		See TCI	
	Total Direct Installaton Costs =	See TCI	
Total Direct Costs (DC) =	Total Purchase Equipment Costs (B) + Total Direct Installation Costs =	See TCI	in 2018 dollars
Total Indirect Installation Costs (in 2018 dollars)			
Engineering =	0.10 × B =	See TCI	
Construction and field expenses =	0.05 × B =	See TCI	
Contractor fees =	0.10 × B =	See TCI	
Start-up =	0.02 × B =	See TCI	
Performance test =	0.01 × B =	See TCI	
		See TCI	
	Total Indirect Costs (IC) =	See TCI	
Continency Cost (C) =	CF(IC+DC)=	See TCI	
Total Capital Investment =	**DC + IC +C =**	**$22,539,492**	**in 2018 dollars**

Topcoat - RTO

Cost Estimate

Direct Annual Costs

Annual Electricity Cost	= Fan Power Consumption × Operating Hours/year × Electricity Price =	$150,592
Annual Fuel Costs for Natural Gas	= $Cost_{fuel}$ × Fuel Usage Rate × 60 min/hr × Operating hours/year	$235,894
Operating Labor	Operator = 0.5hours/shift × Labor Rate × (Operating hours/8 hours/shift)	$36,000
	Supervisor = 15% of Operator	$5,400
Maintenance Costs	Labor = 0.5 hours/shift × Labor Rate × (Operating Hours/8 hours/shift)	$39,600
	Materials = 100% of maintenance labor	$39,600

Direct Annual Costs (DC) = $507,086 in 2018 dollars

Indirect Annual Costs

Overhead	= 60% of sum of operating, supervisor, maintenance labor and maintenance materials	$72,360
Administrative Charges	= 2% of TCI	$450,790
Property Taxes	= 1% of TCI	$225,395
Insurance	= 1% of TCI	$225,395
Capital Recovery	= CRF[TCI-1.08(cat. Cost)]	$1,695,417

Indirect Annual Costs (IC) = $2,669,357 in 2018 dollars

Total Annual Cost = DC + IC = $3,176,442 in 2018 dollars

Cost Effectiveness

Cost Effectiveness = (Total Annual Cost)/(Annual Quantity of VOC/HAP Pollutants Destroyed)

Total Annual Cost (TAC) =	$3,176,442	per year in 2018 dollars
VOC/HAP Pollutants Destroyed =	442.0	tons/year
Cost Effectiveness =	$7,187	per ton of pollutants removed in 2018 dollars
Total Uncontrolled VOC (tpy) =	465.3	see Carbon Concentrator Cost Sheet

E-Coat RTO

Data Inputs

Select the type of oxidizer: Regenerative Thermal Oxidizer

Enter the following information for your emission source:

Composition of Inlet Gas Stream				
Pollutant Name	Concentration (ppmv)	Lower Explosive Limit (LEL) (ppmv)*	Heat of Combustion (Btu/scf)	Molecular Weight
Toluene**	100.2	11,000	4,274	92.13

Note: The lower explosion limit (LEL), heat of combustion and molecular weight for some commonly used VOC/HAP are provided in the table below.

Enter the design data for the proposed oxidizer:

Number of operating hours/year	7,200	hours/year
Inlet volumetric flow rate(Q_{wi}) at 77°F and 1 atm.	14,600	scfm
Inlet volumetric flow rate(Q_{wi}) (actual conditions)	14,600	acfm
Pressure drop (ΔP)	19	inches of water
Motor/Fan Efficiency (ε)	60	percent*
Inlet Waste Gas Temperature (T_{wi})	70	°F
Operating Temperature (T_{fi})	1,450	°F
Destruction and Removal Efficiency (DRE)	95.0	percent
Estimated Equipment Life	20	Years*
Heat Loss (η)	1	percent*

Percent Energy Recovery (HR) = 0 percent

Enter the cost data:

Desired dollar-year	2018			
CEPCI* for 2018	603.1	Enter the CEPCI value for 2018	541.7	2016 CEPCI
Annual Interest Rate (i)	4.25	Percent		
Electricity ($Cost_{elect}$)	0.0762	$/kWh - Detroit Specific costs for industrial electricity		
Natural Gas Fuel Cost ($Cost_{fuel}$)	0.00605	$/scf - Detroit Costs - Oct 2019 industrial		
Operator Labor Rate	$40.00	per hour		
Maintenance Labor rate	$44.00	per hour		
Contingency Factor (CF)	10.0	Percent		

* CEPCI is the Chemical Engineering Plant Cost Escalation/De-escalation Index. The use of CEPCI in this spreadsheet is not an endorsement of the index for purposes of cost escalation or de-escalation, but is there merely to allow for availability of a well-known cost index to spreadsheet users. Use of other well-known cost indexes (e.g., M&S) is acceptable.

E-Coat - RTO

Cost Estimate

Direct Costs			
Total Purchased equipment costs (in 2018 dollars)			
Incinerator + auxiliary equipment[a] (A) =			
Equipment Costs (EC) for Regenerative Oxidizer	=[2.664 x 100,000 + (13.98 x Qtot)] x (2018 CEPI/2016 CEPCI) =	$524,401	in 2018 dollars
Instrumentation[b] =	0.10 × A =	$52,440	
Sales taxes =	0.03 × A =	$15,732	
Freight =	0.05 × A =	$26,220	
	Total Purchased equipment costs (B) =	$618,793	in 2018 dollars

Footnotes

a - Auxiliary equipment includes equipment (e.g., duct work) normally not included with unit furnished by incinerator vendor

b - Includes the instrumentation and controls furnished by the incinerator vendor.

Direct Installation Costs (in 2018 dollars)			
Foundations and Supports =	0.08 × B =	$49,503	
Handlong and Errection =	0.14 × B =	$86,631	
Electrical =	0.04 × B =	$24,752	
Piping =	0.02 × B =	$12,376	
Insulation for Ductwork =	0.01 × B =	$6,188	
Painting =	0.01 × B =	$6,188	
Site Preparation (SP) =		$0	
Buildings (Bldg) =		$0	
	Total Direct Installaton Costs =	$185,638	
Total Direct Costs (DC) =	Total Purchase Equipment Costs (B) + Total Direct Installation Costs =	$804,430	in 2018 dollars

Total Indirect Installation Costs (in 2018 dollars)			
Engineering =	0.10 × B =	$61,879	
Construction and field expenses =	0.05 × B =	$30,940	
Contractor fees =	0.10 × B =	$61,879	
Start-up =	0.02 × B =	$12,376	
Performance test =	0.01 × B =	$6,188	
	Total Indirect Costs (IC) =	$173,262	
Continency Cost (C) =	CF(IC+DC)=	$97,769	
Total Capital Investment =	**DC + IC +C =**	**$1,075,462**	**in 2018 dollars**

E-Coat - RTO

Cost Estimate

Direct Annual Costs

Annual Electricity Cost	= Fan Power Consumption × Operating Hours/year × Electricity Price =	$29,678
Annual Fuel Costs for Natural Gas	= $Cost_{fuel}$ × Fuel Usage Rate × 60 min/hr × Operating hours/year	$94,367
Operating Labor	Operator = 0.5hours/shift × Labor Rate × (Operating hours/8 hours/shift)	$18,000
	Supervisor = 15% of Operator	$2,700
Maintenance Costs	Labor = 0.5 hours/shift × Labor Rate × (Operating Hours/8 hours/shift)	$19,800
	Materials = 100% of maintenance labor	$19,800

Direct Annual Costs (DC) = $184,344 in 2018 dollars

Indirect Annual Costs

Overhead	= 60% of sum of operating, supervisor, maintenance labor and maintenance materials	$36,180
Administrative Charges	= 2% of TCI	$21,509
Property Taxes	= 1% of TCI	$10,755
Insurance	= 1% of TCI	$10,755
Capital Recovery	= CRF[TCI-1.08(cat. Cost)]	$80,896

Indirect Annual Costs (IC) = $160,095 in 2018 dollars

Total Annual Cost = DC + IC = $344,439 in 2018 dollars

Cost Effectiveness

Cost Effectiveness = (Total Annual Cost)/(Annual Quantity of VOC/HAP Pollutants Destroyed)

Total Annual Cost (TAC) =	$344,439	per year in 2018 dollars
VOC/HAP Pollutants Destroyed =	25.3	tons/year
Cost Effectiveness =	$13,630	per ton of pollutants removed in 2018 dollars
Total Uncontrolled VOC (tpy) =	26.6	

APPENDIX I

NESHAP SURFACE COATING OF AUTOMOBILES AND LIGHT DUTY TRUCK - RECONSTRUCTION ANALYSIS

The following provides the detailed cost analysis related to the MACT Reconstruction Demonstration in 40 CFR 63.3082.

JNAP estimated costs to construct an entirely new paint facility similar to the existing three coating line system as follows:

- Paint Building/Paint Mix - $ 147 Million
- Paint Process/Conveyors - <u>$ 467 Million</u>
- Total Cost Estimate - $ 614 Million

The costs associated with the proposed sustainment activities and changes to the paint shop (e.g., tutone, rapid repair, etc.) are provided below:

- Paint Shop Sustainment - $186.8 Million
- Paint Shop New Equipment (tutone, etc.) - <u>$87.1 Million</u>
- Total Cost Estimate - $273.9 Million

Based upon the above, the cost demonstration includes a comparison on a percentage basis as follows:

$273.9 Million/$614 Million = 44.6%