PSD / PART 70 SIGNIFICANT SOURCE MODIFICATION
OFFICE OF AIR MANAGEMENT

AM General Corporation
13200 McKinley Highway
Mishawaka, Indiana 46545

This permit is issued to the above mentioned company (herein known as the Permittee) under the provisions of 326 IAC 2-2 and 40 CFR 52.21 (Regulations for Prevention of Significant Deterioration of air quality); and 40 CFR 124 (Procedure for decision Making), with conditions listed on the attached pages.

This approval is also issued in accordance with 40 CFR Part 70 Appendix A and contains the conditions and provisions specified in 326 IAC 2-7 as required by 42 U.S.C. 7401, et. seq. (Clean Air Act as amended by the 1990 Clean Air Act Amendments), 40 CFR Part 70.6, IC 13-15 and IC 13-17.

PSD / Significant Source Modification No.:141-11673-00031	
Issued by: Paul Dubenetzky, Branch Chief Office of Air Management	Issuance Date:

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D.5 FACILITY OPERATION CONDITIONS

(a) Changes to the existing HUMMER I plant:

(1) Relocation of the current sanding, masking, painting and final trim operation from the Armour Building to the existing main plant;

(2) Exterior painting of the existing HUMMER I vehicle to be performed either in the existing plant or in the proposed new paint shop;

(b) New HUMMER II Vehicle production plant:

(1) Two (2) natural-gas-fired low NOx boilers (Categories #1 & #2), identified as boiler #1 and boiler #2, each has a heat input capacity of 25 million British Thermal Units per hour (mmBtu/hr);

(2) Miscellaneous natural gas-fired low NOx process ovens and various heaters, with a total heat input of 109 mmBtu/hr, and low NOx Thermal Oxidizer with a total heat input of 9.7 mmBtu/hr;

(3) Body Shop - This is where the first major step of the assembly process will be performed, metal body components of the HUMMER II vehicle (i.e. door, deck lid, hood, roof, and side panels and frame) will be supplied by off-site contractors. Various types of welding, resistance spot welding, metal grinding/brazing will be performed;

(4) Painting Operations for the HUMMER I and HUMMER II:

(a) Electrodeposition dip prime process (ELPO) (Category #3) - Pre-clean wash, using a mixture of water and water reducible detergents and Phosphate application. These cleaners are applied to the vehicle surface using a combination of spray nozzles and/or dip tanks, to remove oils and grease that may have accumulated on the vehicle parts.

The prime coating system (ELPO), which follows the phosphate cleaning will utilized waterborne coatings made up of a mixture of resins, pigments and water. The coated vehicle will then enter the ELPO/E-coat drying oven.

The VOC and HAPs emissions from the ELPO will be controlled by a Regenerative Thermal Oxidizer

(b) Primer Surfacer/Guidecoat (Category #4) - Body sealers and/or fillers, prep operation which involves scuff sanding and manual wiping using solvent and tack cloths to remove particles, then to antichip booth, then to primer surfacer booth where the exterior will be painted and primer surfacer drying oven. The coating will be manually applied or will use automatic spray systems.

The VOC and HAPs emissions from the Primer Surfacer/Guidecoat automatic zones and from the curing oven will be controlled by a Regenerative Thermal Oxidizer. The PM overspray will be controlled by a wet scrubber.

(c) Topcoat System (Category #5) - This system will consists of a preparation area, which involves minor scuffing and manual wiping using solvent and tack cloths to remove particles and/or otherwise prepare the surface for painting, basecoat spray booth, clearcoat spray booth, flash-off area and natural gas-fired drying oven, repair/polish. The coating will be applied to the vehicle parts using various types of spray applicators.

The VOC and HAPs emissions from the basecoat/clearcoat automatic spray application zones and from the curing oven of the topcoat system will be controlled by a Regenerative Thermal Oxidizer. The PM overspray will be controlled by a wet scrubber.

(d) Deadener Spray Booth (Category #6) - After the topcoat a deadener material will be sprayed to the wheel wells to reduce the amount of noise passengers hear while in the vehicle. The deadener material will be air dried. The PM overspray from this system will be controlled by a wet scrubber or dry filters.

(e) Vehicle Fluid Filling (Category #7) - Where gasoline, diesel, antifreeze, transmission fluid, windshield washer fluid, power steering fluid, brake fluid, engine oil, will be filled into the vehicles.

(f) Final and Spot Repair (Category #8) - This includes, off-line spot and final repair. The PM overspray from this system will be controlled by dry filters.

(g) Assembly Final Line (Category #9) - After the paint shop, the painted vehicle components are routed to general assembly. General assembly consists of interior and exterior trim components and glass installation, chassis, wheel/tires, powertrain and final line assembly operations. The Vehicle start-up and roll test verifies if powertrain is installed correctly.

(h) Miscellaneous Solvent Purge Usage and Cleanup (Category #10) - Solvents will be used in the body shop, paint shop, oven cleaning, general assembly areas and routine housekeeping. In the paint shop the purge material is reclaimed internally or externally to the spray application equipment.

(i) Miscellaneous Sealers and Adhesives (Category #11) - Various sealers and adhesives will be used throughput the assembly process. Majority of these sealers and adhesives will be used in the paint shop. A special sealant will be used in the vehicle glass installation. These materials will be either air-dried or oven cured.

(e) Bulk Storage Tanks (Category #12) - Submerged fill pipes, and conservation vents on these tanks to further minimize VOC and HAPs emissions. Stage I vapor controls will also be installed where appropriate.

Tank ID No.	Storage Capacity (gallons)	Location	Material Stored
1	12,000	New Bulk Tank Farm	Unleaded Gasoline
2	12,000	New Bulk Tank Farm	Antifreeze
3	12,000	New Bulk Tank Farm	Transmission Fluid
4	12,000	New Bulk Tank Farm	Diesel Fluid
5	12,000	New Bulk Tank Farm	Purge Thinner
6	12,000	New Bulk Tank Farm	Windshield Washer
7	12,000	New Bulk Tank Farm	Power Steering Fluid
8	12,000	New Bulk Tank Farm	Waste Paint/Thinner
9	12,000	New Bulk Tank Farm	Engine Oil

	AIR POLLUTION CONTROL SUMMARY	
CATEGORY	OPERATION	CONTROL EQUIPMENT/TECHNOLOGY
1	Miscellaneous natural gas-fired process ovens, heaters and control equipment (RTO)	Low NOx Burners
2	Two Boilers	Low NOx Burners
3	- Electrodeposition dip prime, E-Coat process (ELPO) - E-Coat Oven	Regenerative Thermal Oxidizer (RTO)
4	- Primer Surfacer/Guidecoat Spray System - Primer Surfacer/Guidecoat Drying Oven	Regenerative Thermal Oxidizer for VOC and HAP control (paint automatic applicator sections only). Wet Scrubber for PM overspray.
5	- Topcoat Spray System - Topcoat Drying Oven	Regenerative Thermal Oxidizer (paint automatic applicator sections only). Wet Scrubber for PM overspray.
12	Bulk Storage Tanks	Submerged fill pipes, conservation vents, and Stage I vapor controls.

SECTION D.5 GENERAL CONSTRUCTION CONDITIONS

D.5.1 Permit No Defense [IC 13]

This approval to construct does not relieve the Permittee of the responsibility to comply with the provisions of the Indiana Environmental Management Law (IC 13-11 through 13-20; 13-22 through 13-25; and 13-30), the Air Pollution Control Law (IC 13-17) and the rules promulgated thereunder, as well as other applicable local, state, and federal requirements.

D.5.2 Definitions [326 IAC 2-7-1]

Terms in this approval shall have the definition assigned to such terms in the referenced regulation. In the absence of definitions in the referenced regulation, any applicable definitions found in IC 13-11, 326 IAC 1-2 and 326 IAC 2-7 shall prevail.

D.5.3 Effective Date of the Permit [40CFR 124]

Pursuant to 40 CFR 124.15, 40 CFR 124.19, and 40 CFR 124.20, this permit is effective upon issuance.

D.5.4 Expiration of Permits [326 IAC 2-2-8]

Pursuant to 326 IAC 2-2-8(a)(1), this permit to construct shall expire if construction is not commenced within eighteen (18) months after receipt of this approval, or if construction is suspended for a continuous period of eighteen (18) months or more.

D.5.5 Significant Source Modification [326 IAC 2-7-10.5(h)]

This document shall also become the approval to operate pursuant to 326 IAC 2-7-10.5(h) when, prior to start of operation, the following requirements are met:

(a) The attached affidavit of construction shall be submitted to the Office of Air Management (OAM), Permit Administration & Development Section, verifying that the emission units were constructed as proposed in the application. The emissions units covered in the Significant Source Modification approval may begin operating on the date the affidavit of construction is postmarked or hand delivered to IDEM if constructed as proposed.

(b) If actual construction of the emissions units differs significantly from the construction proposed in the application, the source may not begin operation until the source modification has been revised pursuant to 326 IAC 2-7-11 or 326 IAC 2-7-12 and an Operation Permit Validation Letter is issued.

(c) If construction is completed in phases; i.e., the entire construction is not done continuously, a separate affidavit must be submitted for each phase of construction. Any permit conditions associated with operation start up dates such as stack testing for New Source Performance Standards (NSPS) shall be applicable to each individual phase.

(d) The Permittee shall receive an Operation Permit Validation Letter from the Chief of the Permit Administration & Development Section and attach it to this document.

OPERATION CONDITIONS

Emission Limitations and Standards

D.5.6 PSD BACT Limit [326 IAC 2-2] [40 CFR 52.21]

Pursuant to the Prevention of Significant Deterioration (PSD) rules, 326 IAC 2-2 and 40 CFR Part 52.21, the HUMMER II plant shall be limited as follows:

(a) The HUMMER II plant production rate shall be limited to 86,000 vehicles per 12-consecutive month period, rolled on a monthly basis. Daily maximum production shall not exceed 364 vehicles.

During the first twelve (12) months of operation, the vehicle shall be limited such that the total vehicle produced divided by the accumulated months of operation shall not exceed 86,000 vehicles per year divided by twelve (12) months, which equals an average of 7,166 vehicles per month, rolled on a monthly basis.

(b) The volatile organic material (VOC) usages, and natural gas usages from the HUMMER II plant shall be limited such that the summation of the VOC emissions from all facilities at this plant shall not exceed 260 tons per 12-month period, rolled on a monthly basis.

During the first twelve (12) months of operation, the volatile organic material (VOC) usages, and natural gas usages shall be limited such that the summation of the VOC emissions from all facilities at this HUMMER II plant divided by the accumulated months of operation shall not exceed 260 tons per year divided by twelve (12) months, which equals an average of 21.7 tons per month, rolled on a monthly basis.

(c) The limitations for the following HUMMER II surface coating facilities shall be as follows:

Facilities/Operations	VOC Limit (Pounds of VOC/Gallon Applied Coating Solids)
ELPO / E-Coat System	0.04
Primer Surfacer/Guidecoat System	2.9
Topcoat System	5.3

The VOC limit in pounds of VOC/gallon applied coating solids shall be determined on a daily-volume-weighted average and actual transfer efficiencies.

(d) Good Work Practices To Reduce VOC Emissions:

(1) Conservation vents, submerged fill pipes and Stage I Vapor Recovery System where appropriate shall be installed for the gasoline storage tanks.

(2) High efficiency spray applicators shall be utilized for all the surface coating facilities.

(3) Capturing of paint lines solvent for recycling.

(4) Capturing of solvent purged from paint lines for off-site recycling and/or other processing.

(5) The use of masking material to protect certain equipment, walls, and floors around the booths from overspray, thus reducing the cleaning solvent usage.

(6) The use of water-based coatings when feasible.

(7) Water blasting of vehicle carriers.

(8) The use of closed containers to store or dispose of cloth, paper, or other materials impregnated with VOC.

(9) The use of Stage 2 Recovery System in the fluid filling operation.

(10) Minimizing spills in the vehicle fluid filling operation, and

(11) Closing the receiving vessel after it has been filled with the fluid.

(e) Compliance with sections (a) through (d) of this PSD BACT condition and condition D.6.3 of this permit shall satisfy 326 IAC 2-2, the Prevention of Significant Deterioration and also satisfy 326 IAC 2-4.1-1 (New Source Toxic Control) and 326 IAC 8-1-6 (General VOC Reduction Requirements).

D.5.7 Volatile Organic Compound (VOC) [326 IAC 8-2-9]

(a) Pursuant to 326 IAC 8-2-9 (Miscellaneous Metal Coating Operations), the volume weighted average volatile organic compound (VOC) content of coating applied to the metal part of the HUMMER II shall be limited as follows:

Type of Coating	VOC Emissions Limit (pounds per gallon of coatings less water)
Clear Coatings	4.3
Forced Warm Air Dried Coatings	3.5
Air Dried Coatings	3.5
Extreme Performance Coatings	3.5
All Other Coating	3.0

(b) The VOC limit in this condition shall be determined on a daily-volume- weighted average, using the following equation:

$$\frac{\text{Lb VOC}}{\text{Gallon less water}} = \frac{\sum \text{coatings } [D * O * Q] / [1 - w * Dc/Dw]}{\sum C}$$

Where:
Dc = density of coating, lb/gal
Dw = density of water, 8.33 lb/gal
O = weight percent organics, %
W = percent volume water, %
Q = quantity of coating, gal/unit
C = total coatings used, gal/unit

(c) The VOC input usage from the Spot and Final Repair operation shall be limited to less than 15 pounds per day (lbs/day). Compliance with this limit shall make 326 IAC 8-2-9 (Miscellaneous Metal Coating) not applicable. This limit shall be based on daily-volume-weighted average.

(d) Solvent sprayed from application equipment during cleanup or color changes shall be directed into appropriately designed reclaim equipment. Such equipment shall be designed to effectively capture purge solvent and minimize evaporation. The waste solvent shall be disposed of in such a manner that evaporation is minimized.

D.5.8 Volatile Organic Compounds [326 IAC 8-1-2(a)

Pursuant to 326 IAC 8-1-2(a), the Topcoat System and the Primer Surfacer/Guidecoat System VOC emission limitations specified under 326 IAC 8-2-9, shall be achieved through one (1) or any combination of the following:

(a) Thermal or catalytic incineration;

(b) Equivalent emissions limitations based on actual transfer efficiency higher than specified baseline transfer efficiency as follows:

Miscellaneous Metal Coating	Equivalent Emission Limit	
	kg/liter Solids Deposited	Lbs/gal Solids Deposited
Clear Coatings	2.08	17.3
Air Dried up to 90^0C	1.34	11.2
Extreme Performance Coatings	1.34	11.2
All Other Coatings and Coating Systems	1.01	8.4

Compliance with the equivalent emissions limits in this condition shall be determined according to the following equation:

$$E = \frac{L}{[(1-(L/D)) * (T)]}$$

Where: E = Equivalent emission limit in pounds of VOC per gallon coating solid deposited.
L = Actual VOC content in coating in pounds per gallon of coating, as applied.
D = Actual density of VOC in coating in pounds per gallon of VOC.
T = Actual measured transfer efficiency.

D.5.9 Particulate Matter (PM) [326 IAC 6-3-2(c)]

The PM overspray emissions from the Primer Surfacer/Guidecoat System, Deadener, Topcoat System, Spot and Final Repair operations shall not exceed the pound per hour emission rate established as E in the following formula:

Interpolation and extrapolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$E = 4.10\ P^{0.67}$ where E = rate of emission in pounds per hour; and P = process weight rate in tons per hour

or

Interpolation and extrapolation of the data for the process weight rate in excess of sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$E = 55.0\ P^{0.11} - 40$ where E = rate of emission in pounds per hour; and P = process weight rate in tons per hour

D.5.10 New Source Performance Standards (NSPS) [326 IAC 12 and 40 CFR § 60.110b, Subpart Kb]

Pursuant to 326 IAC 12 and 40 CFR § 60.110b, Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels), the following storage tanks are subject to this NSPS:

Tank ID No.	Storage Capacity (gallons)	Location	Material Stored
1	12,000	New Bulk Tank Farm	Unleaded Gasoline
2	12,000	New Bulk Tank Farm	Antifreeze
3	12,000	New Bulk Tank Farm	Transmission Fluid
4	12,000	New Bulk Tank Farm	Diesel Fluid
5	12,000	New Bulk Tank Farm	Purge Thinner
6	12,000	New Bulk Tank Farm	Windshield Washer
7	12,000	New Bulk Tank Farm	Power Steering Fluid
8	12,000	New Bulk Tank Farm	Waste Paint/Thinner
9	12,000	New Bulk Tank Farm	Engine Oil

(a) Pursuant to Section (b) of this NSPS the owner or operator of these storage vessels shall keep readily accessible records showing the dimension of the storage vessel and an analysis showing the capacity of the storage vessel.

(b) Pursuant to Section (a) of this NSPS the owner or operator of these storage vessels shall keep copies of the records required in Section (b) for the life of the source.

D.5.11 New Source Performance Standards [326 IAC 12 and 40 CFR § 60.40c, Subpart Dc]

Pursuant to 326 IAC 12 and 40 CFR § 60.40c, Subpart Dc- Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, the proposed two (2) 25 mmBtu/hr boilers #1 and #2 are subject to the § 60.48 Subsections (a), (g) and (i) of this NSPS.

(a) Pursuant to Subsection (a) of § 60.48, the owner/operator of the two (2) boilers shall submit notification of the date of construction, or reconstruction, anticipated startup and actual startup as provided by § 60.7 of this part. The notification shall include:

(1) The design heat input capacity of the two (2) boilers and identification of the fuel to be combusted; and

(2) The annual capacity factor at which the owner/operator anticipates operating the two (2) boilers, based on all fuels fired and based on individual fuel fired.

(b) Pursuant to Subsection (g) § 60.48, the owner/operator of the two (2) boilers shall maintain records of the amounts of fuel combusted during each month.

(c) Pursuant Subsection (i) § 60.48, all records required in this Section shall be maintained by the owner or operator of the two (2) boilers for a period of two (2) years following the date of such record.

D.5.12 Particulate Emissions Limitation for Sources of Indirect Heating [326 IAC 6-2-4]

Pursuant to 326 IAC 6-2-4, the Particulate Matter (PM) emissions from the two (2) 25 million British Thermal Units (mmBtu) boilers shall:

(a) Be limited as follows:

Facility	PM Emissions Limit (lb/mmBtu)
Boiler #1	0.33
Boiler #2	0.33

The PM emissions limits shall be determined using the following equation:

$$Pt = \frac{1.09}{Q^{0.26}}$$

Where: Pt = Pounds of particulate matter emitted per million Btu (lb/mmBtu) heat input.
Q = Total source maximum operating capacity rating in million Btu per hour (mmBtu/hr) heat input.

(b) Be equipped with Low NOx burners; and

(c) Combust only natural gas.

D.5.13 Gasoline Dispensing Facilities [326 IAC 8-4-6]

(a) Pursuant to 326 IAC 8-4-6(b) - No owner or operator shall allow the transfer of gasoline between any transport and any storage tank unless such tank is equipped with the following:

(1) A submerge fill pipe.
(2) Either a pressure relief valve set to release at no less than seven-tenths (0.7) pounds per square inch or an orifice of five-tenths (0.5) inch in diameter.
(3) A vapor balance system connected between the tank and the transport, operating according to manufacturer's specifications.

(b) It shall be the responsibility of the owner or operator of the transport to make certain that the vapor balance system is connected between the transport and the storage tank and is operating according to the manufacturer's specifications.

(c) The storage tank will dispense gasoline to fuel the manufactured vehicles for testing. AM General Corporation is proposing to install submerged fill pipes and pressure relief valves on the gasoline storage tank and will employ a vapor balancing system for gasoline tank truck unloading activities, to comply with 326 IAC 8-4-6.

D.5.14 Opacity [326 IAC 5-1]

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following, unless otherwise stated in this permit:

(a) Opacity shall not exceed an average of thirty percent (30%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

D.5.15 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for this facility and its control device.

Compliance Determination Requirements

D.5.16 Testing Requirements [326 IAC 2-7-6(1),(6)][326 IAC 2-1.1-11]

(a) Compliance stack tests shall be performed on the Regenerative Thermal Oxidizer (RTO) to determine the operating temperature that will achieve the following destruction efficiency and to determine the capture system efficiency for each coating system:

Facility	Destruction Efficiency
ELPO/E-Coat	95%
Primer Surfacer/Guidecoat System	95%
Topcoat System	95%

(b) The Compliance stack tests for the Primer Surfacer/Guidecoat System and Topcoat System in (a) of this condition shall be made utilizing Method 25 for destruction efficiency, and or other methods as approved by the Commissioner for capture efficiency. This test shall be repeated at least once every two and a half (2.5) years from the date of this valid compliance demonstration. In addition to these requirements, IDEM may require compliance testing when necessary to determine if the facility is in compliance.

(c) The compliance stack tests shall perform on the Primer Surfacer/Guidecoat, Topcoat, and Deadener operations for PM and PM-10 utilizing Methods 5 or 17 (40 CFR 60, Appendix A) for PM and Methods 201 or 201A and 202 (40 CFR 51, Appendix M) for PM-10, or other methods as approved by the Commissioner. The PM and PM10 testing is required to demonstrate that the source is not major for either pollutant, under 326 IAC 2-2, Prevention of Significant Deterioration. This test shall be repeated at least once every two and half (2.5) years from the date of this valid compliance demonstration. PM-10 includes filterable and condensible PM-10. In addition to these requirements, IDEM may require compliance testing when necessary to determine if the facility is in compliance.

(d) The compliance tests required in (a), (b) and (c) of this condition shall be made within180 days after achieving maximum production rate, but no later than 365 days after receipt of the Validation Letter from the IDEM, OAM.

D.5.17 Volatile Organic Compounds (VOC)

Compliance with the VOC content and usage limitations contained in Conditions D.5.6 shall be determined pursuant to 326 IAC 8-1-4(a)(3) and 326 IAC 8-1-2(a) using formulation data supplied by the coating manufacturer. IDEM, OAM, reserves the authority to determine compliance using Method 24 in conjunction with the analytical procedures specified in 326 IAC 8-1-4.

D.5.18 Permanent or Temporary Total Enclosure

(a) The capture system for the ELPO/E-Coat System shall meet the following criteria for a Permanent or Temporary Total Enclosure:

(1) Any Natural Draft Opening (NDO) shall be at least four (4) equivalent opening diameters from each VOC emitting point.

(2) Any exhaust point from the enclosure shall be at least four (4) equivalent duct or hood diameters from each NDO.

(3) The total area of all NDO's shall not exceed five (5) percent of the surface area of the enclosure's four (4) walls, floor, and ceiling.

(4) The average facial velocity (FV) of air through all NDO's shall be at least 3,600 meter per hour (200 fpm). The direction of air through all NDO's shall be into the enclosure.

(5) All access doors and windows whose areas are not included in Section (c) and are not included in the calculations in Section (d) shall be closed during routine operation of the process.

or

(b) Verify 100% capture through other methods as approved by the Commissioner.

D.5.19 Volatile Organic compounds

(a) The Regenerative Thermal Oxidizer (RTO) shall be in operation at all times when the ELPO/E-Coat System and the automatic zones for the Primer Surface/Guidecoat System, and Topcoat System are in operation.

(b) The RTO shall be calibrated, operated and maintained in accordance with the manufacturer's specifications.

D.5.20 Particulate Overspray

(a) The wet scrubbers, or dry filters shall be in operation or in place at all times when the Primer Surfacer/Guidecoat System, Topcoat System, and Deadener Spray System are in operation.

(b) The dry filters shall be in place at all times the Final and Spot Repair System are in operation.

D.5.21 Fugitive Dust Emissions [326 IAC 6-4]

The Permittee shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4 (Fugitive Dust Emissions). 326 IAC 6-4-2(4) is not federally enforceable.

D.5.22 Performance Testing [326 IAC 3-6]

(a) All testing required in D.5.15 shall be performed according to the provisions of 326 IAC 3-6 (Source Sampling Procedures), except as provided elsewhere in this permit, utilizing any applicable procedures and analysis methods specified in 40 CFR 51, 40 CFR 60, 40 CFR 61, 40 CFR 63, 40 CFR 75, or other procedures approved by IDEM, OAM.

A test protocol, except as provided elsewhere in this permit, shall be submitted to:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Management
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

no later than thirty-five (35) days prior to the intended test date. The Permittee shall submit a notice of the actual test date to the above address so that it is received at least two weeks prior to the test date.

(b) All test reports must be received by IDEM, OAM within forty-five (45) days after the completion of the testing. An extension may be granted by IDEM, OAM, if the source submits to IDEM, OAM, a reasonable written explanation within five (5) days prior to the end of the initial forty-five (45) day period.

The documentation submitted by the Permittee does not require certification by the "responsible official" as defined by 326 IAC 2-7-1(34).

Compliance Monitoring Requirements

D.5.23 Operating Parameters

The Regenerative Thermal Oxidizer shall maintain a minimum operating temperature of 1350^0F or a minimum operating temperature determined in the most recent stack tests to maintain at least 95% destruction efficiency, that is necessary to achieve compliance with condition D.5.6(c) and D.5.8. The operating temperature of the exhaust of the RTO shall be continuously recorded whenever it is operating.

D.5.24 Monitoring

(a) Daily inspections shall be performed to verify that the liquid levels and flow rates of the wet scrubbers meet the manufacturer's recommended level. To monitor the performance of the wet scrubbers, the scrubbant level of the wet scrubbers shall be maintained weekly at a level where surface agitation indicates impact of the air flow. To monitor the performance of the baffles, weekly inspections of the baffle panels shall be conducted to verify placement and configuration meet recommendations of the manufacturer. In addition, weekly observations shall be made of the overspray from the surface coating booths (Primer Surfacer/Guidecoat, Topcoat, Deadener, and Final and Spot Repair) exhaust stacks while one or more of the booths are in operation. The Compliance Response Plan shall be followed whenever a condition exists which should result in a response step. Failure to take response steps in accordance with Section C - Compliance Monitoring Plan - Failure to Take Response Steps, shall be considered a violation of this permit.

(b) Monthly inspections shall be performed of the coating emissions from the stack to determine the presence of paint overspray on the rooftops and the nearby ground. The Compliance Response Plan for this unit shall contain troubleshooting contingency and response steps for when a noticeable change or excessive accumulation in overspray emission, or evidence of overspray emission is observed. The Compliance Response Plan shall be followed whenever a condition exists which should result in a response step. Failure to take response steps in accordance with Section C - Compliance Monitoring Plan - Failure to Take Response Steps, shall be considered a violation of this permit.

(c) Additional inspections and preventive measures shall be performed as prescribed in the Preventive Maintenance Plan.

Record Keeping and Reporting Requirements

D.5.25 Record Keeping Requirements

(a) To document compliance with Conditions D.5.6, 5.7 and D.5.8, the Permittee shall maintain records in accordance with (1) through (9) below. Records maintained for (1) through (9) shall be sufficient to establish compliance with the VOC usage limits and/or the VOC emission limits established in Conditions D.5.6, 5.7 and D.5.8.

(1) The amount and VOC content of each coating material and solvent used. Records shall include purchase orders, invoices, and material safety data sheets (MSDS) necessary to verify the type and amount used. Solvent usage records shall differentiate between those added to coatings and those used as cleanup solvents;

(2) A log of the dates of use;

(3) The volume weighted VOC content of the coatings used for each day;

(4) The volume weighted VOC content of the coatings used each day for the Final and Spot Repair;

(5) The cleanup solvent usage for each month;

(6) The total VOC usage for each month;

(7) The weight of VOCs emitted for each compliance period;

(8) A statement that the rate of the liquid level and flow at the wet scrubber was maintained according to vendor recommended specification;

(9) Continuous recorder operating temperature readings from the RTO.

(b) All records shall be maintained in accordance with Section C - General Record Keeping Requirements, of this permit.

D.5.26 Reporting Requirements

(a) A quarterly summary of the information to document compliance with Condition D.5.6 shall be submitted, using the reporting forms located at the end of this permit, or their equivalent, within thirty (30) days after the end of the quarter being reported. These reports shall be submitted to the following address:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Management
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

(b) Pursuant to 326 IAC 12 (New Source Performance Standards (NSPS)) 40 CFR Part 60.40c, Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units), and 40 CFR Part 60.110b, Subpart Kb (Standards of Performance for Volatile Organic Liquid (VOL) Storage Vessels, Including Petroleum Liquid Storage Vessels), AM General Corporation shall report the following for boiler #1, boiler #2, and VOL vessels:

(1) Commencement of construction date (no later than 30 days after such date);

(2) Anticipated start-up date (not more than 60 days or less than 30 days prior to such date);

(3) Actual start-up date (within 15 days after such date); and

(4) Date of performance testing (at least 30 days prior to such date), when required by a condition elsewhere in this permit.

Section D.6 Operation Conditions

General List of Trivial/Insignificant Activities	
(a)	Production of hot water for on-site personal use not related to any industrial or production process.
(b)	Portable electrical generators that can be moved by hand from one location to another.
(c)	Ventilation exhaust, central chiller water systems, refrigeration and air conditioning equipment, not related to any industrial or production process, including natural draft hoods or ventilating systems that do not remove air pollutants.
(d)	Air vents from air compressors.
(e)	Fuel use related to food preparation for on-site consumption.
(f)	Activities performed using hand-held equipment including the following: - Application of hot melt adhesives with no VOC in the adhesive formulation - Drilling - Routing - Surface grinding - Grinding - Sanding - Machining wood, metal or plastic - Sawing - Polishing - Turning wood, metal or plastic
(g)	Activities related to routine fabrication, maintenance and repair of buildings, structures, equipment or vehicles at the source where air emissions from those activities would not be associated with any commercial production process including the following: - Activities associated with the repair and maintenance of paved and unpaved roads, including paving or sealing, or both or parking lots and roadways. - Painting, including interior and exterior paintings or buildings, and solvent use, excluding degreasing operations utilizing halogenated organic solvents. - Brazing, soldering, or welding operations and associated equipment. - Batteries and battery charging stations, except at battery manufacturing plants. - Lubrications, including hand-held spray can lubrication, dipping metal parts into lubricating oil, and manual or automated addition of cutting oil in machining operations.
(h)	Office related including the following: - Office supplies and equipment. - Photocopying equipment and associated supplies. - Paper shredding. - Blueprint machines, photographic equipment, and associated supplies.
(i)	Lawn care and landscape maintenance activities and equipment, including the storage, spraying, or application of insecticides, pesticides, and herbicides.
(j)	Storage equipment and activities including: - Pressurized storage tanks and associated piping for anhydrous ammonia, acetylene, acrbon monoxide, chlorine, inorganic compounds, liquid natural gas (LNG)(Propane), liquid petroleum gas (LPG), natural gas, nitrogen dioxide and sulfur dioxide. - Storage tanks, vessels, and containers holding or storing liquid substances that do not contain any VOC or HAP. - Storage tanks, reservoirs, and pumping and handling equipment of any size containing soap, wax, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions provided appropriate lids and covers are utilized. - Storage of drums containing maintenance raw materials. - Storage of castings, Lance rods, or any non-HAP containing material in solid form stored in a sealed or covered container
(k)	Emergency and standby equipment including: - Safety and emergency equipment, except engine driven fire pumps, including fire suppression systems and emergency road flares. - Vacuum producing devices for the purpose of removing potential accidental releases

(l)	Activities associated with production including the following: - Closed, non-vented, tumblers used for cleaning or deburring metal products without abrasive blasting. - Electrical resistance welding. - Application equipment for hot melt adhesives with no VOC in the adhesive formulation. - Compressor or pump lubrication and seal oil systems. - Equipment used to mix and package soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized. - Equipment for washing or drying fabricated glass or metal products, if no VOCs or HAPs are used in the process, and no gas, oil, or solid fuel is burned.
(m)	Miscellaneous equipment, but not emissions associated with the process for which the equipment is used, and activities including the following: - Equipment used for surface coating, painting, dipping or spraying operations, except those that will emit VOCs and HAPs. - Electric or steam heated drying ovens and autoclaves, including only the heating emissions and not any associated process emissions. - Application equipment for hot melt adhesives with no VOC in the adhesive formulation.
(n)	A gasoline fuel transfer and dispensing operation handling less than or equal to 1,300 gallons per day, such as filling of tanks, locomotives, automobiles, having a storage capacity less than or equal to 10,500 gallons.
(o)	A petroleum fuel, other than gasoline dispensing facility , having a storage capacity of less than or equal to 10,500 gallons, and dispensing less than or equal to 230,000 gallons per month.
(p)	The following VOC and HAP storage containers: - Storage tanks with capacity less than 1,000 gallons and annual throughput less than 12,000 gallons. - Vessels storing lubricating oils, hydraulic oils, machining oils and machining fluids.
(q)	Application of oils, greases, lubricants or other nonvolatile materials applied as temporary protective coatings.
(r)	Machining where an aqueous cutting coolant continuously floods the machining interface.
(s)	Degreasing operations that do not exceed 145 gallons per 12 months, except if subject to 326 IAC 20-6.
(t)	Cleaners and solvents characterized as follows: - having a vapor pressure equal to or less than 2 kPa; 15 mmHg, or 0.3 psi measured at 38 degrees C (100 ^{0}F) or - having a vapor pressure equal to or less than 0.7 kPa; 5 mmHg; or 0.1 psi measured at 20 ^{0}C (68 ^{0}F). The used of which for all cleaners and solvents combined does not exceed 145 gallons per 12 months
(u)	The following equipment related to manufacturing activities not resulting in the emissions of HAPs: brazing equipment, cutting torches, soldering equipment, welding equipment.
(v)	Closed loop heating and cooling systems.
(w)	Infrared cure equipment.
(x)	Exposure chambers for curing of ultraviolet inks and ultra-violet coatings where heat is the intended discharge.
(y)	Solvent recycling systems with bath capacity less than or equal to 100 gallons.
(z)	Activities associated with the treatment of wastewater streams with an oil and grease content less than or equal to 1% by volume.
(aa)	Water based adhesives that are less than or equal to 5% by volume of VOCs excluding HAPs.

(bb)	Non-contact cooling tower systems with either of the following: - Natural draft cooling towers not regulated under a NESHAP - Forced and induced draft cooling tower system not regulated under a NESHAP.
(cc)	Heat exchanger cleaning and repair.
(dd)	Process vessel degassing and cleaning to prepare for internal repairs.
(ee)	Paved and unpaved roads and parking lots with public access
(ff)	Purging of gas lines and vessels that is related to routine maintenance and repair of buildings, structures, or vehicles at the source where air emissions from those activities would not be associated with any production process.
(gg)	Equipment used to collect any material that might be released during a malfunction, process upset, or spill cleanup, including catch tanks, temporary liquid separators tank and fluid handling equipment.
(hh)	Emergency generators as follows: Gasoline generators not exceeding 110 horsepower, diesel generators not exceeding 1,600 horsepower, natural gas turbines or reciprocating engines not exceeding 16,000 horsepower.
(ii)	Grinding and machining operations controlled with fabric filters, scrubbers, mist collectors, wet collectors and electrostatic precipitations with a design grain loading of less than or equal to 0.03 grains per actual cubic foot and a gas flow rate less than or equal to 4000 actual cubic feet per minute, including the following: - Deburring - Buffing - Polishing - Pneumatic conveying - Woodworking operations - Abrasive blasting
(jj)	Space heaters, process heaters, or boilers using the following fuels: - Natural gas-fired combustion sources with heat input equal to or less than ten million (10,000,000) Btu per hour. - Propane or liquified petroleum gas, or butane-fired combustion sources with heat input equal to or less than six million (6,000,000) Btu per hour. - Fuel oil-fired combustion sources with heat input equal to or less than two million (2,000,000) Btu per hour and firing fuel containing less than five-tenths (0.5) percent sulfur by weight.

Plant Specific Trivial / Insignificant Activities	
(a)	Sludge room water treatment (Emissions accounted for in the emission determinations at each respective source)
(b)	Sludge room (Emissions accounted for in the emission determinations at each respective source)
(c)	Laboratories
(d)	Print/Copy shops
(e)	Wet/dry sanding booths
(f)	Open metal grinding - Performed in the body shop
(g)	Resistance Welding - Majority of welding operations performed in the body shop
(h)	Property Maintenance - Landscaping, paving, roofing, and painting
(i)	Material Storage
(j)	Paint Mix Rooms (Emissions accounted for in the emission determinations at each respective source)

(k)	Non-VOC parts washing.
(l)	Equipment maintenance lube/degreaser.
(m)	Vehicle washers prior to shipping.
(n)	Vehicle fluid fill operations: - Engine oil - Windshield fluid - Engine coolant - Brake fluid - Air conditioning refrigerant - Power steering fluid
(o)	Storage tanks for brake fluid, gear oil and engine oil.
(p)	Engine sub-assembly line - Assembly of engine components.
(q)	Radiator sub-assembly line - Assembly of radiator components.
(r)	Trim assembly line - Installation of various interior/exterior vehicle components.
(s)	Paint pump repair shop.
(t)	Leak test areas.
(u)	Pre-washers.
(v)	Spot sanding and painting.
(w)	Phosphate system.
(x)	Masking and polishing areas.
(y)	Turbo blower - Power blowing of vehicle.
(z)	Dolly touch-up.
(aa)	Dolly cleaning (water blast) - Cleaning of vehicle carrier.
(bb)	Inspection and audit areas.
(cc)	Emergency generators less than 1600 hp and fire pumps.

Boilers **Natural Gas-fired Boilers less than 10 MMBtu/hr**

Emission Limitations and Standards

D.6.1 Particulate Matter (PM)

Pursuant to 326 IAC 6-2-4 (Particulate Matter Emission Limitations for Sources of Indirect Heating, all the boilers with heat input rating of less than ten (10) mmBtu/hr each shall have a PM emissions limit to be determined by the following equation:

$$Pt = \frac{1.09}{Q^{0.26}}$$

Where: Pt = Pounds of particulate matter emitted per million Btu (lb/mmBtu) heat input.
Q = Total source maximum operating capacity rating in million Btu per hour (mmBtu/hr) heat input.

Degreasing operations **And certain cleaners and solvents, that do not exceed 145 gallons usage per 12 months, except if subject to 326 IAC 20-6):**

D.6.2 Volatile Organic Compounds (VOC)

Pursuant to 326 IAC 8-3-2 (Cold Cleaner Operations), the owner or operator shall:

(a) Equip the cleaner with a cover;

(b) Equip the cleaner with a facility for draining cleaned parts;

(c) Close the degreaser cover whenever parts are not being handled in the cleaner;

(d) Drain cleaned parts for at least fifteen (15) seconds or until dripping ceases;

(e) Provide a permanent, conspicuous label summarizing the operation requirements;

(f) Store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, in such a manner that greater than twenty percent (20%) of the waste solvent (by weight) can evaporate into the atmosphere.

D.6.3 PSD BACT

The PSD BACT for the insignificant activities shall be as follows:

(a) Gasoline fuel transfer and dispensing operation shall not exceed 1,300 gallons per day.

(b) The petroleum fuel dispensing facility, shall not exceed a storage capacity greater 10,500 gallons, and shall not dispense fuel greater than 230,000 gallons per month.

(c) Storage tanks with capacity less than 1,000 gallons shall have annual throughput less than 12,000 gallons. This shall include vessels storing lubricating oils, hydraulic oils, machining oils and machining fluids.

(d) Cleaners and solvents used in this section shall have a vapor pressure equal to or less than 2 kPa; 15 mmHg, or 0.3 psi measured at 38 degrees C (100 ^{0}F) or shall have a vapor pressure equal to or less than 0.7 kPa; 5 mmHg; or 0.1 psi measured at 20 ^{0}C (68 ^{0}F).

The used of which for all cleaners and solvents combined shall not exceed 145 gallons per 12 months.

(e) Compliance with this condition and condition D.5.6 of this permit shall satisfy 326 IAC 2-2, the Prevention of Significant Deterioration.

D.6.4 Particulate Matter (PM) [326 IAC 6-3-2(c)]

(a) The PM overspray emissions from the surface coating, painting, dipping, or spraying operation under the insignificant activities shall not exceed the pound per hour emission rate established as E in the following formula:

Interpolation and extrapolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$E = 4.10\ P^{0.67}$ where E = rate of emission in pounds per hour; and P = process weight rate in tons per hour

(b) Pursuant to 326 IAC 6-3 (Process Operations), the allowable PM emission rate from the grinding, machining, sanding, soldering, welding facilities shall individually be determined using the equation in D.6.2.

Compliance Determination Requirement

D.6.5 Testing Requirements [326 IAC 2-7-6(1),(6)][326 IAC 2-1.1-11]

The Permittee is not required to test any of the facilities in Section 6 by this permit. However, IDEM may require compliance testing when necessary to determine if the facility is in compliance. If testing is required by IDEM, compliance with the PM limit specified in Conditions D.6.1 and D.6.2 shall be determined by a performance test conducted in accordance with Section C - Performance Testing.

Record Keeping and Reporting Requirements

D.6.6 Record Keeping Requirement

(a) To document compliance with Conditions D.6.1 and D.6.3, the Permittee shall maintain records of the amount of raw materials (process weight), paint, solvent, weld sticks, abrasives, etc. Records shall include purchase orders, invoices. Records maintained shall be taken monthly and shall be complete.

(b) These records shall be maintained in accordance with Section C - General Record Keeping Requirements of the issued Part 70 permit.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR MANAGEMENT
COMPLIANCE DATA SECTION

Quarterly Report

Source Name: AM General Corporation
Source Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
Mailing Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
PSD/Significant Major Modification: 141-11673-00031
Facility: Vehicle (HUMMER II) production
Parameter: VOC
Limits: 86,000 vehicles per 12-consecutive month period, rolled on a monthly basis. Daily maximum production shall not exceed 364 vehicles.

During the first twelve (12) months of operation, the vehicle shall be limited such that the total vehicle produced divided by the accumulated months of operation shall not exceed 86,000 vehicles per year divided by twelve (12) months, which equals an average of 7,166 vehicles per month, rolled on a monthly basis.

Month _____ **Year** _____

Day	Vehicle Produced This Day	Day	Vehicle Produced This Day
1		17	
2		18	
3		19	
4		20	
5		21	
6		22	
7		23	
8		24	
9		25	
10		26	
11		27	
12		28	
13		29	
14		30	
15		31	
16			

Submitted by: _____ Signature: _____

Title/Position: _____ Date: : _____

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR MANAGEMENT
COMPLIANCE DATA SECTION

Quarterly Report

Source Name: AM General Corporation
Source Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
Mailing Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
PSD/Significant Major Modification: 141-11673-00031
Facility: Vehicle (HUMMER II) production
Parameter: VOC
Limits: 86,000 vehicles per 12-consecutive month period, rolled on a monthly basis.

During the first twelve (12) months of operation, the vehicle shall be limited such that the total vehicle produced divided by the accumulated months of operation shall not exceed 86,000 vehicles per year divided by twelve (12) months, which equals an average of 7,166 vehicles per month, rolled on a monthly basis.

The volatile organic material (VOC) usages, and natural gas usages from the HUMMER II plant shall be limited such that the summation of the VOC emissions from all facilities at this plant shall not exceed 260 tons per 12-month period, rolled on a monthly basis.

During the first twelve (12) months of operation, the volatile organic material (VOC) usages, and natural gas usages shall be limited such that the summation of the VOC emissions from all facilities at this HUMMER II plant divided by the accumulated months of operation shall not exceed 260 tons per year divided by twelve (12) months, which equals an average of 21.7 tons per month, rolled on a monthly basis.

YEAR _____

Month	Column 1		Column 2		Column 1 + 2	
	This Month Vehicle Production	This Month VOC Emissions in Tons	Previous 11 Months Vehicle Production	Previous 11 Months VOC Emissions in Tons	12 Month Total Vehicle Production	12 Month Total VOC Emissions in Tons

Note: This Report shall be submitted with a detailed VOC emissions calculations (spreadsheet) showing all the VOC usages and natural gas usages.

Submitted by: _____Signature:_____

Title/Position: _____Date: : _____

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR MANAGEMENT
COMPLIANCE DATA SECTION

Quarterly Report

Source Name: AM General Corporation
Source Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
Mailing Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
PSD/Significant Major Modification: 141-11673-00031
Facility: Vehicle (HUMMER II) production
Parameter: VOC
Limits: The VOC limits shall be based on a daily-volume- weighted average of the coatings used, and actual transfer efficiencies.

Facility/Operation	VOC Limit (lb of VOC/gallon applied solids (lb/gacs))
ELPO/E-Coat	0.04
Primer Surfacer/Guidecoat	2.9
Topcoat	5.3

Year _____

Month	ELPO/E-Coat VOC Emissions (lb/gacs)	Primer Surfacer/Guidecoat (lb/gacs)	Topcoat (lb/gacs)	Month	ELPO/E-Coat VOC Emissions (lb/gacs)	Primer Surfacer/Guidecoat (lb/gacs)	Topcoat (lb/gacs)
1				1			
2				2			
3				3			

Note: This Report shall be submitted with a detailed VOC emissions calculations (spreadsheet) showing all the coatings usages in each facility.

Submitted by: _____Signature:_____

Title/Position: _____Date: : _____

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR MANAGEMENT
COMPLIANCE DATA SECTION

Quarterly Report

Source Name: AM General Corporation
Source Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
Mailing Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
PSD/Significant Major Modification: 141-11673-00031
Facility: Vehicle (HUMMER II) production
Parameter: VOC
Limits: The VOC input usage from the Spot and Final Repair operation shall be limited to **less than 15 pounds per day** (lbs/day). This limit shall be based on daily-volume- weighted average.

Month _____ **Year** _____

Day	VOC Input Usage (lb/day)	Day	VOC Input Usage (lb/day)
1		17	
2		18	
3		19	
4		20	
5		21	
6		22	
7		23	
8		24	
9		25	
10		26	
11		27	
12		28	
13		29	
14		30	
15		31	
16			

Submitted by: _____Signature:_____

Title/Position: _____Date: : _____

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR MANAGEMENT
COMPLIANCE DATA SECTION

PART 70 SOURCE MODIFICATION CERTIFICATION

Source Name: AM General Corporation
Source Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
Mailing Address: 13200 McKinley Highway, Mishawaka, Indiana 46545
PSD/Significant Major Modification: 141-11673-00031

This certification shall be included when submitting monitoring, testing reports/results or other documents as required by this approval.

Please check what document is being certified:

9 Test Result (specify) _____

9 Report (specify) _____

9 Notification (specify) _____

9 Other (specify) _____

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

Signature:

Printed Name:

Title/Position:

Date:

Mail to: Permit Administration & Development Section
Office Of Air Management
100 North Senate Avenue
P. O. Box 6015
Indianapolis, Indiana 46206-6015

AM General Corporation
13200 McKinley Highway
Mishawaka, Indiana

Affidavit of Construction

I, _____, being duly sworn upon my oath, depose and say:
(Name of the Authorized Representative)

1. I live in _____ County, Indiana and being of sound mind and over twenty-one (21) years of age, I am competent to give this affidavit.

2. I hold the position of _____ for _____.
(Title) (Company Name)

3. By virtue of my position with _____,I have personal
(Company Name)
knowledge of the representations contained in this affidavit and am authorized to make these representations on behalf of _____ .
(Company Name)

4. I hereby certify that AM General Corporation, 13200 McKinley Highway, Mishawaka, Indiana, has constructed the following:

(a) Changes to the existing HUMMER I plant:

(1) Relocation of the current sanding, masking, painting and final trim operation from the Armour Building to the existing main plant;

(2) Exterior painting of the existing HUMMER I vehicle to be performed either in the existing plant or in the proposed new paint shop;

(b) New HUMMER II Vehicle production plant:

(1) Two (2) natural-gas-fired low NOx boilers (Categories #1 & #2), identified as boiler #1 and boiler #2, each has a heat input capacity of 25 million British Thermal Units per hour (mmBtu/hr);

(2) Miscellaneous natural gas-fired low NOx process ovens and various heaters, with a total heat input of 109 mmBtu/hr, and low NOx Thermal Oxidizer with a total heat input of 9.7 mmBtu/hr;

(3) Body Shop - This is where the first major step of the assembly process will be performed, metal body components of the HUMMER II vehicle (i.e. door, deck lid, hood, roof, and side panels and frame) will be supplied by off-site contractors. Various types of welding, resistance spot welding, metal grinding/brazing will be performed;

(4) Painting Operations for the HUMMER I and HUMMER II:

(a) Electrodeposition dip prime process (ELPO) (Category #3) - Pre-clean wash, using a mixture of water and water reducible detergents and Phosphate application. These cleaners are applied to the vehicle surface using a combination of spray nozzles and/or dip tanks, to remove oils and grease that may have accumulated on the vehicle parts.

The prime coating system (ELPO), which follows the phosphate cleaning will utilized waterborne coatings made up of a mixture of resins, pigments and water. The coated vehicle will then enter the ELPO/E-coat drying oven.

The VOC and HAPs emissions from the ELPO will be controlled by a Regenerative

Thermal Oxidizer.

(b) Primer Surfacer/Guidecoat (Category #4) - Body sealers and/or fillers, prep operation which involves scuff sanding and manual wiping using solvent and tack cloths to remove particles, then to antichip booth, then to primer surfacer booth where the exterior will be painted and primer surfacer drying oven. The coating will be manually applied or will use automatic spray systems.

The VOC and HAPs emissions from the Primer Surfacer/Guidecoat automatic zones and from the curing oven will be controlled by a Regenerative Thermal Oxidizer. The PM overspray will be controlled by a wet scrubber.

(c) Topcoat System (Category #5) - This system will consists of a preparation area, which involves minor scuffing and manual wiping using solvent and tack cloths to remove particles and/or otherwise prepare the surface for painting, basecoat spray booth, clearcoat spray booth, flash-off area and natural gas-fired drying oven, repair/polish. The coating will be applied to the vehicle parts using various types of spray applicators.

The VOC and HAPs emissions from the basecoat/clearcoat automatic spray application zones and from the curing oven of the topcoat system will be controlled by a Regenerative Thermal Oxidizer. The PM overspray will be controlled by a wet scrubber.

(d) Deadener Spray Booth (Category #6) - After the topcoat a deadener material will be sprayed to the wheel wells to reduce the amount of noise passengers hear while in the vehicle. The deadener material will be air dried. The PM overspray from this system will be controlled by a wet scrubber or dry filters.

(e) Vehicle Fluid Filling (Category #7) - Where gasoline, diesel, antifreeze, transmission fluid, windshield washer fluid, power steering fluid, brake fluid, engine oil, will be filled into the vehicles.

(f) Final and Spot Repair (Category #8) - This includes, off-line spot and final repair. The PM overspray from this system will be controlled by dry filters.

(g) Assembly Final Line (Category #9) - After the paint shop, the painted vehicle components are routed to general assembly. General assembly consists of interior and exterior trim components and glass installation, chassis, wheel/tires, powertrain and final line assembly operations. The Vehicle start-up and roll test verifies if powertrain is installed correctly.

(h) Miscellaneous Solvent Purge Usage and Cleanup (Category #10) - Solvents will be used in the body shop, paint shop, oven cleaning, general assembly areas and routine housekeeping. In the paint shop the purge material is reclaimed internally or externally to the spray application equipment.

(i) Miscellaneous Sealers and Adhesives (Category #11) - Various sealers and adhesives will be used throughput the assembly process. Majority of these sealers and adhesives will be used in the paint shop. A special sealant will be used in the vehicle glass installation. These materials will be either air-dried or oven cured.

(j) Bulk Storage Tanks (Category #12) - Submerged fill pipes, and conservation vents on these tanks to further minimize VOC and HAPs emissions. Stage I vapor controls will also be installed where appropriate.

Tank ID No.	Storage Capacity (gallons)	Location	Material Stored
1	12,000	New Bulk Tank Farm	Unleaded Gasoline
2	12,000	New Bulk Tank Farm	Antifreeze
3	12,000	New Bulk Tank Farm	Transmission Fluid
4	12,000	New Bulk Tank Farm	Diesel Fluid
5	12,000	New Bulk Tank Farm	Purge Thinner
6	12,000	New Bulk Tank Farm	Windshield Washer
7	12,000	New Bulk Tank Farm	Power Steering Fluid
8	12,000	New Bulk Tank Farm	Waste Paint/Thinner
9	12,000	New Bulk Tank Farm	Engine oil

in conformity with the requirements and intent of the construction permit application received by the Office of Air Management on (? date) and as permitted pursuant to **PSD/Significant Source Modification 141-11673-00031** issued on _____

5. Additional (?operations/facilities) were constructed/substituted as described in the attachment to this document and were not made in accordance with the construction permit. (Delete this statement if it does not apply.)

6. AM General has been issued a Part 70 permit (T 141-6023-00031) on February 25, 1999.

Further Affiant said not.

I affirm under penalties of perjury that the representations contained in this affidavit are true, to the best of my information and belief.

_____
Signature

_____
Date

STATE OF INDIANA)
)SS

COUNTY OF _____)

Subscribed and sworn to me, a notary public in and for _____ County and State of Indiana on this _____ day of _____, 20 _____ .

My Commission expires: _____

_____
Signature

_____
Name (typed or printed)

Indiana Department of Environmental Management
Office of Air Management

Technical Support Document (TSD) for a PSD and Part 70 Significant Source Modification

Source Background and Description

Source Name:	AM General Corporation
Source Location:	13200 McKinley Highway, Mishawaka, Indiana 46545
County:	St. Joseph
SIC Code:	3711
Operation Permit No.:	T141-6023-00031
Operation Permit Issuance Date:	February 25, 1999
PSD/Significant Source Modification No.:	141-11673-00031
Permit Reviewer:	Aida De Guzman

The Office of Air Management (OAM) has reviewed a modification application from AM General Corporation relating to the construction of the following emission units and pollution control devices, used for the HUMMER II vehicle production, which has a total capacity of 92,000 vehicles per year. This also includes some changes to the existing HUMMER I plant :

(a) Changes to the existing HUMMER I plant:

(1) Relocation of the current sanding, masking, painting and final trim operation from the Armour Building to the existing main plant;

(2) Exterior painting of the existing HUMMER I vehicle to be performed in either the existing plant or in the proposed new paint shop;

(b) New HUMMER II Vehicle production plant:

(1) Miscellaneous natural gas-fired low NOx process ovens and various heaters (Category #1), with a total heat input of 109 mmBtu/hr, and low NOx Thermal Oxidizer with a total heat input of 9.7 mmBtu/hr;

(2) Two (2) natural-gas-fired low NOx boilers (Category #2), identified as boiler #1 and boiler #2, each has a heat input capacity of 25 million British Thermal Units per hour (mmBtu/hr);

(3) Body Shop - This is where the first major step of the assembly process will be performed, metal body components of the HUMMER II vehicle (i.e. door, deck lid, hood, roof, and side panels and frame) will be supplied by off-site contractors. Various types of welding, resistance spot welding, metal grinding/brazing will be performed;

(4) Painting Operations for the HUMMER I and HUMMER II:

(a) Electrodeposition dip prime process (ELPO) (Category #3) - Pre-clean wash, using a mixture of water and water reducible detergents and Phosphate application. These cleaners are applied to the vehicle surface using a combination of spray nozzles and/or dip tanks, to remove oils and grease that may have accumulated on the vehicle parts.

The prime coating system (ELPO), which follows the phosphate cleaning will utilized waterborne coatings made up of a mixture of resins, pigments and water. The coated vehicle will then enter the ELPO/E-coat drying oven.

The VOC and HAPs emissions from the ELPO/E-coat will be controlled by a Regenerative Thermal Oxidizer.

(b) Primer Surfacer/Guidecoat (Category #4) - Body sealers and/or fillers, prep operation which involves scuff sanding and manual wiping using solvent and tack cloths to remove particles, then to antichip booth, then to primer surfacer booth where the exterior will be painted and primer surfacer drying oven. The coating will be manually applied or will use automatic spray systems.

The VOC and HAPs emissions from the Primer Surfacer/Guidecoat automatic zones and from the curing oven will be controlled by a Regenerative Thermal Oxidizer. The PM overspray will be controlled by a wet scrubber.

(c) Topcoat System (Category #5) - This system will consists of a preparation area, which involves minor scuffing and manual wiping using solvent and tack cloths to remove particles and/or otherwise prepare the surface for painting, basecoat spray booth, clearcoat spray booth, flash-off area and natural gas-fired drying oven, repair/polish. The coating will be applied to the vehicle parts using various types of spray applicators.

The VOC and HAPs emissions from the basecoat/clearcoat automatic spray application zones and from the curing oven of the topcoat system will be controlled by a Regenerative Thermal Oxidizer. The PM overspray will be controlled by a wet scrubber.

(d) Deadener Spray Booth (Category #6)- After the Topcoat a deadener material will be sprayed to the wheel wells to reduce the amount of noise passengers hear while in the vehicle. The deadener material will be air dried. The PM overspray from this system will be controlled by a wet scrubber or dry filters.

(e) Vehicle Fluid Filling (Category #7) - Where gasoline, diesel, antifreeze, transmission fluid, windshield washer fluid, power steering fluid, brake fluid, engine oil, are filled into the vehicles.

(f) Final and Spot Repair (Category #8) - This includes, off-line spot and final vehicle. The PM overspray from this system will be controlled by dry filters.

(g) Assembly Final Line (Category #9) After the paint shop, the painted vehicle components are routed to general assembly. General assembly consists of interior and exterior trim components and glass installation, chassis, wheel/tires, powertrain and final line assembly operations. The Vehicle start-up and roll test verifies if powertrain is installed correctly.

(h) Miscellaneous Solvent, Purge Usage and Cleanup (Category #10) - Solvents will be used in the body shop, paint shop, oven cleaning, general assembly areas and routine housekeeping. In the paint shop the purge material is reclaimed internally or externally to the spray application equipment.

(i) Miscellaneous Sealers and Adhesives (Category #11) - Various sealers and adhesives will be used throughput the assembly process. Majority of these sealers and adhesives will be used in the paint shop. A special sealant will be used in the vehicle glass installation. These materials will be either air-dried or oven cured.

(j) Bulk Storage Tanks (Category #12) - Submerged fill pipes, and conservation vents on these tanks to further minimize VOC and HAPs emissions. Stage I vapor controls will also be installed where appropriate.

Tank ID No.	Storage Capacity (gallons)	Location	Material Stored
1	12,000	New Bulk Tank Farm	Unleaded Gasoline
2	12,000	New Bulk Tank Farm	Antifreeze
3	12,000	New Bulk Tank Farm	Transmission Fluid
4	12,000	New Bulk Tank Farm	Diesel Fluid
5	12,000	New Bulk Tank Farm	Purge Thinner
6	12,000	New Bulk Tank Farm	Windshield Washer
7	12,000	New Bulk Tank Farm	Power Steering Fluid
8	12,000	New Bulk Tank Farm	Waste Paint/Thinner
9	12,000	New Bulk Tank Farm	Engine Oil

	AIR POLLUTION CONTROL SUMMARY	
CATEGORY	OPERATION	CONTROL EQUIPMENT/TECHNOLOGY
1	Miscellaneous natural gas-fired process ovens, heaters and control equipment (RTO)	Low NOx Burners
2	Two Boilers	Low NOx Burners
3	- Electrodeposition dip prime, E-Coat process (ELPO) - E-Coat Oven	Regenerative Thermal Oxidizer (RTO)
4	- Primer Surfacer/Guidecoat Spray System - Primer Surfacer/Guidecoat Drying Oven	Regenerative Thermal Oxidizer for VOC and HAP control (paint automatic applicator sections only). Wet Scrubber for PM overspray.
5	- Topcoat Spray System - Topcoat Drying Oven	Regenerative Thermal Oxidizer (paint automatic applicator sections only). Wet Scrubber for PM overspray.
10	- Miscellaneous Solvent Booth Cleanup and Purge Usage	Regenerative Thermal Oxidizer (automatic paint applicator lines purging only)
12	Bulk Storage Tanks	Submerged fill pipes, conservation vents, and Stage I vapor controls.

Insignificant Activities

General List of Trivial/Insignificant Activities	
(a)	Production of hot water for on-site personal use not related to any industrial or production process.
(b)	Portable electrical generators that can be moved by hand from one location to another.
(c)	Ventilation exhaust, central chiller water systems, refrigeration and air conditioning equipment, not related to any industrial or production process, including natural draft hoods or ventilating systems that do not remove air pollutants.
(d)	Air vents from air compressors.
(e)	Fuel use related to food preparation for on-site consumption.

(f)	Activities performed using hand-held equipment including the following: - Application of hot melt adhesives with no VOC in the adhesive formulation - Drilling - Surface grinding - Routing - Grinding - Sanding - Machining wood, metal or plastic - Sawing - Polishing - Turning wood, metal or plastic
(g)	Activities related to routine fabrication, maintenance and repair of buildings, structures, equipment or vehicles at the source where air emissions from those activities would not be associated with any commercial production process including the following: - Activities associated with the repair and maintenance of paved and unpaved roads, including paving or sealing, or both of parking lots and roadways. - Painting, including interior and exterior paintings or buildings, and solvent use, excluding degreasing operations utilizing halogenated organic solvents. - Brazing, soldering, or welding operations and associated equipment. - Batteries and battery charging stations, except at battery manufacturing plants. - Lubrications, including hand-held spray can lubrication, dipping metal parts into lubricating oil, and manual or automated addtion of cutting oil in machining operations.
(h)	Office related including the following: - Office supplies and equipment. - Photocopying equipment and associated supplies. - Paper shredding. - Blueprint machines, photographic equipment, and associated supplies.
(i)	Lawn care and landscape maintenance activities and equipment, including the storage, spraying, or application of insecticides, pesticides, and herbicides.
(j)	Storage equipment and activities including: - Pressurized storage tanks and associated piping for anhydrous ammonia, acetylene, carbon monoxide, chlorine, inorganic compounds, liquid natural gas (LNG)(Propane), liquid petroleum gas (LPG), natural gas, nitrogen dioxide and sulfur dioxide. - Storage tanks, vessels, and containers holding or storing liquid substances that do not contain any VOC or HAP. - Storage tanks, reservoirs, and pumping and handling equipment of any size containing soap, wax, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions provided appropriate lids and covers are utilized. - Storage of drums containing maintenance raw materials. - Storage of castings, Lance rods, or any non-HAP containing material in solid form stored in a sealed or covered container.
(k)	Emergency and standby equipment including: - Safety and emergency equipment, except engine driven fire pumps, including fire suppression systems and emergency road flares. - Vacuum producing devices for the purpose of removing potential accidental releases

(l)	Activities associated with production including the following: - Closed, non-vented, tumblers used for cleaning or deburring metal products without abrasive blasting. - Electrical resistance welding. - Application equipment for hot melt adhesives with no VOC in the adhesive formulation. - Compressor or pump lubrication and seal oil systems. - Equipment used to mix and package soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized. - Equipment for washing or drying fabricated glass or metal products, if no VOCs or HAPs are used in the process, and no gas, oil, or solid fuel is burned.
(m)	Miscellaneous equipment, but not emissions associated with the process for which the equipment is used, and activities including the following: - Equipment used for surface coating, painting, dipping or spraying operations, except those that will emit VOCs and HAPs. - Electric or steam heated drying ovens and autoclaves, including only the heating emissions and not any associated process emissions. - Application equipment for hot melt adhesives with no VOC in the adhesive formulation.
(n)	A gasoline fuel transfer and dispensing operation handling less than or equal to 1,300 gallons per day, such as filling of tanks, locomotives, automobiles, having a storage capacity less than or equal to 10,500 gallons.
(o)	A petroleum fuel, other than gasoline dispensing facility , having a storage capacity of less than or equal to 10,500 gallons, and dispensing less than or equal to 230,000 gallons per month.
(p)	The following VOC and HAP storage containers: - Storage tanks with capacity less than 1,000 gallons and annual throughput less than 12,000 gallons. - Vessels storing lubricating oils, hydraulic oils, machining oils and machining fluids.
(q)	Application of oils, greases, lubricants or other nonvolatile materials applied as temporary protective coatings.
(r)	Machining where an aqueous cutting coolant continuously floods the machining interface.
(s)	Degreasing operations that do not exceed 145 gallons per 12 months, except if subject to 326 IAC 20-6.
(t)	Cleaners and solvents characterized as follows: - having a vapor pressure equal to or less than 2 kPa; 15 mmHg, or 0.3 psi measured at 38 degrees C (100 ^{0}F) or - having a vapor pressure equal to or less than 0.7 kPa; 5 mmHg; or 0.1 psi measured at 20 ^{0}C (68 ^{0}F). The usage for all cleaners and solvents combined does not exceed 145 gallons per 12 months
(u)	The following equipment related to manufacturing activities not resulting in the emissions of HAPs: brazing equipment, cutting torches, soldering equipment, welding equipment.
(v)	Closed loop heating and cooling systems.
(w)	Infrared cure equipment.
(x)	Exposure chambers for curing of ultraviolet inks and ultra-violet coatings where heat is the intended discharge.

(y)	Solvent recycling systems with bath capacity less than or equal to 100 gallons.
(z)	Activities associated with the treatment of wastewater streams with an oil and grease content less than or equal to 1% by volume.
(aa)	Water based adhesives that are less than or equal to 5% by volume of VOCs excluding HAPs.
(bb)	Non-contact cooling tower systems with either of the following: - Natural draft cooling towers not regulated under a NESHAP - Forced and induced draft cooling tower system not regulated under a NESHAP.
(cc)	Heat exchanger cleaning and repair.
(dd)	Process vessel degassing and cleaning to prepare for internal repairs.
(ee)	Paved and unpaved roads and parking lots with public access
(ff)	Purging of gas lines and vessels that is related to routine maintenance and repair of buildings, structures, or vehicles at the source where air emissions from those activities would not be associated with any production process.
(gg)	Equipment used to collect any material that might be released during a malfunction, process upset, or spill cleanup, including catch tanks, temporary liquid separators tank and fluid handling equipment.
(hh)	Emergency generators as follows: Gasoline generators not exceeding 110 horsepower, diesel generators not exceeding 1,600 horsepower, natural gas turbines or reciprocating engines not exceeding 16,000 horsepower.
(ii)	Grinding and machining operations controlled with fabric filters, scrubbers, mist collectors, wet collectors and electrostatic precipitators with a design grain loading of less than or equal to 0.03 grains per actual cubic foot and a gas flow rate less than or equal to 4000 actual cubic feet per minute, including the following: - Deburring - Buffing - Polishing - Pneumatic conveying - Woodworking operations - Abrasive blasting
(jj)	Space heaters, process heaters, or boilers using the following fuels: - Natural gas-fired combustion sources with heat input equal to or less than ten million (10,000,000) Btu per hour. - Propane or liquified petroleum gas, or butane-fired combustion sources with heat input equal to or less than six million (6,000,000) Btu per hour. - Fuel oil-fired combustion sources with heat input equal to or less than two million (2,000,000) Btu per hour and firing fuel containing less than five-tenths (0.5) percent sulfur by weight.

Plant Specific Trivial / Insignificant Activities	
(a)	Sludge room water treatment (Emissions accounted for in the emission determinations at each respective source)
(b)	Sludge room (Emissions accounted for in the emission determinations at each respective source)
(c)	Laboratories

(d)	Print/Copy shops
(e)	Wet/dry sanding booths
(f)	Open metal grinding - Performed in the body shop
(g)	Resistance Welding - Majority of welding operations performed in the body shop
(h)	Property Maintenance - Landscaping, paving, roofing, and painting
(i)	Material Storage
(j)	Paint Mix Rooms (Emissions accounted for in the emission determinations at each respective source)
(k)	Non-VOC parts washing.
(l)	Equipment maintenance lube/degreaser.
(m)	Vehicle washers prior to shipping.
(n)	Vehicle fluid fill operations: - Engine oil - Windshield fluid - Engine coolant - Brake fluid - Air conditioning refrigerant - Power steering fluid
(o)	Storage tanks for brake fluid, gear oil and engine oil.
(p)	Engine sub-assembly line - Assembly of engine components.
(q)	Radiator sub-assembly line - Assembly of radiator components.
(r)	Trim assembly line - Installation of various interior/exterior vehicle components.
(s)	Paint pump repair shop.
(t)	Leak test areas.
(u)	Pre-washers.
(v)	Spot sanding and painting.
(w)	Phosphate system.
(x)	Masking and polishing areas.
(y)	Turbo blower - Power blowing of vehicle.
(z)	Dolly touch-up.
(aa)	Dolly cleaning (water blast) - Cleaning of vehicle carrier.
(bb)	Inspection and audit areas.
(cc)	Emergency generators less than 1600 hp and fire pumps.

History

On December 15, 1999 AM General Corporation submitted an application to the OAM requesting to add additional process operations, including VOC control units to their existing plant for the production of the HUMMER II vehicle. AM General Corporation was issued a Part 70 permit, T141-6023-00031 on February 25, 1999.

Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (^{0}F)
1	Phosphate System	65	1.25	3,600	70
2	Phosphate System	65	1.25	3,600	70
3	E-coat	65	1.25	3,600	70
4	E-coat	65	1.25	3,600	70
5	E-coat oven	65	1.58	5,778	350
6	E-coat oven	65	1.58	5,778	350
7	E-coat cooling	65	4	37,360	90
8	E-coat cooling	65	4	37,360	90
9	Scuff	65	3.5	30,000	70
10	Scuff	65	3.5	30,000	70
11	Tack-off	65	3.4	27,000	70
12	Anti-chip	65	3.58	30,000	70
13	Prime-manual	65	3.16	25,000	70
14	Prime-manual	65	3.16	25,000	70
15	Prime-Auto to RTO				
	Prime-Auto-recirculation				
16	Prime-oven to RTO				
17	Prime-oven to RTO				
18	Prime-cooling	65	4	37,019	85
19	Prime-cooling	65	4	37,019	85
20	Prime-repairs	65	3.33	27,000	70
21	Prime blow-off	65	3.16	20,250	70
22	Scuff	65	3.08	22,500	70
23	Scuff	65	3.08	22,500	70
24	Feather duster	65	3	21,000	70
25	Feather duster	65	3	21,000	70
26	Base manual	65	4.33	45,000	70
27	Base-auto to RTO				

28	Observation	65	3.7	30,000	70
29	Clear-manual	65	4.16	40,000	70
30	Clear-auto to RTO				
	Clear-auto recirculation				
31	Observation	65	3.7	30,000	70
32	Clear-oven to RTO				33
33	Clear-auto to RTO				
34	Clear-cooling	65	4.33	43,189	85
35	Clear-cooling	65	4.33	43,189	85
36	Spot repair	80	4	40,000	70
37	Spot repair	80	4	40,000	70
38	Spot repair	80	4	40,000	70
39	Major repair	80	3.08	22,500	70
40	Major repair	80	3.08	22,500	70
41	Polish encl.	80	2.9	20,250	70
42	Polish encl.	80	2.9	20,250	70
43	Boiler room	65	3	14,000	300
44	Paint sludge	65	1.7	5,333	70
45	Paint mix room	65	2	8,000	70
46	Paint storage	65	1.5	4,800	70
47	Carrier cleaner	65	2.9	19,000	70
48	RTO Regenerative Thermal oxidizer	65	6	86,520	277

Recommendation

The staff recommends to the Commissioner that the PSD/Part 70 Significant Source Modification be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on December 15, 1999. Additional information via letter was received on February 1, and 16, 2000. Additional information via e-mail was received on February 10, 2000.

Emission Calculations

(a) Plantwide Natural Gas-Fired Combustion Emissions (Category #1): See Page 1 of 11 TSD Appendix A for detailed emissions calculation.

(b) Natural Gas-Fired Boilers Emissions (Category #2): See Page 2 of 11 TSD Appendix A for detailed emission calculation.

(c) ELPO (E-Coat) System Emissions (Category #3): See Page 3 of 11 TSD Appendix A for detailed emissions calculation.

(d) Primer Surfacer System Emissions (Category #4): See Page 4 of 11 TSD Appendix A for detailed emissions calculation.

(e) Topcoat System Emissions (Category #5): See Page 5 of 11 TSD Appendix A for detailed emissions calculation.

(f) Deadener System Emissions (Category #6): See Page 6 of 11 TSD Appendix A for detailed emissions calculation.

(g) Vehicle Fluid Fill Operation Emissions (Category #7): See 18 pages (1 of 23 through 18 of 23) Appendix B: Emissions Calculations.

(h) Final and Spot Repair Emissions (Category #8): See Page 7 of 11 TSD Appendix A for detailed emissions calculation.

(i) Vehicle Startup and Roll Test Operations Emissions (Category #9): See 6 pages (1 of 19 through 23 of 23) Appendix B: Emissions Calculations..

(j) Miscellaneous Solvent, Booth Cleanup and Purge Emissions (Category #10): See Page 9 of 11 TSD Appendix A for detailed emissions calculation.

(k) Miscellaneous Sealers and Adhesives Emissions (Category #11) See Page 10 of 11 TSD Appendix A for detailed emissions calculation.

(l) Storage Tanks Emissions Calculations: See Tanks Program 4.0 Spreadsheet for detailed emissions calculation.

(m) HAPs Emissions: See Page 8 of 11 TSD Appendix A for detailed calculations.

(n) Demonstration of Compliance with 326 IAC 8-1-2: See page 11 of 11 TSD Appendix A for detailed calculations.

SUMMARY OF EMISSIONS (TONS/YEAR)												
Facility/Process	PM Emissions	Controlled PM Emissions	PM 10 Emissions	Controlled PM10 Emissions	VOC Emissions	Controlled VOC Emissions	NOx Emissions	Controlled NOx Emissions	CO Emissions	Controlled CO Emissions	SO2 Emissions	Controlled SO2 Emisisons
Category #1 Process Ovens, Heaters, and Control Units	1.0	1.0	3.9	3.9	2.8	2.8	26.0	26.0	43.7	43.7	0.3	0.3
Category #2 Boilers	0.4	0.4	1.6	1.6	1.2	1.2	11.0	11.0	18.4	18.4	0.2	0.2
Category #3 E-Coat System	0.0	0.0	0.0	0.0	10.68	0.534	0.0	0.0	0.0	0.0	0.0	0.0
Category #4 Primer Surfacer System	167.26	2.0	167.26	2.0	229.8	62.0	0.0	0.0	0.0	0.0	0.0	0.0
Category #5 Topcoat System	180.4	4.4	180.4	4.4	745.28	221.0	0.0	0.0	0.0	0.0	0.0	0.0
Category #6 Deadener	139.45	1.4	139.45	1.4	6.64	6.64	0.0	0.0	0.0	0.0	0.0	0.0
Category #7 Vehicle Fluid Filling	0.0	0.0	0.0	0.0	4.32	4.32	0.0	0.0	0.0	0.0	0.0	0.0
Category #8 Final and Spot Repair	5.59	0.31	5.59	0.31	35.04	35.04	0.0	0.0	0.0	0.0	0.0	0.0
Category #9 Assembly Final Line (Start-Up & Roll Test)	0.46	0.46	0.46	0.46	0.32	0.32	0.79	0.79	2.32	2.32	0.0	0.0
Category #10 Miscellaneous Solvent, Booth Cleanup and Purge	0.0	0.0	0.0	0.0	55.4	36.0	0.0	0.0	0.0	0.0	0.0	0.0
Category #11 Miscellaneous Sealers and Adhesives	0.0	0.0	0.0	0.0	45.0	45.0	0.0	0.0	0.0	0.0	0.0	0.0
Category #12 Bulk Storage Tanks	0.0	0.0	0.0	0.0	5.8	5.8	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	494.6	9.97	498.7	14.07	1,142.3	420.6	37.8	37.8	64.42	64.42	0.5	0.5

Potential To Emit of Modification

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA."

This table reflects the PTE before controls. Control equipment is not considered federally enforceable until it has been required in a federally enforceable permit.

Pollutant	Potential To Emit (tons/year)
PM	494.6
PM-10	498.7
SO_2	0.5
VOC	1,142.3
CO	64.42
NO_x	37.8

HAP's	Potential To Emit (tons/year)
Xylene	538.9
Toluene	100.65
MIK	252.92
Ethyl Benzene	82.46
Cumene	30.73
Ethylene Glycol	3.0
MEK	0.75
Phthalic Anhydride	92.4
Formaldehyde	0.7
MDI	0.03
TOTAL	1,102.5

Justification for Modification

The Part 70 Operating permit is being modified through PSD/Part 70 Significant Source Modification. This modification is being performed pursuant to 326 IAC 2-7-10.5(f), for any modification that would be subject to 326 IAC 2-2, Prevention of Significant Deterioration.

County Attainment Status

The source is located in St Joseph County.

Pollutant	Status (attainment, maintenance attainment, or unclassifiable; severe, moderate, or marginal nonattainment)
PM-10	attainment
SO_2	attainment
NO_2	attainment
Ozone	attainment
CO	attainment
Lead	not determined

(a) Volatile organic compounds (VOC) and oxides of nitrogen (NOx) are precursors for the formation of ozone. Therefore, VOC and NO_X emissions are considered when evaluating the rule applicability relating to the ozone standards. St. Joseph County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and NOx emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

(b) St. Joseph County has been classified as attainment or unclassifiable for all the other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

Source Status

Existing Source PSD Definition (emissions after controls, based upon 8760 hours of operation per year at rated capacity and/or as otherwise limited):

Pollutant	Emissions (tons/year)
PM	48
PM-10	28
SO_2	0.0
VOC	440
CO	0.0
NOx	0.0

This existing source is a major stationary source because an attainment regulated pollutant is emitted at a rate of 250 tons per year or more, and it is not one of the 28 listed source categories.

Potential to Emit of Modification After Issuance

The table below summarizes the potential to emit, reflecting all limits, of the significant emission units after controls. The control equipment is considered federally enforceable only after issuance of this Part 70 source modification.

Potential To Emit (TONS/YEAR)								
Facility/Process	PM Emissions	PM10 Emissions	VOC Emissions		NOx Emissions	CO Emissions	SO2 Emissions	HAPs
		Controlled	Controlled	Limit				Controlled
Category #1 Process Ovens, Heaters, and Control Units	1.0	3.9	2.8	2.8	26.0	43.7	0.3	0.0
Category #2 Boilers	0.4	1.6	1.2	1.2	11.0	18.4	0.2	0.0
Category #3 E-Coat System	0.0	0.0	0.534	0.534	0.0	0.0	0.0	0.0
Category #4 Primer Surfacer System	2.0	2.0	62.0	38.0	0.0	0.0	0.0	37.36

Category #5 Topcoat System	4.4	4.4	221.0	136.6	0.0	0.0	0.0	39.92
Category #6 Deadener	1.4	1.4	6.64	6.60	0.0	0.0	0.0	0.79
Category #7 Vehicle Fluid Filling	0.0	0.0	4.32	4.32	0.0	0.0	0.0	0.0
Category #8 Final and Spot Repair	0.31	0.31	35.04	2.7	0.0	0.0	0.0	11.67
Category #9 Assembly Final Line (Start-Up & Roll Test)	0.46	0.46	0.32	0.32	0.79	2.32	0.0	0.0
Category #10 Miscellaneous Solvent, Booth Cleanup and Purge	0.0	0.0	36.0	36.0	0.0	0.0	0.0	190.5
Category #11 Miscellaneous Sealers and Adhesives	0.0	0.0	45.0	28.0	0.0	0.0	0.0	197.4
Windshield Installation								
Category #12 Bulk Storage Tanks	0.0	0.0	5.8	3.6	0.0	0.0	0.0	0.0
TOTAL	9.97	14.07	420.6	260.7	37.8	64.42	0.5	484.55

This modification to an existing major stationary source is major because the VOC emission increase is greater than the PSD significant level of 40 tons per year. Therefore, pursuant to 326 IAC 2-2, and 40 CFR 52.21, the PSD requirements do apply.

Federal Rule Applicability

(a) New Source Performance Standards (NSPS) 326 IAC 12 and 40 CFR Part 60:

(1) 40 CFR § 60.390, Subpart MM - Standards of Performance for Automobile and Light Duty Truck Surface Coating Operations. This rule applies to each prime coat operation, each guide coat operation and each topcoat operation in an automobile and light duty truck assembly plant.

This rule is not applicable to the prime coat operation, guide coat operation and topcoat operation of AM General, because the HUMMER II vehicles being manufactured by the source do not meet the definition of light duty trucks, because HUMMER II are heavier than the 3,850 kilograms (kg) (8,480 lbs).

(2) 40 CFR § 60.40c, Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. This rule applies to each steam generating unit for which construction, reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 100 million British Thermal Units per hour (mmBtu/hr) or less, but greater than 10 mmBtu/hr.

The proposed two (2) 25 mmBtu/hr boilers #1 and #2 are subject to the § 60.48 Subsections (a), (g) and (i) of this NSPS.

(a) Under Subsection (a) of § 60.48, the owner/operator of the two (2) boilers shall submit notification of the date of construction, or reconstruction, anticipated startup and actual startup as provided by § 60.7 of this part. The notification shall include:

(1) The design heat input capacity of the two (2) boilers and identification of the fuel to be combusted; and

(2) the annual capacity factor at which the owner/operator anticipates operating the two (2) boilers, based on all fuels fired and based on individual fuel fired.

(b) Under Subsection (g) § 60.48, the owner/operator of the two (2) boilers shall maintain records of the amounts of fuel combusted during each month.

(c) Under Subsection (i) § 60.48, all records required in this Section shall be maintained by the owner or operator of the two (2) boilers for a period of two (2) years following the date of such record.

(3) 40 CFR § 60.110b, Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which construction, reconstruction or modification commenced after July 23, 1984.

The following storage vessels are subject to this NSPS:

Tank ID No.	Storage Capacity (gallons)	Location	Material Stored
1	12,000	New Bulk Tank Farm	Unleaded Gasoline
2	12,000	New Bulk Tank Farm	Antifreeze
3	12,000	New Bulk Tank Farm	Transmission Fluid
4	12,000	New Bulk Tank Farm	Diesel Fluid
5	12,000	New Bulk Tank Farm	Purge Thinner
6	12,000	New Bulk Tank Farm	Windshield Washer
7	12,000	New Bulk Tank Farm	Power Steering Fluid
8	12,000	New Bulk Tank Farm	Waste Paint/Thinner
9	12,000	New Bulk Tank Farm	Engine Oil

The above tanks with capacities less than 75 m^3 (19,813 gallons) are subject to the “Monitoring of Operation” requirement of Part 60.116b(a) and (b).

Section (b) requires the owner or operator of these storage vessels to keep readily accessible records showing the dimension of the storage vessel and an analysis showing the capacity of the storage vessel.

Section (a) requires the owner or operator of these storage vessels to keep copies of the records required in Section (b) for the life of the source.

(4) There are no other New Source Performance Standards (NSPS)(326 IAC 12 and 40 CFR Part 60) applicable to this proposed modification.

(b) National Emission Standards for Hazardous Air Pollutants (NESHAPs)(326 IAC 14 and 40 CFR Part 63)

40 CFR Part 63.460, Subpart T - National Standards for Halogenated Solvent Cleaning. The degreasing operation under Section D.6 of the insignificant activities will not be subject to the NESHAP, because no halogenated HAP solvent will be used by this operation.

No other NESHAPs will possibly be applicable to this Hummer II plant.

PSD Rule Requirements

(a) 326 IAC 2-2 (Prevention of Significant Deterioration (PSD)) and 40 CFR 52.21:
The requirements of this rule shall apply to AM General Corporation HUMMER II vehicle production plant, which is a modification to the existing major source. The HUMMER II vehicle production plant will emit greater than 40 tons per year of VOC.

(b) 326 IAC 2-2-3 (PSD Rule: Best Available Control Technology (BACT):
Pursuant to 326 IAC 2-2-3(a)(3), a major PSD modification shall apply Best Available Control Technology (BACT) for each pollutant subject to regulation under the provisions of the Clean Air Act for which said modification would result in a significant net emissions increase at the source. This requirement applies to each proposed emissions unit at which a net emissions increase of the pollutant would occur.

(1) The “BACT Analysis” submitted by AM General Corporation was based on the Draft “Top Down Approach: BACT Guidance” by USEPA, Office of Air Quality Planning Standards, March 15, 1990. The analysis includes the use of the following:

(a) BACT/RACT/LAER Information System; USEPA, BACT/RACT/LAER Clearinghouse 1990;
(b) Compilation of Control Technology: USEPA, BACT/RACT/LAER Clearinghouse 1990;
(c) EPA, State, and Local Air Quality Permits and Applications;
(d) Federal, State and Local Permit Engineers;
(e) Vendors/Suppliers; and
(f) OAQPS Control Cost Manual and Trade Journals

(2) AM General Corporation evaluated control technologies selected as BACT or LAER for the following recently permitted and operational Automotive and Light Duty Truck Assembly Plants:

(a) FORD - Louisville, Kentucky Plant (1995 - 1999)
(b) TOYOTA MOTOR MANUFACTURING - Princeton, Indiana Plant (1996)
(c) GMC - Lansing Craft Centre, Lansing, Michigan Plant (1999)
(d) GMC - Oklahoma City, Oklahoma Plant (1999)

(3) The BACT analysis submitted by AM General Corporation has been evaluated by IDEM, OAM. The OAM will require AM General to meet the BACT limit determined for the Topcoat System at the GMC - Oklahoma City, Oklahoma Plant, and the BACT limit determined for the ELPO System at the GMC - Lansing, Michigan. The OAM agrees with the rest of the BACT limits and control technologies chosen by AM General for the other significant process operations. The BACT established for AM General were based upon the Toyota, GMC, and Ford plants since they are the most recent permits issued for automobile and light duty truck assembly plants, and they are most stringent BACT established for this industry for the past ten (10) years.

PSD BACT Established For Some Automobile and light Duty Truck Manufacturing Plants As Compared to AM General Corporation

Company Name	Date of Permit Issued	ELPO (E-Coat) System (lb/gal applied coating solids (gacs))	Primer Surfacer (Guidecoat) System (lb/gal applied coating solids (gacs))	Topcoat System (lb/gal applied coating solids (gacs))	Control Technology
Proposed Modification to AM General Corporation	Proposed	0.04	2.9	5.3	Regenerative Thermal Oxidizer
Toyota Services of North America, Inc.- Route 41, Princeton, Indiana 47670	1996	0.22	2.37	8.2	Thermal Oxidizer
General Motors Corporation - Lansing Craft Centre, Lansing, Michigan	1999	0.04	9.8	11.7	Thermal Oxidizer
General Motors Corporation - Oklahoma City, Oklahoma	1999	0.13	- (powder coating)	5.3	Thermal Oxidizer
FORD - Louisville, Kentucky	1995-1999		7.17	7.06	Carbon Adsorption/Thermal Oxidizer
BMW Manufacturing Corp. - South Carolina	1997	0.22	0.5 (powder coating)	6.24	Thermal Oxidizer

The BACT Guidance states that EPA does not expect an applicant to necessarily accept an emission limit as BACT solely because it was required previously of a similar source. It does require however, that an applicant has to justify why a higher limit is appropriate for the specific source under review. The guidance further explains that where a control technology has been applied to only a very limited number of sources, the applicant has to identify those characteristics unique to those other sources that may have made the application of the control technology appropriate in those cases.

(a) Primer Surfacer System - GMC, Oklahoma City plant will use a powder coating system for the primer surfacer. AM General cannot use powder coating materials, because powder coating material has not been used for trucks like Hummer which requires a specific type of paint technology.

(b) Primer Surfacer System - BMW manufacturing Corp., South Carolina uses a powder coating system for the primer surfacer. AM General cannot use powder coating materials, because powder coating material has not been used for trucks like Hummer which requires a specific type of paint technology.

(c) Primer Surfacer System - AM General was advised to investigate and comply with the BACT limit of 2.37 lb/gacs for the Primer Surfacer/ Guidecoat demonstrated by Toyota Services of North America, Inc., Princeton, Indiana. Compliance from 2.9 lbs/gacs to 2.37 lb/gacs will only reduce the VOC emissions by approximately **4 tons per year**.

The primer surfacer system being proposed by AM General Corporation at the Mishawaka, Indiana plant is designed specifically to accommodate the Hummer vehicle. The vehicle has a totally different configuration from automobiles and trucks. Because of its configuration and intended use by the public, the paint system must meet specific requirements. These requirements which include appearance, as well as overall durability, will be achieved by using specific type of paint system (paint material and spray application equipment). Thus, the VOC content and volume solids of the coating material, as well as the transfer efficiencies are dedicated by the paint system and are not easily altered.

AM General proposed **booths recirculation** and **thermal oxidation** to control VOC emissions from the primer surfacer automatic spray application sections and the curing oven **is the technology being implemented by Toyota** and **other vehicle assembly plants** across the United States. The destruction efficiency of the thermal oxidizer proposed by AM General is even slightly higher than Toyota's thermal oxidizer, (see below table for comparison).

Toyota Services of North America, Inc., Princeton, Indiana		AM General Corporation	
(%) VOC Destruction Efficiency		(%) VOC Destruction Efficiency	
Primer Surfacer Sealer Ovens	95	Primer Surfacer/Guide coat System	95
Primer Surfacer Coat Booths *	80.75		
Primer Coat Ovens	95		

* Destruction efficiency is the combined system destruction efficiency of the thermal oxidizer in series with the carbon adsorber,

It is not technically feasible to recirculate the air from the booth's manual zone because of human exposure.

Since the VOC capture and destruction system being proposed by AM General's primer surfacer system will be essentially the same technology installed by Toyota, it is not feasible to conduct an incremental cost analysis for the 2.9 lbs/gacs versus the 2.37 lb/gacs.

SUMMARY OF BACT FOR VOC ESTABLISHED FOR THE HUMMER II VEHICLE PRODUCTION		
Operation	**BACT Limit**	**Control Technology**
Miscellaneous natural gas-fired process ovens and various heaters (Category #1)		Low NOx burners
Two (2) natural-gas-fired boilers, boiler #1 and boiler #2 (Category #2)		Low NOx burners
ELPO (E-Coat) System, (Category #3)	0.04 lb VOC/gal applied coating solids (lb/gacs)	Regenerative Thermal Oxidizer
Primer Surfacer (Guidecoat System (Category #4)	2.9 lb/gacs	Regenerative Thermal Oxidizer - Automatic zone only and Cure Oven
Topcoat System (Category #5)	5.3 lb/gacs	Regenerative Thermal Oxidizer - Automatic zone only and Cure Oven
Deadener Coating System (Category #6)		Low VOC coatings and High Efficiency Spray Applicators
Assembly Final Line -Fluid Filling (Category #7)		Good operating practices on the fluid line is (a) the use of stage 2 vapor recovery system (b) minimizing spills and (c) closing the receiving vessel after it has been filled.
Final and Spot Repair (Category #8)	Limited to 2.7 tons VOC emission per year	VOC material usage limit. Area not being painted is masked to prevent overspray, thus minimizing the use of clean-up solvent
Assembly Final Line ((Start-Up & Roll Test) (Category #9))		Good operating practices
Miscellaneous Solvent, Booth Cleanup and Purge (Category #10)		Capture spent solvents, use of low or zero VOC cleaners where applicable, use of paint booth and equipment masking, capturing of paint line solvent for recycling, and water blasting of vehicle carriers. The automatic paint applicator lines purging, paint booths stripper, paint booths mask and paint booths general cleaner (primer surfacer and topcoat) will be controlled by the Regenerative Thermal Oxidizer.
Miscellaneous Sealers and Adhesives (Category #11)	3.5 lb/gal less water	The use of materials with low VOC content.
Bulk Storage Tanks (Category #12)		The use of submerged fill pipes and pressure relief valves on the gasoline storage tank

Sourcewide PSD Limit	The HUMMER II plant production rate will be limited to 86,000 vehicles per year. Daily maximum production will be limited to 364 vehicles, and each vehicle produced will be limited to a VOC emissions of 6.0 pounds (6.0 lbs/veh The sourcewide VOC emissions will be limited to 260 tons per year	The source will be using a Regenerative Thermal Oxidizer, and other control technologies mentioned above to control the VOC emissions to 420 tons/yr. On top of this control, the raw material usage will be limited to restrict the new Hummer II VOC emissions to 260 tons/yr.

(c) 326 IAC 2-2-4 (PSD Rule: Air Quality Analysis)
Section (a) of this rule states that "any application for a permit under the provisions of this rule shall contain an analysis of ambient air quality in the area that the major stationary PSD source or major PSD modification would affect for each of the following pollutant:

(1) For a modification, each pollutant regulated under the provisions of the Clean Air Act for which the modification would result in a significant net emissions increase.

AM General Corporation has submitted an air quality analysis of the area where the proposed modification will be located. This analysis has been evaluated by the OAM, Air Modeling Section. See Appendix C, Air Quality Analysis for details.

(d) 326 IAC 2-2-5 (PSD Rule: Air Quality Impact)
Section (1) of this rule states that the owner or operator of the major PSD modification shall demonstrate that allowable emissions increases in conjunction with all other applicable emissions increases or reduction(including secondary emissions) will not cause or contribute to air pollution in violation of:

(1) any ambient air quality standard as designated in 326 IAC 1-3, and any air quality control region; or
(2) any applicable maximum allowable increase over the baseline concentration in any area.

Section (c) of this rule states that air quality impact analysis required shall be conducted based upon the applicable air quality models, data bases and other requirements specified in the US EPA "Guidelines on Air Quality Models".

The air quality impact analysis submitted by AM General Corporation was checked and verified by the Air Modeling Section, IDEM, OAM.

(e) 326 IAC 2-2-6 (PSD Rule: Increment Consumption)
Any demonstration pursuant to section 5 of this rule should demonstrate that increased emissions caused by the proposed major PSD modification will not exceed eighty percent (80%) of the available maximum allowable increases (MAI) over the baseline concentration for sulfur dioxide (SO_2), particulate matter and nitrogen oxide (NOx)

See Appendix C, Air Quality Analysis of details on the increment consumption analysis and evaluation.

(f) 326 IAC 2-2-7 (PSD Rule: Additional Analysis)
Section (a) of this rule requires the owner or operator to provide an analysis of the impairment to visibility, soils, and vegetation that would occur as a result of the major PSD modification and general commercial , residential, industrial and other growth associated with this modification.

(1) Land Use Classification - The area is considered commercial and residential, therefore a rural classification was used.

(2) Wind Flow Pattern - Wind rose analysis indicates that prevailing winds in the area occur from the southwest and south-southwest during the months of May through September when ozone formation is most likely to occur. Ozone impacts from the modification would likely fall north, northeast and east northeast of the facility, potentially impacting the Granger monitor during ozone conducive weather conditions.

(3) Topography - The topography of the site is gently rolling terrain

(4) Construction Impact - A construction workforce of 500 is expected and AM General will employ from 300 to 500 people selected from the local and regional area once the modification is operational. Emissions from the construction are not expected to cause significant impacts.

(5) Fugitive Dust - Fugitive emissions are not expected to significantly impact the area as all roadways will be paved

(6) Air Quality Impact on Soil - According to the modeled concentrations CO, NO_2, SO_2 and PM_{10} and the HAPs analysis, the soils will not be adversely affected by the modification.

(7) Air Quality Impact on Vegetation - The maximum modeled concentrations of the proposed modification for CO, NO_2, SO_2 and PM_{10} are well below the threshold limits necessary to have adverse impacts on surrounding vegetation such as autumn bent, nimblewill, barnyard grass, bishopscap and horsetail milkweed (Flora of Indiana - Charles Deam). Trees in the area are mainly Beech, Maple, Pine, Oak and Hickory. These are considered hardy trees and due to the modeled concentrations, no significant adverse impacts are expected.

(8) Air Quality Impact on Visibility - Operation of the proposed modification will not adversely affect the visibility at this Class I area. The results of the additional impact analysis conclude the AM General proposed modification will have no adverse impact on economic growth, soils, vegetation, endangered or threatened species or visibility on any Class I area.

(9) Air Quality Impact on PSD Class I Area - The nearest Class I area is Kentucky's Mammoth Cave National Park which is 490 kilometers from the proposed modification site in St. Joseph County, Indiana. There was no impact review conducted for the nearest Class I area, which is Mammoth Cave National Park in Kentucky.

(g) 326 IAC 2-2-8 (PSD Rule: Source Obligation)

(1) Pursuant to 326 IAC 2-2-8(a)(1) - Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, or if construction is not completed within reasonable time.

(2) Pursuant to 326 IAC 2-2-8(a)(2) - Approval for construction shall not relieve any owner or operator of the responsibility to comply fully with applicable provisions of the Indiana Implementation Plan, and any other requirements under local, state or federal law.

(h) 326 2-2-10 (PSD Rule: Source Information)
The owner operator of a proposed PSD modification shall submit all information necessary to perform any analysis or make any determination required under this rule, 326 IAC 2-2.

AM General has submitted the information necessary to perform analysis or make the determination required under PSD review.

(i) 326 IAC 2-2-11 (PSD Rule: Stack Height)
This rule requirement applies to a source which commenced construction after December 31, 1970.

(j) 326 IAC 2-2-12 (PSD Rule: Permit Rescission)
The PSD permit or the significant source modification permit shall remain in effect unless it is rescinded, modified, revoked or expires.

State Rule Applicability -

(a) 326 IAC 2-6 (Emission Reporting)
This source is subject to 326 IAC 2-6 (Emission Reporting), because it has the potential to emit more than ten (10) tons per year of volatile organic compounds and it is located in St. Joseph County. Pursuant to this rule, the owner/operator of the source must annually submit an emission statement for the source. The annual statement must be received by April 15 of each year and contain the minimum requirement as specified in 326 IAC 2-6-4. The submittal should cover the period defined in 326 IAC 2-6-2(8)(Emission Statement Operating Year).

(b) 326 IAC 5-1 (Visible Emissions Limitations)
Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following, unless otherwise stated in this permit:

(1) Opacity shall not exceed an average of forty percent (30%) any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(2) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings) as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

(c) 326 IAC 1-6-3 (Preventive Maintenance Plan)
The Permittee shall prepare and maintain Preventive Maintenance Plans (PMP) for the HUMMER II vehicle process operations, including their control equipment, where the allowable emissions are at least 10 pounds an hour.

(d) 326 IAC 6-3-2 (Process Operations)
The particulate matter (PM) overspray emissions from the painting operations shall be limited by the following:

Interpolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$E = 4.10\ P^{0.67}$ where E = rate of emission in pounds per hour and P = process weight rate in tons per hour

The water wash or wet scrubber shall be in operation at all times the paint booths are in operation, in order to comply with this limit.

or

Interpolation and extrapolation of the data for the process weight rate in excess of sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$E = 55.0\ P^{0.11} - 40$ where E = rate of emission in pounds per hour and P = process weight rate in tons per hour

The water wash or wet scrubber shall be in operation at all times the paint booths are in operation, in order to comply with this limit.

(h) 326 IAC 6-2-4 (Particulate Emissions Limitation for Sources of Indirect Heating)
This rule is applicable to indirect heating units constructed after September 21, 1983. The two (2) 25 mmBtu/hr boilers, identified as boiler #1 and boiler #2 are subject to this rule. This rule mandates a PM emissions limit using the following equation:

$$Pt = \frac{1.09}{Q^{0.26}}$$

Where: Pt = Pounds of particulate matter emitted per million Btu (lb/mmBtu) heat input.
Q = 50.4 mmBtu/hr (existing boilers) + 50 mmBtu/hr (proposed boilers) = 100.4 mmBtu/hr, total source maximum operating capacity rating in million Btu per hour (mmBtu/hr) heat input. The maximum operating capacity rating is defined as the maximum capacity at which the facility is operated or the nameplate capacity, whichever is specified in the facility's permit application, except when some lower capacity is contained in the facility's operation permit, in which case, the capacity specified in the operating permit shall be used.

$$Pt = \frac{1.09}{Q^{0.26}}$$
$$= \frac{1.09}{(100.4)^{0.26}}$$
$$= 0.33 \text{ lb/mmBtu}$$

Using Natural gas as fuel:
0.2 tons/yr, PM emissions fr. 1 boiler * 2000 lb/ton * yr/219 MMCF, throughput * MMCF/1000 mmBtu = 0.0018 lb/mmBtu < 0.33 lb/mmBtu. Therefore, each boiler is in compliance with this rule.

(f) 326 IAC 7-1.1 (SO_2 Emission Limitation)
This rule applies to all facilities with a potential to emit twenty-five (25) tons per year or ten (10) pounds per hour of sulfur dioxide.

This rule is not applicable to all the natural gas-fired boilers, including the various heaters, because they do not emit 25 tons per year or 10 pounds per hour sulfur dioxide.

(g) 326 IAC 8-2-2 (Surface Coating Emissions Limitation: Automobile and Light Duty Truck Coating Operations)
This rule establishes emission limitation for automobile and light duty truck surface coating operation which includes all passenger car or passenger car derivatives capable of seating twelve (12) passengers and any motor vehicle rated at 3,864 kilograms (8,500 pounds) gross weight or less which are designed primarily for the purpose of transportation or are derivatives of such vehicles.

This rule is not applicable to the HUMMER II vehicle surface coating operations, because HUMMER II has a gross weight heavier than 3,864 kilograms (8,500 pounds).

(h) 326 IAC 8-2-9 (Miscellaneous Metal Coating)
This rule applies to facilities of which construction commences after July 1, 1990 located in any county and which have actual emissions of greater than 15 pounds of VOC per day before control.

The individual VOC emissions from the E-Coat Dip Tank, Primer/Guidecoat, Topcoat, Final/Spot Repair, Body Shop Sealers and Paint Shop Sealers are greater than 15 pounds per day. Therefore, they are subject to 326 IAC 8-2-9.

(1) The VOC emissions from the surface coating facilities (E-Coat Dip Tank, Primer/Guidecoat, Topcoat, Body Shop Sealers and Paint Shop Sealers) which coat miscellaneous metal parts and products shall be limited as follows:

Type of Coating	VOC Emissions Limit (pounds per gallon of coatings less water)
Clear Coatings	4.3
Forced Warm Air Dried Coatings	3.5
Air Dried Coatings	3.5
Extreme Performance Coatings	3.5
All Other Coating	3.0

(2) The E-Coat system is in compliance with 326 IAC 8-2-9, since it is emitting 0.06 pound per gallon less water (before control), which is less than 3.5 pounds per gallon less water limit (see Page 3 of 12 TSD Appendix A, for detailed calculations).

(3) The Body Shop and Paint Shop Sealers are in compliance with 326 IAC 8-2-9, since the coatings used emit less than 3.5 pounds per gallon less water limit (see Page 11 of 12 TSD Appendix A, for detailed calculations).

(4) The Topcoat System coatings do not comply with 326 IAC 8-2-9, because they contain 4.18 pounds VOC per gallon less water (before control), which is greater than the limit of 3.5 lb/gallon less water. The source will demonstrate compliance using one (1) or combination of the following Compliance Methods in 326 IAC 8-1-2:

(a) Thermal or Catalytic incineration;
(b) Equivalent emission limitations based on an actual measured transfer efficiency higher than the specified baseline transfer efficiency.

(i) Equivalent emissions limits in kilograms of VOC per liter solids deposited (pounds of VOC per gallon solid deposited), baseline transfer efficiencies, and baseline volume percent solid content of coatings are as follows:

Miscellaneous Metal Coating	Equivalent Emission Limit		Baseline Transfer Efficiency	Baseline Volume Percent Solids
	kg/liter Solids Deposited	Lbs/gal Solids Deposited		
Clear Coatings	2.08	17.3	60%	41.6%
Air Dried up to 90^0C	1.34	11.2	60%	52.4%
Extreme Performance Coatings	1.34	11.2	60%	52.4%
All Other Coatings and Coating Systems	1.01	8.4	60%	59.2%

(ii) Compliance with the equivalent emission limit shall be determined according to the following equation:

$$E = \frac{L}{[(1-(L/D)) * (T)]}$$

Where: E = Equivalent emission limit in pounds of VOC per gallon coating solid deposited.
L = Actual VOC content in coating in pounds per gallon of coating, as applied.
D = Actual density of VOC in coating in pounds per gallon of VOC.
T = Actual measured transfer efficiency.

The source will be in compliance with the rule using the thermal oxidizer to meet the equivalent emission limits. See pages 11 and 12 of 12 TSD Appendix A for detailed calculations.

(5) The Primer Surfacer/Guidecoat is not in compliance with 326 IAC 8-2-9, because it emits a volume-weighted average of 3.73 pounds per gallon less water before control, which is greater than 3.5 pounds per gallon less water. The source will demonstrate compliance using one (1) or any of the following Compliance Methods in 326 IAC 8-1-2, the same demonstration as in the Topcoat System.

The source will be in compliance with the rule using the thermal oxidizer to meet the equivalent emission limits. See pages 11 and 12 of 12 TSD Appendix A for detailed calculations.

(6) The Spot and Final Repair operations are limited to a total VOC limit of 15 pounds of VOC per day to avoid the applicability of 326 IAC 8-2-9.

(7) Solvent sprayed from application equipment during cleanup or color changes shall be directed into appropriately designed reclaim equipment. Such equipment shall be designed to effectively capture purge solvent and minimize evaporation The waste solvent shall be disposed of in such a manner that evaporation is minimized.

(i) 326 IAC 8-4-6 (Gasoline Dispensing Facilities)

(1) Pursuant to 326 IAC 8-4-6(b) - No owner or operator shall allow the transfer of gasoline between any transport and any storage tank unless such tank is equipped with the following:

(a) A submerge fill pipe.
(b) Either a pressure relief valve set to release at no less than seven-tenths (0.7) pounds per square inch or an orifice of five-tenths (0.5) inch in diameter.
(c) A vapor balance system connected between the tank and the transport, operating according to manufacturer's specifications.

(2) Pursuant to section (c) of this rule - it is the responsibility of the owner or operator of the transport to make certain that the vapor balance system is connected between the transport and the storage tank and is operating according to the manufacturer's specifications.

The storage tank will dispense gasoline to fuel the manufactured vehicles for testing. AM General Corporation is proposing to install submerged fill pipes and pressure relief valves on the gasoline storage tank and will employ a vapor balancing system for gasoline tank truck unloading activities, to comply with 326 IAC 8-4-6.

(j) 326 IAC 9 (Carbon Monoxide (CO)
This rule is applicable to all stationary sources of carbon monoxide (CO) emissions commencing operation after March 21, 1972.

This rule is not applicable to the HUMMER II vehicle production plant, because it is not a source of carbon monoxide.

(k) 326 IAC 2-4.1-1 (New Source Toxic Control)
This rule is applicable to owner or operator who construct or reconstruct a major source of hazardous air pollutants (HAPs) after July 27, 1997.

The construction of the Hummer II plant is subject to this rule because it is major for hazardous air pollutants. This rule is satisfied by the BACT requirements under 326 IAC 2-2, Prevention of Significant Deterioration (PSD).

Conclusion

The construction and operation of this HUMMER II production plant shall be subject to the conditions of the attached proposed **PSD/Significant Source Modification Permit 141-11673-00031.**

Indiana Department of Environmental Management
Office of Air Management

Addendum to the
Technical Support Document for a PSD/Significant Part 70 Source Modification

Source Name: AM General Corporation
Source Location: 13200 McKinley Highway, Mishawaka, Indiana 46545
County: St Joseph
SIC Code: 3711
Operation Permit No.: T141-6023-00031 Issuance Date: February 25, 1999
PSD / Significant Source Modification No.: 141-11673-00031
Permit Reviewer: Aida De Guzman

On May 19, 2000 the Office of Air Management (OAM) had a notice published in the South Bend Tribune, South Bend, Indiana, stating that AM General Corporation had applied for a PSD/Significant Part 70 Source Modification to construct and operate the new HUMMER II vehicle production plant. The notice also stated that OAM proposed to issue a permit for this operation and provided information on how the public could review the proposed permit and other documentation. Finally, the notice informed interested parties that there was a period of thirty (30) days to provide comments on whether or not this permit should be issued as proposed.

Upon further review, the OAM has decided to make the following revisions to the permit (changes are bolded and deletions are struck-through for emphasis).

1. *The Malfunction Condition D.5.23, and the Malfunction Report in the proposed PSD/Significant Source Modification, were deleted in the final permit. AM General Corporation is a Part 70 source, and subject to 326 IAC 2-7-16 (Emergency Provision). "This Emergency provision supersedes 326 IAC 1-6 (Mulfunctions) for source subject to this rule after the effective date of this rule".*

   Subsequent conditions in the proposed PSD permit were renumbered accordingly.

2. *Condition D.5.16(c) was revised and added the reason why stack tests for PM and PM10 were necessary*.

D.5.16 Testing Requirements [326 IAC 2-7-6(1),(6)][326 IAC 2-1.1-11]

(a) No changes
(b) No changes

(c) The compliance stack tests shall be perform on the Primer Surfacer/Guidecoat, Topcoat, and Deadener operations for PM and PM-10 utilizing Methods 5 or 17 (40 CFR 60, Appendix A) for PM and Methods 201 or 201A and 202 (40 CFR 51, Appendix M) for PM-10, or other methods as approved by the Commissioner. **The PM and PM10 testing is required to demonstrate that the source is not major for either pollutant, under 326 IAC 2-2, Prevention of Significant Deterioration.** This test shall be repeated at least once every two and half (2.5) years from the date of this valid compliance demonstration. PM-10 includes filterable and condensible PM-10. In addition to these requirements, IDEM may require compliance testing when necessary to determine if the facility is in compliance.

3. Since there are no public comments, Condition D.5.3 was revised to state the effective date of the permit is upon issuance:

D.5.3 Effective Date of the Permit [40CFR 124]

Pursuant to 40 CFR 124.15, 40 CFR 124.19, and 40 CFR 124.20, ~~the effective date of this permit will be thirty-three (33) days after issuance, if comments are received. The~~ **this** permit is effective upon issuance ~~, if there are no comments~~.

4. Condition D.5.14 was revised due to a typographical error:

D.5.14 Opacity [326 IAC 5-1]

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following, unless otherwise stated in this permit:

(a) Opacity shall not exceed an average of ~~forty~~ **thirty** percent (30%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period

CATEGORY #1

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
Small Industrial Boiler

Company Nai AM General Corporation
Address City 13200 McKinley, Highway, Mishawaka, IN 46545
PSD/Significant Source Modificati 141-11673
Plt ID: 141-00031
Reviewer: Aida De Guzman
Date: January 3, 2000

Process ovens and various heaters with total heat input of 109 mmBtu/hr Control Equipment with total heat input of 9.7 mmBtu/hr

Heat Input Capacity MMBtu/hr	Potential Throughput MMCF/yr
109.0	954.8
9.7	85.0

	Pollutant					
	PM*	PM10*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	0.6	50.0 **see below	5.5	84.0
PTE for the Ovens and Heaters	0.9	3.6	0.3	23.9	2.6	40.1
PTE for the Control Equipment	0.1	0.3	0.02	2.1	0.2	3.6

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

above emission

CATEGORY #2

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
Small Industrial Boiler

Company Nai AM General Corporation
Address City 13200 McKinley, Highway, Mishawaka, IN 46545
PSD/Significant Source Modificati 141-11673
2 Boilers @ 25 mmBtu/hr **Plt ID:** 141-00031
Reviewer: Aida De Guzman
Date: January 3, 2000

Heat Input Capacity MMBtu/hr	Potential Throughput MMCF/yr
25.0	219.0
25.0	219.0

	Pollutant					
	PM*	PM10*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	0.6	50.0 **see below	5.5	84.0
PTE for Boiler #1	0.2	0.8	0.1	5.5	0.6	9.2
PTE for Boiler #2	0.2	0.8	0.1	5.5	0.6	9.2

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

above emission

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Nai AM General Corporation
Address City **13200 McKinley Hwy., Mishawaka, Indiana 46545**
PSD/Significant Source Modificati **141-11673**
Plt ID: **141-00031**
Reviewer: **Aida De Guzman**
Date: **January 3, 200**

CATEGORY #3

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water	Pounds VOC per gallon of coating	Potential VOC pounds per hour	Potential VOC pounds per day	Potential VOC tons per year	Particulate Potential (ton/yr)	lb VOC/gal solids	Transfer Efficiency
E-Coat System																
E-coat bath (pigment	8.7	79.50%	78.8%	0.7%	0.0%	16.80%	2.20000	18.200	0.06	0.06	2.44	58.52	10.68	0.00	0.36	100%

State Potential Emissions **Add worst case coating to all solvents**	**2.44**	**58.52**	**10.68**	**0.00**

	% PM Overspray Control Eff.	% VOC Overall Control Eff.	Controlled VOC Emissions (ton/year)	Controlled PM Emissions (ton/year)
E-coat bath (pigment	--	95.00%	0.534	--

Pounds of VOC per Gallon Applied Coating Solids				
VOC lbs/gallon	Volume Solids	Transfer Efficiency	Overall Control Efficiency	Lbs VOC/GACS
0.06	**17%**	**100%**	**90%**	**0.04**

METHODOLOGY

lb VOC/gacs (controlled) = VOC lb/gal / Vol. solids * (1-overall control %)

Note: Capture Efficiency =

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)

Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)

Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr)

Potential VOC Pounds per Day = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (24 hr/day)

Potential VOC Tons per Year = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (8760 hr/yr) * (1 ton/2000 lbs)

Particulate Potential Tons per Year = (units/hour) * (gal/unit) * (lbs/gal) * (1- Weight % Volatiles) * (1-Transfer efficiency) *(8760 hrs/yr) *(1 ton/2000 lbs)

Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)

Total = Worst Coating + Sum of all solvents used

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Na AM General Corporation
Address City 13200 McKinley Hwy., Mishawaka, IN 46545
PSD/Significant Source Modificati 141-11673
Plt ID: 141-00031
Reviewer: Aida De Guzman
Date: January 3, 20(

CATEGORY #4

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water	Pounds VOC per gallon of coating	Potential VOC pounds per hour	Potential VOC pounds per day	Potential VOC tons per year	Particulate Potential (ton/yr)	lb VOC/gal solids	Transfer Efficiency	Reg. Thermal Oxidizer Overall Efficiency	Wet Scrubber Control Efficiency
Primer Surfacer Syst																		
Primer Surfacer	10.7	35.00%	0.0%	35.0%	0.0%	53.00%	0.72000	18.200	3.75	3.75	49.07	1177.79	214.95	159.67	7.07	60%	73%	99.5%
Antichip																		
Primer Surfacer	6.9	54.00%	0.0%	54.0%	0.0%	47.00%	0.05000	18.200	3.73	3.73	3.39	81.38	14.85	7.59	7.93	40%	73%	95%
State Uncontrolled Potential Emissions				**Add worst case coating to all solvents**							**52.47**	**1259.16**	**229.80**	**167.26**				

	% PM Overspray Control Eff.	% VOC Overall Control Eff.	Controlled VOC Emissions (tons/yr)	Controlled PM Emissions (tons/yr)
Primer Surfacer Syst				
Primer Surfacer	**99%**	**73%**	**58**	**1.6**
Antichip				
Primer Surfacer	**95%**	**73%**	**4**	**0.4**
TOTAL			**62**	**2.0**

METHODOLOGY

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)
Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)
Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr)
Potential VOC Pounds per Day = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (24 hr/day)
Potential VOC Tons per Year = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (8760 hr/yr) * (1 ton/2000 lbs)
Particulate Potential Tons per Year = (units/hour) * (gal/unit) * (lbs/gal) * (1- Weight % Volatiles) * (1-Transfer efficiency) *(8760 hrs/yr) *(1 ton/2000 lbs)
Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)
Total = Worst Coating + Sum of all solvents used

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Na AM General Corporation
Address City 13200 McKinley Hwy., Mishawaka, IN 46545
PSD/Significant Source Modificatic 141-11673
Plt ID: 141-00031
Reviewer: Aida De Guzman
Date: January 3, 2000

CATEGORY #5

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water	Pounds VOC per gallon of coating	Potential VOC pounds per hour	Potential VOC pounds per day	Potential VOC tons per year	Particulate Potential (ton/yr)	lb VOC/gal solids	Transfer Efficiency	Reg. Thermal Oxidizer Destruction Efficiency
Topcoat System																	
Basecoat (Manua	8.2	58.00%	0.0%	58.0%	0.0%	40.00%	0.24000	18.200	4.76	4.76	20.77	498.58	90.99	16.47	11.89	75%	95%
Basecoat (Automa	8.2	58.00%	0.0%	58.0%	0.0%	40.00%	0.71000	18.200	4.76	4.76	61.46	1474.97	269.18	48.73	11.89	75%	95%
Clearcoat (manua	8.3	46.00%	0.0%	46.0%	0.0%	50.00%	0.29000	18.200	3.82	3.82	20.15	483.63	88.26	25.90	7.64	75%	95%
Clearcoat (Autom	8.3	46.00%	0.0%	46.0%	0.0%	50.00%	0.88000	18.200	3.82	3.82	61.15	1467.58	267.83	78.60	7.64	75%	95%
Repair - Basecoa	8.4	61.90%	0.0%	61.9%	0.0%	37.50%	0.03000	18.200	5.20	5.20	2.84	68.14	12.43	4.59	13.87	40%	95%
Repair - Clearcoa	8.4	61.90%	0.0%	61.9%	0.0%	37.50%	0.04000	18.200	5.20	5.20	3.79	90.85	16.58	6.12	13.87	40%	95%

State Potential Emissions **Add worst case coating to all solvents**

170.16	**4083.74**	**745.28**	**180.43**

	% PM Overspray Control Eff.	% VOC Overall Control Eff.	Controlled VOC Emissions (tons/yr)	Controlled PM Emissions (tons/yr)
Topcoat System				
Basecoat (manua	**97.5%**	**5%**	**86.4**	**0.41**
Basecoat (automa	**97.5%**	**95%**	**13.4**	**1.22**
Clearcoat (manua	**97.5%**	**11%**	**78.5**	**0.65**
Clearcoat (automa	**97.5%**	**95%**	**13.4**	**1.96**
Repair	**97.5%**	**0.00%**	**29.01**	**0.14**
TOTAL			**221**	**4.4**

METHODOLOGY

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)
Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)
Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr)
Potential VOC Pounds per Day = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (24 hr/day)
Potential VOC Tons per Year = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (8760 hr/yr) * (1 ton/2000 lbs)
Particulate Potential Tons per Year = (units/hour) * (gal/unit) * (lbs/gal) * (1- Weight % Volatiles) * (1-Transfer efficiency) *(8760 hrs/yr) *(1 ton/2000 lbs)
Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)
Total = Worst Coating + Sum of all solvents used

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Na AM General Corporation
Address City 13200 McKinley Hwy., Mishawaka, IN 46545
PSD/Significant Source Modificati 141-11673
Plt ID: 141-00031
Reviewer: Aida De Guzman
Date: January 3, 2000

CATEGORY #6

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water	Pounds VOC per gallon of coating	Potential VOC pounds per hour	Potential VOC pounds per day	Potential VOC tons per year	Particulate Potential (ton/yr)	lb VOC/gal solids	Transfer Efficiency
Deadener																
Deadener	14.0	16.00%	15.0%	1.0%	0.0%	85.00%	0.59500	18.200	0.14	0.14	1.52	36.39	6.64	139.45	0.16	75%

State Potential Emissions **Add worst case coating to all solvents**

1.52	**36.39**	**6.64**	**139.45**

	% PM Overspray Control Eff.	% VOC Overall Control Eff.	Controlled VOC Emissions (tons/yr)	Controlled PM Emissions (tons/yr)
Deadener				
Deadener	**99%**	**-**	**-**	**1.4**

METHODOLOGY

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)
Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)
Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr)
Potential VOC Pounds per Day = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (24 hr/day)
Potential VOC Tons per Year = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (8760 hr/yr) * (1 ton/2000 lbs)
Particulate Potential Tons per Year = (units/hour) * (gal/unit) * (lbs/gal) * (1- Weight % Volatiles) * (1-Transfer efficiency) *(8760 hrs/yr) *(1 ton/2000 lbs)
Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)
Total = Worst Coating + Sum of all solvents used

Appendix A: Emission Calculations
HAP Emission Calculations

Company Na AM General Corporation
Address Cit 13200 McKinley Hwy., Mishawaka, IN 46545
PSD/Significant Source Modifica 141-11673
Plt ID: 141-00031
Permit Revi Aida De Guzman
Date: Jan. 7, 2000

Material	Density (Lb/Gal)	Gallons of Material (gal/unit)	Maximum (unit/hour)	Weight % Xylene	Weight % Toluene	Weight % MIK	Weight % E. Benzen	Weight % Cumene	Weight % EthyleneGlyco	Weight % Formaldeh	Weight % MEK	Weight % Phthalic Anhydride	Weight % MDI	Xylene Emissions (ton/yr)	Toluene Emissions (ton/yr)	MIK Emissions (ton/yr)	Ethyl Benzene Emissions (ton/yr)	Cumene Emissions (ton/yr)	Ethylene Glycol Emissions (ton/yr)	Formaldehyde Emissions (ton/yr)	MEK Emissions (ton/yr)	Phthalic Anhydride Emissions (ton/yr)	MDI Emissions (ton/yr)	Combined Controlled HAPs Emissions (ton/yr)
E-Coat System	No HAPs is emitted from this system.																							
Primer Surfacer Sy																								
Primer Surfacer	10.7	0.720000	18.20	20.00%	0.00%	0.00%	2.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	122.83	0.00	0.00	15.60	0.00	0.00	0.00	0.00	0.00	0.00	37.36
Topcoat System																								
topcoat paint	10.44	2.250000	18.20	5.00%	0.00%	1.90%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	93.63	0.00	35.58	3.75	0.00	0.00	0.00	0.00	0.00	0.00	39.92
Deadener System																								
Deadener	14.178	0.700000	18.20	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.79
Final & Spot Repai																								
Final & spot paint	11.18	0.300000	1.82	27.70%	9.68%	0.00%	6.16%	0.00%	0.00%	0.00%	2.75%	0.00%	0.00%	7.41	2.59	0.00	1.65	0.00	0.00	0.00	0.02	0.00	0.00	11.67
Miscellanous Sealers & Adhesives																								
Body Shop Sealers	13.5	0.750000	16.50	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.40%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.90	0.00	2.9
Paint Shop Sealers	13.5	1.600000	18.20	0.00%	5.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.20%	0.00%	0.00	89.54	0.00	0.00	0.00	0.00	0.00	0.00	89.50	0.00	179.04
Trim & General Ass	13.5	0.036000	16.50	22.00%	22.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.73	7.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.46
Miscellaneous Sol																								
Purge Solvent	7.01	1.100000	18.20	50.00%	0.00%	35.00%	10.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00%	307.35	0.00	215.14	61.47	30.73	0.00	0.00	0.00	0.00	0.00	190.5
Windshield Install.																								
Betaseal 43520A Glass Primer	10.09	0.002000	16.50	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.73
Betaseal 15948 Urethane Adhesives	10.09	0.600000	16.50	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
Betaseal 43518 Glass Primer	10.09	0.002000	16.50	0.00%	55.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.8
Antichip																								
Antichip Paint	11.06	0.050000	18.20	0.00%	0.00%	5.00%	0.00%	0.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00	0.00	2.20	0.00	0.00	2.20	0.00	0.00	0.00	0.00	4.4

'Note: In case a melamine resin based-paint will be used Formaldehyde will be emitted, and calculated as f

Process	Usage Ra (gal/yr)	Production (Unit/hr)	Density (lb/gal)	Melamine Resin % w	Free HCHO Paint %	Transfer Eff.	Formaldehyde Booths (t/y)	Emissions Ovens (t/y
Topcoat	195,040	18	10	30%	1%	65%	0.2	0.3
Primer Surfa	66,240	18	10	30%	1%	65%	0.06	0.1
Final Repair	2,760	1.8	10	30%	1%	40%	0.004	0.1
TOTAL							**0.7**	

Total Single HAP Uncontrolled Potential Emissions														**538.93**	**100.65**	**252.92**	**82.46**	**30.73**	**3.00**		**0.75**	**92.40**	**0.03**	
Total Single HAP controlled Potential Emissions														**171.70**	**100.65**	**79.60**	**25.95**	**9.50**	**3.00**		**0.75**	**92.40**	**0.03**	**483.6**

	% Overall Control	Xylene Emissions	MIK Emissions	Ethyl Benzene Emissions	Cumene Emissions
E-Coat System	95%	No HAPS is emitted			
Primer Surfacer Sy					
Primer Surfacer	73%	33.16	0.0	4.2	0.0
topcoat System					
Topcoat paint	70%	28.1	10.7	1.12	0.0
Miscellaneous Purge Solvent	69%	95.3	66.7	19	9.5
TOTAL		156.56	77.4	24.3	9.5

Note: Only the E-Coat System, Primer Surfacer, Topcoat system and the Miscellaneous Purge Solvent System are controlled by a Regenerative Thermal Oxidizer.
"The controlled emissions is the sum of the controlled and uncontrolled coating systems' emissions.

METHODOLOGY

Uncontrolled HAPS emission rate (tons/yr) = Density (lb/gal) * Gal of Material (gal/unit) * Maximum (unit/hr) * Weight % HAP * 8760 hrs/yr * 1 ton/2000 lbs
Controlled HAPs emission rate (tons/year) = Controlled HAPs emissions from Systems that are controlled + Uncontrolled HAPs emissions fr. uncontrolled systems

From Surface Coating Operations

Company N AM General Corporation
Address Ci 13200 McKinley Hwy., Mishawaka, IN 46545
PSD/Significant Source Modif 141-11673
Plt ID: 141-00031
Reviewer: Aida De Guzman
Date: January 7, 2000

Material	VOC Usage (Lb/Gal)	Usage (gllon/month)	Usage (gallon/yr)	VOC lbs. per month	VOC Emissions lbs/year	VOC Emissions tons/year
"Body Wipe Purge & Clean Up Materials (Non-Production) (CATEGORY #10)						
P3 Saf-T-Clean 113E Flr. Strippe	2.1	150	1,800	315	3,780	1.9
P3 Cold Stripper 127 Booth Strip	6	300	3,600	1,800	7,251	3.6
P3 Clear Masking 2485 A Booth I	0.2	120	1,440	24.0	97	0.0
P3 Saf-T-Clean 104	7.3	300	3,600	2,190	8,822	**4.4**
"Body Wipe Purge & Clean Up Materials (Production) (CATEGORY #10)						
Pre-Moisten Wipes	0.038	6,900	82,800	262.2	3,149.4	**1.6**
Purge for BC bell & recip	7.01	3,540.8	42,489			
Purge for BC Robots	7.01	726.3	8,716			
Purge for Prime bells	7.01	2,042.8	24,513	93,913 * 7.01 = 658,330 lb/yr		
Purge for Prime Robots	7.01	1,089.5	13,074	658,330 lb/yr * 85% reclaim		
Purge for CC equipment	7.01	426.7	5,121	658,330 lb/yr * 15% lost * ton/2000 =		
TOTAL			**93,913**			
				Uncontroll		**55.4**

METHODOLOGY

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)
Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)
Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr)
Potential VOC Pounds per Day = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (24 hr/day)
Potential VOC Tons per Year = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (8760 hr/yr) * (1 ton/2000 lbs)
Particulate Potential Tons per Year = (units/hour) * (gal/unit) * (lbs/gal) * (1- Weight % Volatiles) * (1-Transfer efficiency) *(8760 hrs/yr) *(1 ton/2000 lbs)
Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)
Total = Worst Coating + Sum of all solvents used

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Nai American General Corporation
Address City 13200 McKinley Highway, Mishiwaka, IN 46545
PSD//Significant Source Modificati 141-11673-00031
Reviewer: Aida De Guzman
Date: February 2, 2(

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water	Pounds VOC per gallon of coating	Potential VOC pounds per hour	Potential VOC pounds per day	Potential VOC tons per year	Particulate Potential (ton/yr)	lb VOC/gal solids	Substrate	Transfer Efficiency
Sealers and Adhesives (Category #11)																	
Body Shop Sealers	15.0	0.40%	0.0%	0.4%	0.0%	99.99%	0.75000	18.200	0.06	0.06	0.82	19.66	3.59	0.00	0.06	metal	100%
Paint Shop Sealers	15.0	1.60%	0.0%	1.6%	0.0%	95.00%	1.60000	18.200	0.24	0.24	6.99	167.73	30.61	0.00	0.25	metal	100%
Trim Sealers	9.0	36.00%	0.0%	36.0%	0.0%	64.00%	0.02000	18.200	3.24	3.24	1.18	28.30	5.17	0.00	5.06	metal	100%
Window Installation Urethane A	9.8	0.80%	0.0%	0.8%	0.0%	99.99%	0.60000	18.200	0.08	0.08	0.86	20.63	3.77	0.00	0.08	metal	100%
Window Installation Glass Prim	8.3	58.40%	0.0%	58.4%	0.0%	41.60%	0.00200	18.200	4.82	4.82	0.18	4.21	0.77	0.00	11.60	metal	100%
Window Installation Glass Prim	6.9	100.00%	0.0%	100.0%	0.0%	0.00%	0.00200	18.200	6.94	6.94	0.25	6.06	1.11	0.00	ERR	metal	100%
State Potential Emissions			**Add worst case coating to all solvents**								**10.28**	**246.60**	**45.00**	**0.00**			

METHODOLOGY

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)
Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)
Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr)
Potential VOC Pounds per Day = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (24 hr/day)
Potential VOC Tons per Year = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (8760 hr/yr) * (1 ton/2000 lbs)
Particulate Potential Tons per Year = (units/hour) * (gal/unit) * (lbs/gal) * (1- Weight % Volatiles) * (1-Transfer efficiency) *(8760 hrs/yr) *(1 ton/2000 lbs)
Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Nai AM General Corporation
Address City 13200 McKinley Highway, Mishawaka, IN 46548
PSD/SMM: 141-11673-00031
Reviewer: Aida De Guzman
Date: Feb. 23, '00

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water	Pounds VOC per gallon of coating	Potential VOC pounds per hour	Potential VOC pounds per day	Potential VOC tons per year	lb VOC/gal solids (before control)	Overall Efficiency of Control Unit	lb VOC/gal solids (after control) For PSD BACT
Category #3 E-Coat System																
E-coat bath	8.7	79.50%	78.8%	0.7%	82.4%	16.80%	2.20000	18.200	0.35	0.06	2.44	58.52	10.68	0.36	90%	**0.04**
Category #4 Primer Surfacer																
Primer surfacer	10.7	35.00%	0.0%	35.0%	0.0%	53.00%	0.72000	18.200	3.75	3.75	49.07	1177.79	214.95	7.07	77%	1.62
Category #4 Antichip																
Primer surfacer	6.9	54.00%	0.0%	54.0%	0.0%	45.00%	0.05000	18.200	3.73	3.73	3.39	81.38	14.85	8.28	17%	6.8
Coatings Weighted Average	*10.4*	*35.90%*	*0.0%*	*35.9%*	*0.0%*	*52.40%*	*0.66500*	*18.200*	*3.74*	*3.74*	*45.27*	*1086.37*	*198.26*	*7.13*	*85%*	***1.07***
Category #5 Topcoat System																
Basecoat (Manual)	8.2	58.00%	0.0%	58.0%	0.0%	37.00%	0.24000	18.200	4.76	4.76	20.77	498.58	90.99	12.85	5%	12.2
Basecoat (Automatic)	8.2	58.00%	0.0%	58.0%	0.0%	37.00%	0.71000	18.200	4.76	4.76	61.46	1474.97	269.18	12.85	95%	0.64
Clearcoat (Manual)	8.3	46.00%	0.0%	46.0%	0.0%	50.00%	0.29000	18.200	3.82	3.82	20.15	483.63	88.26	7.64	11%	6.79
Clearcoat (Automatic)	8.3	46.00%	0.0%	46.0%	0.0%	50.00%	0.88000	18.200	3.82	3.82	61.15	1467.58	267.83	7.64	95%	0.38
Repair -Basecoat	9.5	55.00%	0.0%	55.0%	0.0%	55.00%	0.03000	18.200	5.23	5.23	2.85	68.47	12.50	9.50	0%	9.5
Repair - Clearcoat	8.4	55.00%	0.0%	55.0%	0.0%	43.00%	0.04000	18.200	4.62	4.62	3.36	80.72	14.73	10.74	0%	10.74
Coatings Weighted Average	*8.2*	*51.00%*	*0.0%*	*51.0%*	*0.0%*	*44.00%*	*0.64000*	*18.200*	*4.18*	*4.18*	*48.69*	*1168.53*	*213.26*	*9.55*	*70%*	***2.87***
Category #8 Final & Spot Rep																
Basecoat	8.0	63.00%	0.0%	63.0%	0.0%	30.00%	0.30000	1.650	5.04	5.04	2.49	59.88	10.93	16.80	0%	
Clearcoat	8.0	61.00%	0.0%	61.0%	0.0%	33.00%	0.30000	1.650	4.88	4.88	2.42	57.97	10.58	14.79	0%	
Clearcoat Activator	8.0	78.00%	0.0%	78.0%	0.0%	18.00%	0.30000	1.650	6.24	6.24	3.09	74.13	13.53	34.67	0%	
Coatings Weighted Average	8.0	67.00%	0.0%	67.0%	0.0%	69.00%	0.30000	1.650	5.36	5.36	2.65	63.68	11.62	7.80	0%	
Miscellaneous Sealers & Adh																
Body Shop Sealers	15.0	0.01%	0.0%	0.0%	0.0%	99.99%	0.75000	18.200	0.00	0.00	0.02	0.49	0.09	0.00	0%	
Paint Shop Sealers	15.0	5.00%	0.0%	5.0%	0.0%	95.00%	0.80000	18.200	0.75	0.75	10.92	262.08	47.83	0.79	0%	
Trim Sealers/windows Installati	9.0	36.00%	0.0%	36.0%	0.0%	64.00%	0.02000	18.200	3.24	3.24	1.18	28.30	5.17	5.06	0%	

State Potential Emissions **Add worst case coating to all solvents**

METHODOLOGY

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)
Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)
Coatings Weighted Ave. Density = Summation of Density, lb/gal * coating usage, gal/unit / Summation of coating usage, gal/unit
Coatings Weighted Ave of Wt % Organics = Summation of Wt % Organics * coating usage, gal/unit / Summation of coating usage, gal/unit
Coatings Weighted Ave. of Vol. % non-vol solids = Summation of vol % non-volatile soilds * coating usage, gal/unit * Summation od coatings usage, gal/unit
Coatings Weighted Ave. of Coating Usage, gal/unit = Summation of coating usage, gal/unit * coating usage / Summation of coating usage, gal/unit

Process Description: Gasoline filling into the vehicle gas tank.

DATA:
Fluid being filled: Gasoline
GM Number: Multiple FID #s

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

5.0 Gallons/tank

0.67 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = \frac{Pi}{Pt} = \frac{xiPi^*}{Pt}$$

Where: Yi = Mole fraction of i in the vapor, 0.4694
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 1.0
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

Or $Xi\ Pi^* = 0.4694$

Pt

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Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\,(Vr)\,(Pt)\,(MW)}{(R)\,(T)}$$

= 0.0501 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Gasoline Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.0501 lb/veh * ton/2000 lb
= 2.15 tons/year

Process Description: Diesel filling into the vehicle gas tank.

DATA:
Fluid being filled: Diesel
GM Number: Multiple FID #s

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

5.0 Gallons/tank

0.67 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = \frac{Pi}{Pt} = \frac{xiPi^*}{Pt}$$

Where: Yi = Mole fraction of i in the vapor, 0.4694
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 1.0
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

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Appendix B: Emissions Calculations

VOC Emissions From FLUID FILL

DIESEL FILLING - C/

Or $\frac{Xi\ Pi^*}{Pt} = 0.4694$

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\ (Vr)\ (Pt)\ )\ (MW)}{(R)\ (T)}$$

= 0.0501 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Gasoline Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.0501 lb/veh * ton/2000 lb
= 2.15 tons/year

Appendix B: Emissions Calculations

VOC Emissions From

Process Description: Antifreeze filling into the vehicle fluid tank.

DATA:
Fluid being filled: Antifreeze Coolant
GM Number: Multiple FID #s

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential
2.5 Gallons/tank
0.33 Cu.

Calculations of VOC Emissions

Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$Yi = Pi = xiPi^*$
$Pt \quad Pt$

Ethylene G

Where: Yi = Mole fraction of i in the vapor, 0.0001
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.95
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

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Appendix B: Emissions Calculations

VOC Emis

Or $Xi\ Pi^* = 0.0001$
Pt

Materials Found in Antifreeze Coolant:

HAP Nam	CAS Numl	Percen	Percent Used
Ethylene G	107-21-1	95	0.95

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$Er = (Yi)\ (Vr)\ (Pt)\ )\ (MW)$
$(R)\ (T)$
$= 0.000003$ lb/unit

Where: Yi = Mole fraction of i ir

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Antifreeze Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.000003 lb/veh * ton/2000 lb
= 0.0001 tons/year

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Appendix B: Emissions Calculations

VOC Emis

Process Description: Automatic Transmission Fluid filling into the vehicle fluid tank.

DATA:
Fluid being filled: Automatic Transmission Fluid

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential
2.5 Gallons/tank
0.33 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

Yi = Pi = xiPi*

Pt Pt

Petroleum

Where: Yi = Mole fraction of i in the vapor, 0.0006
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.95
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

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Appendix B: Emissions Calculations

VOC Emissions From FLUID FILL

TRANSMISSION FLU

Or Xi Pi* = 0.00

Pt

Materials Found in Automatic Transmission Fluid:

Material N	CAS Numl	Percen	Percent Used
Petroleum	N/A	< 95	0.95

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

Er = (Yi) (Vr) (Pt)) (MW)
(R) (T)
= 0.000097 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Transmission Fluid Filling:

Production Rate of Vehicle - 16.5 veh/hr

- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.000097 lb/veh * ton/2000 lb
= 0.004 tons/year

Appendix B: Emissions Calculations

VOC Emis

Process Description: Windshield Washer Concentrate filling into the vehicle fluid tank.

DATA:
Fluid being filled: Windshield Washer Concentrate

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

0.20 Gallons/tank

0.03 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = Pi = \frac{xiPi^*}{Pt \quad Pt}$$

Methyl Alc

Where: Yi = Mole fraction of i in the vapor, 0.0006
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.95
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

Or Xi Pi* = 0.00
Pt

Materials Found in Windshield Washer Fluid:

Material N	CAS Numl	Percen	Percent Used
Methyl Alh	67-56-1	100	1

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

Er = (Yi) (Vr) (Pt)) (MW)
(R) (T)
= 0.00032 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Windshield Washer Fluid Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.00032 lb/veh * ton/2000 lb
= 0.014 tons/year

Appendix B: Emissions Calculations
VOC Emissions From FLUID FILL

Process Description: Power Steering Fluid filling into the vehicle fluid tank.

DATA:
Fluid being filled: Power Steering Fluid

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

0.30 Gallons/tank

0.04 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = Pi = \frac{xiPi^*}{Pt \quad Pt}$$

Petroleum

Where: Yi = Mole fraction of i in the vapor, 0.0005
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.80
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

Yi = Pi = 0

Or $\frac{X_i P_i^*}{P_t} = 0.00$

Materials Found in Power Steering Fluid:

Material N	CAS Numl	Percen	Percent Used
Petroleum	N/A	<80	0.8

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\ (Vr)\ (Pt)\ )\ (MW)}{(R)\ (T)}$$

= 0.00000945 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Power Steering Fluid Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.00000945 lb/veh * ton/2000 lb
= 0.00041 tons/year

Process Description: Brake fluid filling into the vehicle fluid tank.

DATA:
Fluid being filled: Brake Fluid
CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

0.25 Gallons/tank

0.03 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = \frac{Pi}{Pt} = \frac{xiPi^*}{Pt} \quad A$$

Mineral Sp

Where: Yi = Mole fraction of i in the vapor, 0.0001
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.9
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

Yi = Pi = 0

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Appendix B: Emissions Calculations

VOC Emis

Or $\frac{Xi\ Pi^*}{Pt} = 0.00$

Materials Found in Brake Fluid:

Material N	CAS Numl	Percen	Percent Used
Mineral Sp	64741-97-	<90	0.9

Mineral Sp	64742-54-	<90	0.9
Mineral Sp	64742-65-	<90	0.9

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\ (Vr)\ (Pt)\ )\ (MW)}{(R)\ (T)}$$

= 0.0000048 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Brake Fluid Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.0000048 lb/veh * ton/2000 lb
= 0.00006 tons/year

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Appendix B: Emissions Calculations
VOC Emissions From FLUID FILL

Process Description: Engine Oil filling into the vehicle fluid tank.

DATA:
Fluid being filled: Engine Oil

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential
1.50 Gallons/tank
0.20 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = Pi = \frac{xiPi^*}{Pt} \qquad Pt$$

Petroleum

Where: Yi = Mole fraction of i in the vapor, 0.0005
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.90
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

$$Yi = Pi = 0$$
$$Pt$$

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Appendix B: Emissions Calculations

VOC Emis

$$Or \quad Xi\ Pi^* = 0.00$$
$$Pt$$

Materials Found in Engine Oil:

Material N	CAS Numl	Percen	Percent Used
Mineral Sp	64741-97-	<90	0.9
Mineral Sp	64742-54-	<90	0.9
Mineral Sp	64742-65-	<90	0.9

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\ (Vr)\ (Pt)\ )\ (MW)}{(R)\ (T)}$$

=0.0000532lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Engine Oil Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.0000532 lb/veh * ton/2000 lb
= 0.0023 tons/year

Appendix B: Emissions Calculations

VEHICLE START-UP & ROLL TEST (Gasoline Fuel)- CATEGORY #9

Process Description:

Vehicle powertrains are tested before the vehicles leave the assembly plant. The vehicle start-up and roll test verifies that the vehicle power train is assembled correctly.

Test Conditions:

Test Type	Duration (r	Speed (miles per hour (m.p.h.))	Equivalent Miles Traveled
Vehicle St	5	Idle	0
Alignment	3	Idle	0
Roll Test E	8	45	6
Vehicle Cc	2	Idle	0
Repairs	5	30	2.5

Calculations of Emissions - Based on Emission Factors

Emission Factors: Low Altitude non-California Vehicles (AP-42, 4th Edition September, 1985 Volume II, Mobile Sources) Tables 1.1.1A; 1.2.1A; 1.3.1A; 1.4.1A; 1.5.1; 1.6.1 and 1.7.1)

Vehicle Speed > Idle		(Grams/mile)			
Category	Model Ye	Hydrocarb	NOx	CO	PM
LDGV	1990 +	0.2	0.53	1.14	0.017
LDGT1	1987 +	0.51	0.86	5.6	0.017
LDGT2	1987 +	0.51	0.86	5.6	0.017
HDGV	1994-1996	0.93	4.38	12.63	0.048
	1997 +	0.91	4.3	12.39	
LDDV	1980 +	0.29	0.87	1.15	0.26
LDDT	1981 +	0.43	0.94	1.33	0.26
HDDV	1993-1996	2.39	10.98	7.93	0.7 g/Bhp-hr
	1997 +	2.37	10.89	7.86	

Vehicle Speed > Idle (Grams/minute)

Category	Model Ye	Hydrocarb	NOx	CO	PM
LDGV	1990 +	0.09	0.08	1.48	0.017
LDGT1	1987 +	0.03	0.02	0.34	0.017
LDGT2	1987 +	0.03	0.02	0.34	0.017
HDGV	1994-1996	0.1	0.01	0.34	0.048
	1997 +				
LDDV	1980 +	0.03	0.09	0.15	0.26
LDDT	1981 +	0.07	0.13	0.31	0.26
HDDV	1993-1996	0.27	0.22	0.67	0.7
	1997 +				

EQUATION:

Vehicle at Idle - Lbs/Test = Ef, grams/minute * Duration, minutes/test * lb/454 grams

Vehicle > Idle - Lbs/Test = Ef, grams/mile * MT, miles/test * lb/454 grams

Emission Factor (lbs/test) Light Duty Gasoline Vehicle (LDGV) - Model Year after 1990

Test Type	Hydrocarb	NOx	CO	PM
Vehicle St	0.00099	0.00088	0.0163	0.00019
Alignment	0.00059	0.00053	0.00978	0.00011
Roll Test E	0.00264	0.007	0.01507	0.00022
Vehicle Co	0.0004	0.00035	0.00652	7E-05
Repairs	0.0011	0.00292	0.00628	9E-05

Company Name: AM General Corporation
Address: 13200 McKinley Hwy., Mishawaka, Indiana 46545
PSD/Significant Source Modification: 141-11673-00031
Reviewer: Aida De Guzman

Potential Number of Tests:

Test Type	Number of Tests /Year	
	Potential (t	Potential (vehicles/year)
ALL	16.5	86,000

Potential Emissions

Test Type	Hydrocarb	NOx	CO	PM

Vehicle St	85.24	75.77	1,401.76	16.1
Alignment	51.15	45.46	841.06	9.7
Roll Test E	227.31	602.38	1,295.68	19.32
Vehicle Cc	34.1	30.31	560.7	6.44
Repairs	94.71	250.99	539.87	8.05
Totals (lb/y	492.51	1,005	4,639	60
Emissions	0.25	0.5	2.32	0.03
Emissions	0.15	0.3	1.4	0.018

Emissions, tons/yr = Ef, lb/test * potential tests/year, tests-vehicles/yr * tons/2000 lb

Appendix B: Emissions Calculations

VEHICLE START-UF

Process Description:

Vehicle powertrains are tested before the vehicles leave the assembly plant. The vehicle start-up and roll test verifies that the vehicle power train is assembled correctly.

Test Conditions:

			Equivalent Miles Traveled
Test Type	Duration (r	Speed (miles per hour (m.p.h.))	
Vehicle St	5	Idle	0
Alignment	3	Idle	0
Roll Test E	8	45	6
Vehicle Cc	2	Idle	0
Repairs	5	30	2.5

Calculations of Emissions - Based on Emission Factors

Emission Factors: Low Altitude non-California Vehicles (AP-42, 4th Edition September, 1985 Volume II, Mobile Sources) Tables 1.1.1A; 1.2.1A; 1.3.1A; 1.4.1A; 1.5.1; 1.6.1 and 1.7.1)

Vehicle Speed > Idle		(Grams/mile)			
Category	Model Ye	Hydrocarb	NOx	CO	PM
LDGV	1990 +	0.2	0.53	1.14	0.017
LDGT1	1987 +	0.51	0.86	5.6	0.017
LDGT2	1987 +	0.51	0.86	5.6	0.017
HDGV	1994-1996	0.93	4.38	12.63	0.048
	1997 +	0.91	4.3	12.39	
LDDV	1980 +	0.29	0.87	1.15	0.26
LDDT	1981 +	0.43	0.94	1.33	0.26
HDDV	1993-1996	2.39	10.98	7.93	0.7 g/Bhp-hr
	1997 +	2.37	10.89	7.86	

Vehicle Speed > Idle (Grams/minute)

Category	Model Ye	Hydrocarb	NOx	CO	PM
LDGV	1990 +	0.09	0.08	1.48	0.017
LDGT1	1987 +	0.03	0.02	0.34	0.017
LDGT2	1987 +	0.03	0.02	0.34	0.017
HDGV	1994-1996	0.1	0.01	0.34	0.048
	1997 +				
LDDV	1980 +	0.03	0.09	0.15	0.26
LDDT	1981 +	0.07	0.13	0.31	0.26
HDDV	1993-1996	0.27	0.22	0.67	0.7
	1997 +				

EQUATION:

Vehicle at Idle - Lbs/Test = Ef, grams/minute * Duration, minutes/test * lb/454 grams

Vehicle > Idle - Lbs/Test = Ef, grams/mile * MT, miles/test * lb/454 grams

Emission Factor (lbs/test) Light Duty Gasoline Vehicle (LDGV) - Model Year after 1990

Test Type	Hydrocarb	NOx	CO	PM
Vehicle St	0.00033	0.00099	0.00165	0.00286
Alignment	0.0002	0.00059	0.00099	0.00172
Roll Test E	0.00383	0.0115	0.0152	0.00344
Vehicle Co	0.00013	0.0004	0.00066	0.00115
Repairs	0.0016	0.00479	0.00633	0.00143

Potential Number of Tests:

Test Type	Number of Tests /Year	
	Potential ('	Potential (vehicles/year)
ALL	16.5	86,000

Potential Emissions

Test Type	Hydrocarb	NOx	CO	PM
Vehicle St	28.41	85.24	142.07	246.26
Alignment	17.05	51.15	85.24	147.75
Roll Test E	329.6	988.81	1,307.05	295.51
Vehicle Co	11.37	34.1	56.83	98.5
Repairs	137.33	412	544.6	123.13
Totals (lb/y	524	1,571	2,136	911
Emissions	0.26	0.79	1.07	0.46

Emissions	0.16	0.47	0.64	0.28

Emissions, tons/yr = Ef, lb/test * potential tests/year, tests-vehicles/yr * tons/2000 lb

Appendix B: Emissions Calculations

VEHICLE START-UP & ROLL T

Potential Emissions

	Gasoline F	Diesel Pot	Worst Case Potential Emissions							
Test Type	Hydrocarb	NOx	CO	PM	Hydrocarb	NOx	CO	PM	Hydrocarb	NOx
Vehicle St	85.24	75.77	1,401.76	16.1	28.41	85.24	142.07	246.26	85.24	85.24
Alignment	51.15	45.46	841.06	9.7	17.05	51.15	85.24	147.75	51.15	51.15
Roll Test E	227.31	602.38	1,295.68	19.32	329.6	988.81	1,307.05	295.51	329.6	988.81
Vehicle Cc	34.1	30.31	560.7	6.44	11.37	34.1	56.83	98.5	34.1	34.1
Repairs	94.71	250.99	539.87	8.05	137.33	412	544.6	123.13	137.3	412
Totals (lb/y	492.51	1,005	4,639	60	524	1,571	2,136	911	637.39	1,571
Emissions	0.25	0.5	2.32	0.03	0.26	0.79	1.07	0.46	0.32	0.79
Emissions	1.3	2.7	12.7	0.16	1.4	4.3	5.8	2.5	1.7	4.3

Emissions, tons/yr = Ef, lb/test * potential tests/year, tests-vehicles/yr * tons/2000 lb

_L

GASOLINE FILLING - CATEGORY #7

ft./tank

VOC

omponent i at temp t, 0.47
essel vapor space, 1.0

Pt

_L

GASOLINE FILLING - CATEGORY #7

Potential

ı the vapor 0.4694

metric gas displacement rate (cuft/tank) 0.67

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

ssions From FLUID FILL

DIESEL FILLING - CATEGORY #7

ft./tank

VOC

omponent i at temp t, 0.47
essel vapor space, 1.0

20519

Pt

ATEGORY #7

Potential

ı the vapor 0.4694

metric gas displacement rate (cuft/tank) 0.67

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

ı FLUID FILL

ANTIFREEZE FILLING - CATEGORY #7

ft./tank

Glycol

omponent i at temp t, 0.00007
essel vapor space, 1.0

Pt

sions From FLUID FILL

ANTIFREEZE FILLING- CATEGORY #7

Potential

n the vapor 0.0001

metric gas displacement rate (cuft/tank) 0.33
R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302
T = Temperature of the vessel vapor space (R) 530
Pt = The total pressure in the vessel vapor space (atm) 1.0
MW = Molecular weight of the VOC (inpu
Er = Mass emission r

PRODUCTION INFO

ssions From FLUID FILL

TRANSMISSION FLUID FILLING - CATEGORY #7

ft./tank

Distillates

omponent i at temp t, 0.0006
essel vapor space, 1.0

Pt

JID FILLING - CATEGORY #7

Potential

n the vapor 0.0006
metric gas displacement rate (cuft/tank) 0.33
R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302
T = Temperature of the vessel vapor space (R) 530
Pt = The total pressure in the vessel vapor space (atm) 1.0
MW = Molecular weight of the VOC (inpu
Er = Mass emission r

ssions From FLUID FILL

WINDSHIELD WASHER FLUID FILLING - CATEGORY #7

ft./tank

ohol

omponent i at temp t, 0.0006
essel vapor space, 1.0

Pt

ssions From FLUID FILL

WINDSHIELD WASHER FLUID FILLING - CATEGORY #7

Potential

n the vapor 0.13

metric gas displacement rate (cuft/tank) 0.03

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

POWER STEERING FLUID FILLING - CATEGORY #7

ft./tank

Distillates

ɔmponent i at temp t, 0.0006
ɛssel vapor space, 1.0

Pt

FLUID FILLING - CATEGORY #7

Potential

ı the vapor 0.0005

metric gas displacement rate (cuft/tank) 0.04

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

PRODUC

ı FLUID FILL

BRAKE FLUID FILLING - CATEGORY #7

ft./tank

›irits

›mponent i at temp t, 0.00010
ɛssel vapor space, 1.0

Pt

ɜsions From FLUID FILL

BRAKE FLUID FILLING - CATEGORY #7

Potential

ı the vapor 0.0005

metric gas displacement rate (cuft/tank) 0.03

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

PRODUC

ENGINE OIL FILLING - CATEGORY #7

ft./tank

Distillates

omponent i at temp t, 0.0006
essel vapor space, 1.0

sions From FLUID FILL

ENGINE OIL FILLING - CATEGORY #7

Potential

n the vapor 0.0001
metric gas displacement rate (cuft/tank) 0.03

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0
MW = Molecular weight of the VOC (inpu
Er = Mass emission r

› & ROLL TEST (Gasoline Fuel)- CATEGORY #9

EST (Gasoline Fuel)- CATEGORY #9

› & ROLL TEST (Gasoline Fuel)- CATEGORY #9

› & ROLL TEST (Diesel Fuel)- CATEGORY #9

START-UP & ROLL TEST (Diesel Fuel)- CATEGORY #9

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Na AM General Corporation
Address City 13200 McKinley Highway, Mishawaka, IN 46548
PSD/SMM: 141-11673-00031
Reviewer: Aida De Guzman
Date: Feb. 23, '00

	Coatings Weighted Average												L	D	E		
Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Organics	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water	Transfer Efficiency %	Applicable Emission Limitation (lbs VOC/gal coating solids) 326 IAC 8-2-9	Actual VOC content in coating (lbs VOC/ gallon of coating as applied)	Density of VOC in Coating (lb VOC/gal VOC)	Calculated Equivalent Emission Limitation Before Control (lbs VOC/gal coating solids)	Overall Efficiency of Control Unit	Calculated Equivalent Emission Limitation After Control (lbs VOC/gal coating solids)
Category #3 E-Coat System																	
E-coat bath	8.7	79.50%	78.8%	0.7%	82.4%	0.9%	16.80%	2.20000	18.200	**0.35**	**100.00**	This is in compliance with the 3.5 lb/gal less water limit under 326 IAC 8				90%	**0.04**
Category #4 Primer Surfacer																	
Primer surfacer	10.7	35.00%	0.0%	35.0%	0.0%	47.0%	53.00%	0.72000	18.200	3.75	75.00	3.50	3.75	7.06	10.70	77%	2.46
Category #4 Antichip																	
Primer surfacer	6.9	54.00%	0.0%	54.0%	0.0%	47.0%	45.00%	0.05000	18.200	3.73	75.00	3.50	3.73	7.03	10.65	17%	8.80
Coatings Weighted Average	*10.4*	*68.00%*	*58.0%*	*10.0%*	*61.0%*	*47.0%*	*52.40%*	*0.66500*	*18.200*	***3.74***	***75.00***	3.50	*3.74*	*7.05*	**10.68**	*85%*	***1.60***
Category #5 Topcoat Systen																	
Basecoat (Manual)	8.2	58.00%	0.0%	58.0%	0.0%	63.0%	37.00%	0.24000	18.200	4.76	75.00	3.50	4.76	7.50	17.30	5%	16.4
Basecoat (Automatic)	8.2	58.00%	0.0%	58.0%	0.0%	63.0%	37.00%	0.71000	18.200	4.76	75.00	3.50	4.76	7.50	17.30	95%	0.865
Repair -Basecoat	9.5	55.00%	0.0%	55.0%	0.0%	45.0%	55.00%	0.03000	18.200	5.23	75.00	3.50	5.23	11.60	12.70	0%	12.7
Coatings Weighted Average	*8.2*	*58.00%*	*0.0%*	*58.0%*	*0.0%*	*62.0%*	*37.00%*	*0.57000*	*18.200*	*4.76*	*75.00*	*3.50*	*4.76*	*7.60*	***17.07***	*70%*	***5.12***
Clearcoat (Manual)	8.3	46.00%	0.0%	46.0%	0.0%	50.0%	50.00%	0.29000	18.200	3.82	75.00	4.30	3.82	7.60	10.24	11%	9.11
Clearcoat (Automatic)	8.3	46.00%	0.0%	46.0%	0.0%	50.0%	50.00%	0.88000	18.200	3.82	75.00	4.30	3.82	7.60	10.24	95%	0.512
Repair - Clearcoat	8.4	55.00%	0.0%	55.0%	0.0%	57.0%	43.00%	0.04000	18.200	4.62	75.00	4.30	4.62	8.10	14.40	0%	14.4
Coatings Weighted Average	*8.3*	*46.00%*	*0.0%*	*46.0%*	*0.0%*	*50.0%*	*50.00%*	*0.28000*	*18.200*	*3.84*	*75.00*	*4.30*	*3.84*	*7.60*	***10.36***	*72%*	***2.9***
Category #8 Final & Spot Re																	
Basecoat	8.0	63.00%	0.0%	63.0%	0.0%	70.0%	30.00%	0.30000	1.650	5.04	75.00					0%	
Clearcoat	8.0	61.00%	0.0%	61.0%	0.0%	67.0%	33.00%	0.30000	1.650	4.88	75.00	The Spot & Final Repair is limited to < 15 lb/day to avoid the applicability				0%	
Clearcoat Activator	8.0	78.00%	0.0%	78.0%	0.0%	72.0%	18.00%	0.30000	1.650	6.24	75.00					0%	
Coatings Weighted Average	*8.0*	*67.00%*	*0.0%*	*67.0%*	*0.0%*	*69.0%*	*24.00%*	*0.30000*	*1.650*	*5.36*	*75.00*					0%	
Miscellaneous Sealers & Ad																	
Body Shop Sealers	15.0	0.01%	0.0%	0.0%	0.0%	0.0%	99.99%	0.75000	18.200	**0.00**	**100.00**	This is in compliance with the 3.5 lb/gal less water limit under 326 IAC 8				0%	
Paint Shop Sealers	15.0	5.00%	0.0%	5.0%	0.0%	5.0%	95.00%	0.80000	18.200	**0.75**	**100.00**	This is in compliance with the 3.5 lb/gal less water limit under 326 IAC 8				0%	
Trim Sealers/windows Installa	9.0	36.00%	0.0%	36.0%	0.0%	5.0%	64.00%	0.02000	18.200	**3.24**	**100.00**	This is in compliance with the 3.5 lb/gal less water limit under 326 IAC 8				0%	

State Potential Emissions **Add worst case coating to all solvents**

METHODOLOGY

L = Actual VOC content in coating (lb/gal as applied)
D = Density of VOC in coating (lb VOC/gal VOC) = Density of coating, lb/gal * wt % organics * (1/Volume % Organics)
E = Calculated Equivalent Emissions Limitations (lb VOC/gal coa L/ [1 -(L/D) * Transfer Eff.]
T = Actual measured transfer efficiency

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)
Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)
Coatings Weighted Ave. Density = Summation of Density, lb/gal * coating usage, gal/unit / Summation of coating usage, gal/unit
Coatings Weighted Ave of Wt % Organics = Summation of Wt % Organics * coating usage, gal/unit / Summation of coating usage, gal/unit
Coatings Weighted Ave. of Vol. % non-vol solids = Summation of vol % non-volatile soilds * coating usage, gal/unit / Summation od coatings usage, gal/unit
Coatings Weighted Ave. of Coating Usage, gal/unit = Summation of coating usage, gal/unit * coating usage / Summation of coating usage, gal/unit

Process Description: Gasoline filling into the vehicle gas tank.

DATA:
Fluid being filled: Gasoline
GM Number: Multiple FID #s

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

5.0 Gallons/tank

0.67 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = \frac{Pi}{Pt} = \frac{xiPi^*}{Pt}$$

Where: Yi = Mole fraction of i in the vapor, 0.4694
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 1.0
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

Or $Xi\ Pi^* = 0.4694$

Pt

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Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\,(Vr)\,(Pt)\,(MW)}{(R)\,(T)}$$

= 0.0501 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Gasoline Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.0501 lb/veh * ton/2000 lb
= 2.15 tons/year

Process Description: Diesel filling into the vehicle gas tank.

DATA:
Fluid being filled: Diesel
GM Number: Multiple FID #s

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

5.0 Gallons/tank

0.67 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = \frac{Pi}{Pt} = \frac{xiPi^*}{Pt}$$

Where: Yi = Mole fraction of i in the vapor, 0.4694
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 1.0
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

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Appendix B: Emissions Calculations

VOC Emissions From FLUID FILL

DIESEL FILLING - C/

Or $\frac{Xi\ Pi^*}{Pt} = 0.4694$

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\ (Vr)\ (Pt)\ )\ (MW)}{(R)\ (T)}$$

= 0.0501 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Gasoline Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.0501 lb/veh * ton/2000 lb
= 2.15 tons/year

Appendix B: Emissions Calculations

VOC Emissions From

Process Description: Antifreeze filling into the vehicle fluid tank.

DATA:
Fluid being filled: Antifreeze Coolant
GM Number: Multiple FID #s

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential
2.5 Gallons/tank
0.33 Cu.

Calculations of VOC Emissions

Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$Yi = Pi = xiPi^*$
$Pt \quad Pt$

Ethylene G

Where: Yi = Mole fraction of i in the vapor, 0.0001
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.95
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

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20519

Appendix B: Emissions Calculations

VOC Emis

Or $Xi\ Pi^* = 0.0001$
Pt

Materials Found in Antifreeze Coolant:

HAP Nam	CAS Numl	Percen	Percent Used
Ethylene G	107-21-1	95	0.95

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$Er = (Yi)\ (Vr)\ (Pt)\ )\ (MW)$
$(R)\ (T)$
$= 0.000003$ lb/unit

Where: Yi = Mole fraction of i ir

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Antifreeze Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.000003 lb/veh * ton/2000 lb
= 0.0001 tons/year

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Appendix B: Emissions Calculations

VOC Emis

Process Description: Automatic Transmission Fluid filling into the vehicle fluid tank.

DATA:
Fluid being filled: Automatic Transmission Fluid

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential
2.5 Gallons/tank
0.33 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

Yi = Pi = xiPi*

Pt Pt

Petroleum

Where: Yi = Mole fraction of i in the vapor, 0.0006
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.95
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

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Appendix B: Emissions Calculations

VOC Emissions From FLUID FILL

TRANSMISSION FLU

Or Xi Pi* = 0.00

Pt

Materials Found in Automatic Transmission Fluid:

Material N	CAS Numl	Percen	Percent Used
Petroleum	N/A	< 95	0.95

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

Er = (Yi) (Vr) (Pt)) (MW)
(R) (T)
= 0.000097 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Transmission Fluid Filling:

Production Rate of Vehicle - 16.5 veh/hr

- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.000097 lb/veh * ton/2000 lb
= 0.004 tons/year

Appendix B: Emissions Calculations

VOC Emis

Process Description: Windshield Washer Concentrate filling into the vehicle fluid tank.

DATA:
Fluid being filled: Windshield Washer Concentrate

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

0.20 Gallons/tank

0.03 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = Pi = \frac{xiPi^*}{Pt \quad Pt}$$

Methyl Alc

Where: Yi = Mole fraction of i in the vapor, 0.0006
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.95
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

VOC

Yi = Pi = 0

Or Xi Pi* = 0.00
Pt

Materials Found in Windshield Washer Fluid:

Material N	CAS Numl	Percen	Percent Used
Methyl Alh	67-56-1	100	1

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

Er = (Yi) (Vr) (Pt)) (MW)
(R) (T)
= 0.00032 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Windshield Washer Fluid Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.00032 lb/veh * ton/2000 lb
= 0.014 tons/year

Appendix B: Emissions Calculations
VOC Emissions From FLUID FILL

Process Description: Power Steering Fluid filling into the vehicle fluid tank.

DATA:
Fluid being filled: Power Steering Fluid

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

0.30 Gallons/tank

0.04 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = Pi = \frac{xiPi^*}{Pt \quad Pt}$$

Petroleum

Where: Yi = Mole fraction of i in the vapor, 0.0005
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.80
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

Yi = Pi = 0

Or $\frac{X_i P_i^*}{P_t} = 0.00$

Materials Found in Power Steering Fluid:

Material N	CAS Numl	Percen	Percent Used
Petroleum	N/A	<80	0.8

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\ (Vr)\ (Pt)\ )\ (MW)}{(R)\ (T)}$$

= 0.00000945 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Power Steering Fluid Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.00000945 lb/veh * ton/2000 lb
= 0.00041 tons/year

Process Description: Brake fluid filling into the vehicle fluid tank.

DATA:
Fluid being filled: Brake Fluid
CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential

0.25 Gallons/tank

0.03 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = \frac{Pi}{Pt} = \frac{xiPi^*}{Pt} \quad A$$

Mineral Sp

Where: Yi = Mole fraction of i in the vapor, 0.0001
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.9
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

Yi = Pi = 0

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Appendix B: Emissions Calculations

VOC Emis

Or $\frac{Xi\ Pi^*}{Pt} = 0.00$

Materials Found in Brake Fluid:

Material N	CAS Numl	Percen	Percent Used
Mineral Sp	64741-97-	<90	0.9

Mineral Sp	64742-54-	<90	0.9
Mineral Sp	64742-65-	<90	0.9

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\ (Vr)\ (Pt)\ )\ (MW)}{(R)\ (T)}$$

= 0.0000048 lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Brake Fluid Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.0000048 lb/veh * ton/2000 lb
= 0.00006 tons/year

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Appendix B: Emissions Calculations
VOC Emissions From FLUID FILL

Process Description: Engine Oil filling into the vehicle fluid tank.

DATA:
Fluid being filled: Engine Oil

CONDITIONS OF THE DISPLACED GAS:
Temperature: 70 0F 530 0R
Pressure: 1 atm

Volumetric Rate of Displacement: Potential
1.50 Gallons/tank
0.20 Cu.

Calculations of VOC Emissions
Actual Emissions:
The procedure identified in the Guideline Series to estimate emissions based on vapor displacement is as follows:

Step 1: Completed in Data section

Step 2: Calculate mole fraction of components in displaced gas

Raoults Law - to be used for multicomponent systems assuming that the components are totally miscible to one another.

$$Yi = Pi = \frac{xiPi^*}{Pt} \qquad Pt$$

Petroleum

Where: Yi = Mole fraction of i in the vapor, 0.0005
Pi = Partial pressure of components i _____
Xi = Mole fraction of components i in the liquid, 0.90
Pi* = Vapor pressure (atm) of c
Pt = The total pressure in the ve

$$Yi = Pi = 0$$
$$Pt$$

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Appendix B: Emissions Calculations

VOC Emis

$$Or \quad Xi\ Pi^* = 0.00$$
$$Pt$$

Materials Found in Engine Oil:

Material N	CAS Numl	Percen	Percent Used
Mineral Sp	64741-97-	<90	0.9
Mineral Sp	64742-54-	<90	0.9
Mineral Sp	64742-65-	<90	0.9

Step 3: Calculate the emission rate:

Once Yi is known, the VOC emission rate is calculated by multiplying Yi by the vessel fill rate and converting to a mass emission rate.

$$Er = \frac{(Yi)\ (Vr)\ (Pt)\ )\ (MW)}{(R)\ (T)}$$

=0.0000532lb/unit

Where: Yi = Mole fraction of i ir
Vr = Volu

PRODUCTION INFORMATION

Incineration Capture Eff. - 0%
Incineration Control Eff. - 0%

Potential Emissions for Engine Oil Filling:
Production Rate of Vehicle - 16.5 veh/hr
- 86,000 veh/yr

Potential Emissions = 86,000 veh/yr * 0.0000532 lb/veh * ton/2000 lb
= 0.0023 tons/year

Appendix B: Emissions Calculations

VEHICLE START-UP & ROLL TEST (Gasoline Fuel)- CATEGORY #9

Process Description:

Vehicle powertrains are tested before the vehicles leave the assembly plant. The vehicle start-up and roll test verifies that the vehicle power train is assembled correctly.

Test Conditions:

Test Type	Duration (r	Speed (miles per hour (m.p.h.))	Equivalent Miles Traveled
Vehicle St	5	Idle	0
Alignment	3	Idle	0
Roll Test E	8	45	6
Vehicle Cc	2	Idle	0
Repairs	5	30	2.5

Calculations of Emissions - Based on Emission Factors

Emission Factors: Low Altitude non-California Vehicles (AP-42, 4th Edition September, 1985 Volume II, Mobile Sources) Tables 1.1.1A; 1.2.1A; 1.3.1A; 1.4.1A; 1.5.1; 1.6.1 and 1.7.1)

Vehicle Speed > Idle		(Grams/mile)			
Category	Model Ye	Hydrocarb	NOx	CO	PM
LDGV	1990 +	0.2	0.53	1.14	0.017
LDGT1	1987 +	0.51	0.86	5.6	0.017
LDGT2	1987 +	0.51	0.86	5.6	0.017
HDGV	1994-1996	0.93	4.38	12.63	0.048
	1997 +	0.91	4.3	12.39	
LDDV	1980 +	0.29	0.87	1.15	0.26
LDDT	1981 +	0.43	0.94	1.33	0.26
HDDV	1993-1996	2.39	10.98	7.93	0.7 g/Bhp-hr
	1997 +	2.37	10.89	7.86	

Vehicle Speed > Idle (Grams/minute)

Category	Model Ye	Hydrocarb	NOx	CO	PM
LDGV	1990 +	0.09	0.08	1.48	0.017
LDGT1	1987 +	0.03	0.02	0.34	0.017
LDGT2	1987 +	0.03	0.02	0.34	0.017
HDGV	1994-1996	0.1	0.01	0.34	0.048
	1997 +				
LDDV	1980 +	0.03	0.09	0.15	0.26
LDDT	1981 +	0.07	0.13	0.31	0.26
HDDV	1993-1996	0.27	0.22	0.67	0.7
	1997 +				

EQUATION:

Vehicle at Idle - Lbs/Test = Ef, grams/minute * Duration, minutes/test * lb/454 grams

Vehicle > Idle - Lbs/Test = Ef, grams/mile * MT, miles/test * lb/454 grams

Emission Factor (lbs/test) Light Duty Gasoline Vehicle (LDGV) - Model Year after 1990

Test Type	Hydrocarb	NOx	CO	PM
Vehicle St	0.00099	0.00088	0.0163	0.00019
Alignment	0.00059	0.00053	0.00978	0.00011
Roll Test E	0.00264	0.007	0.01507	0.00022
Vehicle Co	0.0004	0.00035	0.00652	7E-05
Repairs	0.0011	0.00292	0.00628	9E-05

Company Name: AM General Corporation
Address: 13200 McKinley Hwy., Mishawaka, Indiana 46545
PSD/Significant Source Modification: 141-11673-00031
Reviewer: Aida De Guzman

Potential Number of Tests:

Test Type	Number of Tests /Year	
	Potential (t	Potential (vehicles/year)
ALL	16.5	86,000

Potential Emissions

Test Type	Hydrocarb	NOx	CO	PM

Vehicle St	85.24	75.77	1,401.76	16.1
Alignment	51.15	45.46	841.06	9.7
Roll Test E	227.31	602.38	1,295.68	19.32
Vehicle Cc	34.1	30.31	560.7	6.44
Repairs	94.71	250.99	539.87	8.05
Totals (lb/y	492.51	1,005	4,639	60
Emissions	0.25	0.5	2.32	0.03
Emissions	0.15	0.3	1.4	0.018

Emissions, tons/yr = Ef, lb/test * potential tests/year, tests-vehicles/yr * tons/2000 lb

Appendix B: Emissions Calculations

VEHICLE START-UF

Process Description:

Vehicle powertrains are tested before the vehicles leave the assembly plant. The vehicle start-up and roll test verifies that the vehicle power train is assembled correctly.

Test Conditions:

			Equivalent Miles Traveled
Test Type	Duration (r	Speed (miles per hour (m.p.h.))	
Vehicle St	5	Idle	0
Alignment	3	Idle	0
Roll Test E	8	45	6
Vehicle Cc	2	Idle	0
Repairs	5	30	2.5

Calculations of Emissions - Based on Emission Factors

Emission Factors: Low Altitude non-California Vehicles (AP-42, 4th Edition September, 1985 Volume II, Mobile Sources) Tables 1.1.1A; 1.2.1A; 1.3.1A; 1.4.1A; 1.5.1; 1.6.1 and 1.7.1)

Vehicle Speed > Idle		(Grams/mile)			
Category	Model Ye	Hydrocarb	NOx	CO	PM
LDGV	1990 +	0.2	0.53	1.14	0.017
LDGT1	1987 +	0.51	0.86	5.6	0.017
LDGT2	1987 +	0.51	0.86	5.6	0.017
HDGV	1994-1996	0.93	4.38	12.63	0.048
	1997 +	0.91	4.3	12.39	
LDDV	1980 +	0.29	0.87	1.15	0.26
LDDT	1981 +	0.43	0.94	1.33	0.26
HDDV	1993-1996	2.39	10.98	7.93	0.7 g/Bhp-hr
	1997 +	2.37	10.89	7.86	

Vehicle Speed > Idle (Grams/minute)

Category	Model Ye	Hydrocarb	NOx	CO	PM
LDGV	1990 +	0.09	0.08	1.48	0.017
LDGT1	1987 +	0.03	0.02	0.34	0.017
LDGT2	1987 +	0.03	0.02	0.34	0.017
HDGV	1994-1996	0.1	0.01	0.34	0.048
	1997 +				
LDDV	1980 +	0.03	0.09	0.15	0.26
LDDT	1981 +	0.07	0.13	0.31	0.26
HDDV	1993-1996	0.27	0.22	0.67	0.7
	1997 +				

EQUATION:

Vehicle at Idle - Lbs/Test = Ef, grams/minute * Duration, minutes/test * lb/454 grams

Vehicle > Idle - Lbs/Test = Ef, grams/mile * MT, miles/test * lb/454 grams

Emission Factor (lbs/test) Light Duty Gasoline Vehicle (LDGV) - Model Year after 1990

Test Type	Hydrocarb	NOx	CO	PM
Vehicle St	0.00033	0.00099	0.00165	0.00286
Alignment	0.0002	0.00059	0.00099	0.00172
Roll Test E	0.00383	0.0115	0.0152	0.00344
Vehicle Co	0.00013	0.0004	0.00066	0.00115
Repairs	0.0016	0.00479	0.00633	0.00143

Potential Number of Tests:

Test Type	Number of Tests /Year	
	Potential ('	Potential (vehicles/year)
ALL	16.5	86,000

Potential Emissions

Test Type	Hydrocarb	NOx	CO	PM
Vehicle St	28.41	85.24	142.07	246.26
Alignment	17.05	51.15	85.24	147.75
Roll Test E	329.6	988.81	1,307.05	295.51
Vehicle Co	11.37	34.1	56.83	98.5
Repairs	137.33	412	544.6	123.13
Totals (lb/y	524	1,571	2,136	911
Emissions	0.26	0.79	1.07	0.46

Emissions	0.16	0.47	0.64	0.28

Emissions, tons/yr = Ef, lb/test * potential tests/year, tests-vehicles/yr * tons/2000 lb

Appendix B: Emissions Calculations

VEHICLE START-UP & ROLL T

Potential Emissions

	Gasoline F	Diesel Pot	Worst Case Potential Emissions							
Test Type	Hydrocarb	NOx	CO	PM	Hydrocarb	NOx	CO	PM	Hydrocarb	NOx
Vehicle St	85.24	75.77	1,401.76	16.1	28.41	85.24	142.07	246.26	85.24	85.24
Alignment	51.15	45.46	841.06	9.7	17.05	51.15	85.24	147.75	51.15	51.15
Roll Test E	227.31	602.38	1,295.68	19.32	329.6	988.81	1,307.05	295.51	329.6	988.81
Vehicle Cc	34.1	30.31	560.7	6.44	11.37	34.1	56.83	98.5	34.1	34.1
Repairs	94.71	250.99	539.87	8.05	137.33	412	544.6	123.13	137.3	412
Totals (lb/y	492.51	1,005	4,639	60	524	1,571	2,136	911	637.39	1,571
Emissions	0.25	0.5	2.32	0.03	0.26	0.79	1.07	0.46	0.32	0.79
Emissions	1.3	2.7	12.7	0.16	1.4	4.3	5.8	2.5	1.7	4.3

Emissions, tons/yr = Ef, lb/test * potential tests/year, tests-vehicles/yr * tons/2000 lb

_L

GASOLINE FILLING - CATEGORY #7

ft./tank

VOC

omponent i at temp t, 0.47
essel vapor space, 1.0

Pt

_L

GASOLINE FILLING - CATEGORY #7

Potential

ı the vapor 0.4694

metric gas displacement rate (cuft/tank) 0.67

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

ssions From FLUID FILL

DIESEL FILLING - CATEGORY #7

ft./tank

VOC

omponent i at temp t, 0.47
essel vapor space, 1.0

20519

Pt

ATEGORY #7

Potential

ı the vapor 0.4694

metric gas displacement rate (cuft/tank) 0.67

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

ı FLUID FILL

ANTIFREEZE FILLING - CATEGORY #7

ft./tank

Glycol

omponent i at temp t, 0.00007
essel vapor space, 1.0

Pt

sions From FLUID FILL

ANTIFREEZE FILLING- CATEGORY #7

Potential

n the vapor 0.0001

metric gas displacement rate (cuft/tank) 0.33
R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302
T = Temperature of the vessel vapor space (R) 530
Pt = The total pressure in the vessel vapor space (atm) 1.0
MW = Molecular weight of the VOC (inpu
Er = Mass emission r

PRODUCTION INFO

ssions From FLUID FILL

TRANSMISSION FLUID FILLING - CATEGORY #7

ft./tank

Distillates

omponent i at temp t, 0.0006
essel vapor space, 1.0

Pt

JID FILLING - CATEGORY #7

Potential

n the vapor 0.0006
metric gas displacement rate (cuft/tank) 0.33
R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302
T = Temperature of the vessel vapor space (R) 530
Pt = The total pressure in the vessel vapor space (atm) 1.0
MW = Molecular weight of the VOC (inpu
Er = Mass emission r

ssions From FLUID FILL

WINDSHIELD WASHER FLUID FILLING - CATEGORY #7

ft./tank

ohol

omponent i at temp t, 0.0006
essel vapor space, 1.0

Pt

ssions From FLUID FILL

WINDSHIELD WASHER FLUID FILLING - CATEGORY #7

Potential

n the vapor 0.13

metric gas displacement rate (cuft/tank) 0.03

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

POWER STEERING FLUID FILLING - CATEGORY #7

ft./tank

Distillates

ɔmponent i at temp t, 0.0006
ɛssel vapor space, 1.0

Pt

FLUID FILLING - CATEGORY #7

Potential

ı the vapor 0.0005

metric gas displacement rate (cuft/tank) 0.04

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

PRODUC

ı FLUID FILL

BRAKE FLUID FILLING - CATEGORY #7

ft./tank

›irits

›mponent i at temp t, 0.00010
ɛssel vapor space, 1.0

Pt

ɜsions From FLUID FILL

BRAKE FLUID FILLING - CATEGORY #7

Potential

ı the vapor 0.0005

metric gas displacement rate (cuft/tank) 0.03

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0

MW = Molecular weight of the VOC (inpu

Er = Mass emission r

PRODUC

ENGINE OIL FILLING - CATEGORY #7

ft./tank

Distillates

omponent i at temp t, 0.0006
essel vapor space, 1.0

sions From FLUID FILL

ENGINE OIL FILLING - CATEGORY #7

Potential

n the vapor 0.0001
metric gas displacement rate (cuft/tank) 0.03

R = Ideal gas law constant (atm - cuft/lb-mole-R) 0.7302

T = Temperature of the vessel vapor space (R) 530

Pt = The total pressure in the vessel vapor space (atm) 1.0
MW = Molecular weight of the VOC (inpu
Er = Mass emission r

› & ROLL TEST (Gasoline Fuel)- CATEGORY #9

EST (Gasoline Fuel)- CATEGORY #9

› & ROLL TEST (Gasoline Fuel)- CATEGORY #9

› & ROLL TEST (Diesel Fuel)- CATEGORY #9

START-UP & ROLL TEST (Diesel Fuel)- CATEGORY #9

'EST CATEGORY #9

CO	PM
1,401.76	246.24
841.06	147.75
1,307.05	295.51
560.7	98.5
544.6	123.13
4,655.2	911
2.32	0.46
12.7	2.49

AM General Corporation PSD / Significant Source Modification No.141-11673-00031
Mishawaka, Indiana
Reviewer: Aida De Guzman

TANKS 4.0
Emissions Report -Detail Format
Detail Calculation (AP-42)

Tanks ID	VOC Emis	VOC Emissions (tons/year)
AM Gen T	5,566	2.8
AM Gen T	2.7	0
AM Genl T	4.6	0
AM Gen T	7.8	0
AM Gen T	5,371	2.7
AM Gen T	175.8	0.1
AM Gen T	1.73	0
AM Gen T	347.8	0.17
AM Gener	0.03	0
TOTAL	11,477.5	5.8

Appendix C
Air Quality Analysis

Introduction

AM General Corporation (AM General) has applied for a Prevention of Significant Deterioration (PSD) permit to modify its existing specialty vehicle assembly plant in Mishawaka in St. Joseph County, Indiana. The site is located at Universal Transverse Mercator (UTM) coordinates 573449.4 East and 4614283.8 North. The proposed modification would consist of the installation of a new body shop, new paint shop and new trim and assembly area. Modification of the existing plant consists of relocating current sanding, masking, painting and final trim operation for the existing main plant and performing the exterior painting of the existing vehicles in the new paint shop. St. Joseph County is designated as attainment for the National Ambient Air Quality Standards. St. Joseph is a maintenance area for the 1-hour ozone standard. The county was redesignated in November of 1994. The National Ambient Air Quality Standards for Nitrogen Dioxide (NO2), Sulfur Dioxide (SO2), Carbon Monoxide (CO) and Particulate Matter less than 10 microns (PM10) are set by the United States Environmental Protection Agency (U.S. EPA) to protect the public health and welfare.

Dames and Moore prepared the PSD permit application for AM General. The permit application was received by the Office of Air Management (OAM) on December 15, 1999 with additional information received on February 16, 2000. This document provides OAMs Air Quality Modeling Section's review of the PSD permit application including an air quality analysis performed by the OAM.

Air Quality Analysis Objectives

The OAM review of the air quality impact analysis portion of the permit application will accomplish the following objectives:

A. Establish which pollutants require an air quality analysis based on the sources emissions.

B. Determine the ambient air concentrations of the source's emissions and provide analysis of actual stack height with respect to Good Engineering Practice (GEP).

C. Demonstrate that the source will not cause or cont
Ambient Air Quality Standard (NAAQS) or Prevention
increment.

D. Perform an analysis of any a
population.

E. Perform a brief qualitative analys
vegetation and visibility in the impac
nearest Class I area is Kentucky's M
from the proposed modification site

Summary

AM General Corporation has applied for a PSD construction permit to modify its existing specialty vehicle assembly plant in Mishawaka in St. Joseph County, Indiana. The PSD application was prepared by Dames and Moore of Rolling Meadows, Illinois. St. Joseph County is currently designated as attainment for all criteria pollutants, St Joseph County was redesignated to attainment for the 1-hour ozone standard in November of 1994 and is a maintenance area. Emission rates of one pollutant (Volatile Organic Compounds (VOCs)) associated with the proposed modification exceeded significant emission rates established in state and federal law, thus requiring air quality modeling. OAM conducted Hazardous Air Pollutant (HAPs) modeling and all HAP 8-hour maximum concentrations modeled below 0.5% of each Permissible Exposure Limit (PEL). There was no impact review conducted for the nearest Class I area, which is Mammoth Cave National Park in Kentucky. An additional impact analysis on the surrounding area was conducted and showed no significant impact on economic growth, soils, vegetation, federal and state endangered species or visibility from the proposed modification.

Part A - Pollutants Analyzed for Air Quality Impact

Indiana Administrative Code (326 IAC 2-2) PSD requirements apply in attainment and unclassifiable areas and require an air quality impact analysis of each regulated pollutant emitted in significant amounts by a new major stationary source or modification. Significant emission levels for each pollutant are defined in 326 IAC 2-2-1. CO, NO2, SO2, VOCs and PM10 will be emitted from AM

General and an air quality analysis is required for VOCs which exceeded its significant emission rate as shown in Table 1. It should be noted that all emissions are based on the Best Available Control Technology (BACT) determination and other limitations resulting from the OAM review of the application.

TABLE 1 - AM General Significant Emission Rates (tons/yr)

Pollutant	Maximum	Significant Emission Rate
CO	64.4	100
NO2	37.5	40
SO2	0.5	40
PM10	11.2	15
VOCs (ozo 0	260	40

Significant emission rates are established to determine whether a source is required to conduct an air quality analysis. If a source exceeds the significant emission rate for a pollutant, air dispersion modeling is required for that specific pollutant. A modeling analysis for each pollutant is conducted to determine whether the source modeled concentrations would exceed significant impact increments. Modeled concentrations below significant impact increments are not required to conduct further air quality modeling. Modeled concentrations exceeding the significant impact increment would be required to conduct more refined modeling which would include source inventories and background data.

Part B - Ozone Impact Analysis

Ozone formation tends to occur in hot, sunny weather when NOx and VOC emissions photochemically react to form ozone. Many factors such as light winds, hot temperatures and sunlight are necessary for higher ozone production. As per OAM instruction, Dames and Moore submitted its own ozone transport analysis from the proposed AM General modification. This included a wind rose analysis and a Reactive Plume Model-IV (RPM-IV) modeling analysis, which Dames and Moore has used in previous ozone analysis for other projects. The results of the wind rose analysis and the RPM-IV results show that any potential plume emitted from the facility would fall out to the northeast during ozone-conducive conditions in the summer months and potential ozone impacts would be low.

OAM Three-Tiered Ozone Review

OAM incorporates a three-tiered approach in evaluating ozone impacts from a single source. The first step is to determine how NOx and VOC emissions from the new source compare to area-wide NOx and VOC emissions from St. Joseph County as well as the surrounding counties of Elkhart, Kosciusko, LaPorte, Marshall and Starke. Results from this analysis show AM Generals 37.5 tons/yr of NOx would comprise much less than 1% of the area-wide NOx emissions from point, area, onroad and nonroad mobile source and biogenic (naturally-occurring emissions from trees, grass and plants) emissions. AM Generals 260.0 tons/yr of VOC emissions would comprise less than 1% of the area-wide VOC emissions from the different emission sources listed above.

A second step is to review historical monitored data to determine ozone trends for an area and the applicable monitored value assigned to an area for designation determinations. This value is known as the design value for an area. The nearest ozone monitors within this region are the Potato Creek monitor in southwest St. Joseph County which is 25 kilometers (16 miles) to the southwest, the South Bend monitor which is 10 kilometers (6 miles) to the west and the Granger monitor which is 8 kilometers (5 miles) to the north. The Potato Creek monitor is considered upwind while the South Bend and Granger monitors are considered downwind of the facility. The design value for the Potato Creek monitor for the 1-hour ozone standard over the latest three years of monitoring data (1997-1999) is 109 parts per billion (ppb). The South Bend monitor design value is 113 ppb while the Granger monitor design value is 117 ppb for the 1-hour ozone standard over the same period. Wind rose analysis indicates that prevailing winds in the area occur from the southwest and south-southwest during the months of May through September when ozone formation is most likely to occur. Ozone impacts from the modification would likely fall north, northeast and east northeast of the facility, potentially impacting the Granger monitor during ozone conducive weather conditions.

A third step in evaluating the ozone impacts from a single source is to estimate the source individual impact through a screening procedure. The Reactive Plume Model-IV (RPM-IV) has been used in past air quality reviews to determine 1-hour ozone impacts from single VOC/NOx source emissions. RPM-IV is listed as an alternative model in Appendix B to the 40 Code of Federal Register Part 51, Appendix W Guideline on Air Quality Models. The model is unable to simulate all

meteorological and chemistry conditions present during an ozone episode (period of days when ozone concentrations are high). Results from RPM-IV are an estimation of potential ozone impacts. Modeling for 1-hour ozone concentrations was conducted for May 22, 1994, a high ozone day with the highest monitored ozone concentration of 124 parts per billion. This information was used to compare to the 1-hour ozone National Ambient Air Quality Standard (NAAQS) limit. The maximum cell concentration for each time and distance specified was used to compare to the ambient ozone mode. OAM modeling results assumed the short-term emission rates of NO2 and VOCs and are shown in Appendix A. The impact (difference between the plume-injected and ambient modes) from AM General was 2.7 ppb early in the plume development. All ambient plus plume-injected modes were below the NAAQS limit for ozone at every time period and every distance. There were no 1-hour violations of the ozone NAAQS .

Urban Airshed Model (UAM) analysis for regional ozone transport has been conducted by OAM as well as the states surrounding Lake Michigan and various national organizations. UAM is regarded as a regional modeling tool used to develop ozone attainment demonstrations and determine NOx and VOC emission controls for a region. Transport of ozone and ozone-forming pollutants from upwind areas is evident and aid in increased ozone concentrations in St. Joseph County. Previous experience with this model has shown that the amount of additional NOx and VOC emissions from AM General, which are a tiny fractions of the pollutants regionally, would not noticeably increase ozone concentrations in the area.

From this three-tiered approach, ozone formation is a regional issue and the emissions from the AM General modification will represent a small fraction of VOC emissions and even smaller fraction of the NOx emissions in the area. Ozone contribution from AM General is expected to be minimal. Historical ozone data shows that the ozone monitors in the area have design values below the ozone NAAQS of 120 ppb and the AM General ozone impact based on the emissions and modeling will have minimal impact on ozone concentrations in the area.

Part C - Hazardous Air Pollutant Analysis and Results

As part of the air quality analysis, OAM requests data concerning the emission of 188 Hazardous Air Pollutants (HAPs) listed in the 1990 Clean Air Act Amendments which are either carcinogenic or otherwise considered toxic. These substances are listed as air toxic compounds on the State of Indiana, Department of Environmental Management, Office of Air Managements construction permit application Form Y. Any one HAP over 10 tons/year or all HAPs with total emissions over 25 tons/year will be subject to toxic modeling analysis.

Model Description

The Office of Air Management review used the Industrial Source Complex Short Term (ISCST3) model, Version 3, dated June 4, 1999 to determine maximum off-property concentrations or impacts for each pollutant. All regulatory default options were utilized in the United States Environmental Protection Agency (U.S. EPA) approved model, as listed in the 40 Code of Federal Register Part 51, Appendix W Guideline on Air Quality Models. The Auer Land Use Classification scheme was referred to determine the land use in a 3 kilometer (1.9 miles) radius from the source. The area is considered commercial and residential, therefore a rural classification was used. The model also utilized the Schulman-Scire algorithm to account for building downwash effects. Stacks associated with the proposed modification are below the Good Engineering Practice (GEP) formula for stack heights. This indicates that wind flow over and around surrounding buildings can influence the dispersion of concentrations coming from the stacks. 326 IAC 1-7-3 requires a study to demonstrate that excessive modeled concentrations will not result from stacks with heights less than the GEP stack height formula. These aerodynamic downwash parameters were calculated using U.S. EPAs Building Profile Input Program (BPIP).

Meteorological Data

The meteorological data used in the ISCST3 model consisted of the latest available year of surface data from the South Bend National Weather Service station merged with the mixing heights from Peoria, Illinois Airport National Weather Service station. This 1994 meteorological data was purchased through the National Oceanic and Atmospheric Administration (NOAA) and National Climatic Data Center (NCDC) and preprocessed into ISCST3-ready format with a version of U.S. EPAs PCRAMMET.

Receptor Grid

OAM modeling utilized receptor grids out to 10 kilometers. Dense receptor grids surround the property with receptors spaced every 100 meters (328 feet) out to 650 meters (0.4 miles), receptors spaced every 250 meters (656 feet) from 650 meters to 2 kilometers (1.25 miles), receptors spaced every 500 meters (1640 feet) from 2 kilometers to 7.5 kilometers (4.6 miles) and 1000 meters (3280 feet) from 7.5 kilometers to 10 kilometers (6.2 miles). Discrete receptors were placed every 100 meters on AM Generals property lines.

Modeled Emissions Data

The modeling used the emission rates listed in Appendix D of the application and was reviewed and revised by OAM. OAM performed toxic modeling using the ISCST3 model for all HAPs. Maximum 8-hour concentrations were determined and the concentrations were recorded as a percentage of each HAP Permissible Exposure Limit (PEL). The PELs were established by the Occupational Safety and Health Administration (OSHA) and represent a workers exposure to a pollutant over an 8-hour work day or a 40-hour work week. In Table 2 below, the results of the HAP analysis with the emission rates, modeled concentrations and the percentages of the PEL for each HAP are listed. All HAPs concentrations were modeled below 0.5% of their respective PELs. The 0.5% of the PEL represents a safety factor of 200 taken into account when determining the health risk of the general population. 2-Butanone and Methyl Ethyl Ketone are the same HAP and will be listed as Methyl Ethyl Ketone.

TABLE 2 - Hazardous Air Pollutants Analysis

Hazardou	Maximum (tons/year)	Maximum (ug/m3)	PEL (ug/m3)	Percent of PEL (%)
Cumene	9.5	3.3	245000	0.001
Ethyl Benz	26	80.3	435000	0.02
Ethylene G	3	9.4	125000	0.008
Formaldeh	0.7	1.25	930	0.1
Methyl Eth	0.8	7.5	590000	0.001
Methyl Iso	79.6	270.6	410000	0.1
MDI 4-4 Is	0.03	0.4	200	0.2
Phthalic A	92.4	48	12000	0.4
Toluene	100.7	169.2	750000	0.02
Xylene	171.7	433.4	435000	0.1

Part D - Additional Impact Analysis

PSD regulations require additional impact analysis be conducted to show that impacts associated with the facility would not adversely affect the surrounding area. The AM General PSD permit application provided an additional impact analysis performed by Dames and Moore. This analysis included an impact assessment on economic growth, soils, vegetation, federal and state endangered/ threatened species and visibility. The endangered species assessment was received February 16, 2000 and is a separate attachment from the application.

Economic Growth and Impact of Construction Analysis

A construction workforce of 500 is expected and AM General will employ from 300 to 500 people selected from the local and regional area once the modification is operational. Secondary emissions are not expected to significantly impact the area as all roadways will be paved. Industrial and residential growth is predicted to have negligible impact in the area since it will be dispersed over a large area and new home construction is not expected to significantly increase. Any commercial growth, as a result of the proposed modification, will occur at a gradual rate and will be accounted for in the background concentration measurements from air quality monitors. A minimal number of support facilities will be needed. There will be no adverse impact in the area due to industrial, residential or commercial growth.

Soils and Vegetation Analysis

Secondary NAAQS limits were established to protect general welfare which includes soils, vegetation, animals and crops. Soil types in St. Joseph County are predominately an Oshtemo-Fox, Tyner, Renesselaer-Gilford-Maumee and Houghton-Adrian-Palms Association (Soil Survey of St. Joseph County, U.S. Department of Agriculture). The general landscape consists of Kankakee Outwash and Lacustrine Plain or gently rolling terrain (Indiana Geological Survey). According to the modeled concentrations CO, NO2, SO2 and PM10 and the HAPs analysis, the soils will not be adversely affected

by the modification.
25127

Due to the agricultural nature of the land, crops in the St. Joseph County area consists mainly of corn, wheat, soybeans and hay (1992 Agricultural Census for St. Joseph County). The maximum modeled concentrations of the proposed modification for CO, NO2, SO2 and PM10 are well below the threshold limits necessary to have adverse impacts on surrounding vegetation such as autumn bent, nimblewill, barnyard grass, bishopscap and horsetail milkweed (Flora of Indiana - Charles Deam). Trees in the area are mainly Beech, Maple, Pine, Oak and Hickory. These are considered hardy trees and due to the modeled concentrations, no significant adverse impacts are expected. Livestock in the county consist mainly of beef and milk cows, hogs, sheep and chickens (1992 Agricultural Census for St. Joseph County) and will not be adversely impacted from the modification.

Federal and State Endangered Species Analysis

Federally endangered or threatened species as listed in the U.S. Fish and Wildlife Service , Division of Endangered Species for Indiana include 12 species of mussels, 4 species of birds, 2 species of bat and butterflies and 1 specie of snake. The mussels and birds listed are commonly found along major rivers and lakes while the bats are found near caves. The proposed modification will not adversely impact these habitats of the statewide threatened or endangered species of the Indiana Bat and Bald Eagle. The copperbelly water snake makes its habitat in St. Joseph, Kosciusko and Steuben counties along wooded and permanently wet areas. The impacts from the proposed modification are not expected to have any additional adverse effects on the habitats of the species than what has already occurred from the industrial and residential activities in the area.

Federally endangered or threatened plants as listed in the U.S. Fish and Wildlife Service , Division of Endangered Species for Indiana list two threatened and one endangered species of plants. The endangered plant is found along the sand dunes in northern Indiana while the two threatened species do not thrive in industrialized and residential areas. The proposed modification is not expected to impact the area further.

The state of Indianas list of endangered, special concern and extirpated nongame species, as listed in the Department of Natural Resources, Division of Fish and Wildlife, contains species of birds, amphibians, fish, mammals, mollusks and reptiles which may be found in the area of the AM General proposed modification. However, the impacts are not expected to have any additional adverse effects on the habitats of the species than what has already occurred from the industrial and residential activity in the area.

Additional Analysis Conclusions

The nearest Class I area to the proposed modification is the Mammoth Cave National Park located approximately 490 km southwest in Kentucky. Operation of the proposed modification will not adversely affect the visibility at this Class I area. The results of the additional impact analysis conclude the AM General proposed modification will have no adverse impact on economic growth, soils, vegetation, endangered or threatened species or visibility on any Class I area.
30247

APPENDIX A - RPM-IV Modeling for AM General - Emissions from RTO stack
NAAQS Analysis for Ozone (May 22, 1994)

Time (hours)	Distance (meters)	Ambient (ppb)	Plume-Inje (ppb)	Source Impact (ppb)
700.0	100	30	30	0
800.0	8680	44.9	47.6	2.7
900.0	24500	61.9	63.5	1.6
1000	44100	79.6	81.4	1.8
1100	63500	95.8	97	1.2
1200	80800	107	108	1
1300	96400	114	114	0
1400	110000	119	117	-2

1500	128000	122	119	-3
1600	147000	123	120	-3
1700	164000	124	121	-3
1800	182000	124	121	-3
1900	196000	124	122	-2

AM General Corporation PSD / Significant Source Modification No.141-11673-00031
Mishawaka, Indiana
Reviewer: Aida De Guzman

TANKS 4.0
Emissions Report -Detail Format
Detail Calculation (AP-42)

Tanks ID	VOC Emis	VOC Emissions (tons/year)
AM Gen T	5,566	2.8
AM Gen T	2.7	0
AM Genl T	4.6	0
AM Gen T	7.8	0
AM Gen T	5,371	2.7
AM Gen T	175.8	0.1
AM Gen T	1.73	0
AM Gen T	347.8	0.17
AM Gener	0.03	0
TOTAL	11,477.5	5.8