



200 Centennial Court  
Morristown, TN 37814

## COLGATE PALMOLIVE COMPANY

December 17, 2015

Ms. Michelle Walker Owenby  
Technical Secretary  
William R. Snodgrass Tower  
312 Rosa L. Parks Avenue, 15th Floor  
Nashville, TN 37243

DEC 23 2015 AM 10:04

Subject: Construction Permit Application for Fire Pump Engines Subject to 40 CFR 60  
Subpart IIII  
Colgate-Palmolive Company – Morristown, TN  
Emission Source Reference No.: 32-0238

Dear Ms. Owenby:

Colgate-Palmolive Company (Colgate-Palmolive), located in Morristown, Tennessee, currently holds two minor source operating permits for two boilers and a storage silo (No. 060782F and No. 061868P, respectively) issued by the Tennessee Air Pollution Control Division (TNAPC). Colgate-Palmolive recently obtained a construction permit application for an existing 536 horsepower diesel-fired emergency generator, and recently became aware of applicable requirements related to fire pump engines at the facility. The fire pump engines are subject to the requirements of 40 CFR Part 60, Subpart IIII – Standards of Performance For Stationary Compression Ignition Internal Combustion Engines (NSPS IIII). Previously, these fire pump engines were understood to be insignificant emission units which did not require an air pollution permit per TNAPCR 1200-03-09-.04. However, TNAPCR 1200-03-09-.04(5)(c)1, states that regardless of any State exemption, no emissions unit or activity subject to a federally enforceable applicable requirement (other than generally applicable requirements of the State Implementation Plan) shall qualify as an insignificant emissions unit or activity.

This construction permit application has been prepared to provide information required by the TNAPC. Construction permit application forms are included in Attachment 1 and supporting potential emissions calculations are included in Attachment 2. Potential emissions from the fire pump engines will not change the facility's minor source status. Per EPA guidance, potential emissions are based on 500 hours of operation per year (per fire pump engine).

### Regulatory Applicability

The federal EPA issued standards of performance for stationary compression ignition (CI) internal combustion engines on July 11, 2006 and amended the final standards in June 2011. Each of the fire pump engines are defined as new stationary RICE under 40 CFR Part 63, Subpart ZZZZ because they were constructed after June 12, 2006 [40 CFR §63.6590(a)(2)(iii)]<sup>1</sup>. The fire pump engines comply with the requirements of 40 CFR Part 63, Subpart ZZZZ by complying with the requirements of 40 CFR Part 60, Subpart IIII [40 CFR §63.6590(c)(1)].

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<sup>1</sup> There are two fire pump engines located at the facility. The Cummins fire pump engine (Emission Source No. C-4) was manufactured August 26, 2006. The John Deere fire pump engine (Emission Source No. C-5) was manufactured on September 19, 2006.

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The requirements for a new CI fire pump engine include compliance with the emission limits established in 40 CFR Part 60, Table 4 per 40 CFR §60.4205(c)<sup>2</sup>. Colgate-Palmolive will comply with the requirement to use diesel fuel with a maximum sulfur content of 15 ppm per §60.4207(b). Colgate-Palmolive will operate the emergency engine in a manner consistent with good air pollution control practices [40 CFR §60.4206]. The engines are equipped with a non-resettable hour meter as required by 40CFR 60.4209(a). Colgate-Palmolive complies with the requirements of 40 CFR §60.4211 by keeping records of manufacturer data indicating compliance with emission standards established in NSPS IIII, Table 4 and maintaining engine certification documentation. An initial notification and notification of compliance status are not required for emergency engines per 40 CFR 60.4214(b). Colgate-Palmolive will track operating hours spent in emergency and non-emergency operation. Non-emergency operation will not exceed a total of 100 hours per calendar year for readiness and maintenance testing, per 40 CFR 60.4211(f)(2).

Please contact David Mooneyham, EOHS Manager, at (423) 522-3304 with any questions related to this request.

I, the undersigned, am the responsible official as defined in TNAPCR 1200-3-9-.02(11)(b)21 of the source for which this document is being submitted. I certify, based upon the information and belief formed after reasonable inquiry, that the statements made and data contained in this construction permit application are true, accurate, and complete.

Sincerely,



Dariusz Jurczak  
Director of Manufacturing

Cc: David Mooneyham, Colgate-Palmolive  
Jeff Twaddle, P.E., ERM  
Lauren Asher, ERM

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<sup>2</sup> The fire pump engines are each certified to meet EPA's emission standards. The documentation for the John Deere engine references "EPA 40 CFR Part 60" instead of 40 CFR Part 89, Subpart C standards. Although the documentation references NSPS IIII, the John Deere engine is certified to meet the applicable emission limits established in 40 CFR Part 89.

State of Tennessee  
 Department of Environment and Conservation  
 Division of Air Pollution Control  
 William R. Snodgrass Tennessee Tower  
 312 Rosa L. Parks Avenue, 15<sup>th</sup> Floor  
 Nashville, TN 37243  
 Telephone: (615) 532-0554




DEC 25 2015 4:04 PM C 100

## NON-TITLE V PERMIT APPLICATION FACILITY IDENTIFICATION

Please type or print and submit in duplicate for each emission source. Attach appropriate source description forms.				
<b>SITE INFORMATION</b>				
1. <b>Organization's legal name</b> Colgate-Palmolive Company			For APC use only	APC Company point no. <b>32-0238</b>
2. <b>Site name</b> (if different from legal name)				APC Log/Permit no. <b>971193P</b>
3. <b>Site address</b> (St./Rd./Hwy.) 200 Centennial Court			County name Hamblen	
City or distance to nearest town Morristown, TN		Zip code 37813	4. <b>NAICS or SIC code</b> 2844	
5. <b>Site location</b> (in lat. /long.)	Latitude 36° 12' 50" N		Longitude 83° 17' 41" W	
<b>CONTACT INFORMATION (RESPONSIBLE PERSON)</b>				
6. <b>Responsible person/Authorized contact</b> Dariusz Jurczak, Director of Manufacturing			Phone number with area code 423-522-3001	
<b>Mailing address</b> (St./Rd./Hwy.) 200 Centennial Court			Fax number with area code	
City Morristown	State TN	Zip code 37813	Email address Dariusz_Jurczak@colpal.com	
<b>CONTACT INFORMATION (TECHNICAL)</b>				
7. <b>Principal technical contact</b> David Mooneyham, EOHs Manager			Phone number with area code 423-522-3304	
<b>Mailing address</b> (St./Rd./Hwy.) 200 Centennial Court			Fax number with area code	
City Morristown	State TN	Zip code 37813	Email address David_Mooneyham@colpal.com	
<b>CONTACT INFORMATION (BILLING)</b>				
8. <b>Billing contact</b> David Mooneyham, EOHs Manager			Phone number with area code 423-522-3304	
<b>Mailing address</b> (St./Rd./Hwy.) 200 Centennial Court			Fax number with area code	
City Morristown	State TN	Zip code 37813	Email address David_Mooneyham@colpal.com	
<b>EMISSION SOURCE INFORMATION</b>				
9. <b>Emission source no.</b> (number which uniquely identifies this source) C-4 & C-5				
10. <b>Brief description of emission source</b> Two existing emergency fire pump diesel engines.				
11. <b>Normal operation:</b>	Hours/Day <500 hrs/yr	Days/Week N/A	Weeks/Year N/A	Days/Year N/A
12. <b>Percent annual throughput</b>	Dec. – Feb. N/A	March – May N/A	June – August N/A	Sept. – Nov. N/A

(Over)

TYPE OF PERMIT REQUESTED				
13. Operating permit ( X )	Date construction started Aug. 2006 and Sept. 2006	Date completed Aug. 2006 and Sept. 2006	Last permit no. N/A	Emission source reference number N/A
Construction permit ( )	Last permit no.		Emission source reference number	
If you choose Construction permit, then choose either New Construction, Modification, or Location transfer				
	New Construction ( )	Starting date N/A - existing fire pumps	Completion date N/A - existing fire pumps	
	Modification ( )	Date modification started or will start	Date completed or will complete	
	Location transfer ( )	Transfer date	Address of last location	
14. Describe changes that have been made to this equipment or operation since the last construction or operating permit application:				
N/A				
SIGNATURE				
Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application and any attached application(s) is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.				
15. Signature (application must be signed before it will be processed)			Date	
			Dec 18, 2015	
Signer's name (type of print) Dariusz Jurczak		Title Director of Manufacturing	Phone number with area code 423-522-3001	

#### Table of Pollution Reduction Device or Method Codes

**Note:** For cyclones, settling chambers, wet scrubbers, and electrostatic precipitators; the efficiency ranges correspond to the following percentages:

High: 95-99+%      Medium: 80-95%      And Low: Less than 80%.

If the system has several pieces of connected control equipment, indicate the sequence. For example: 008'010.97%

If none of the below codes fit, use 999 as a code for other and specify in the comments.

No Equipment.....	000	Limestone Injection - Dry.....	041
Activated Carbon Adsorption.....	048	Limestone Injection - Wet.....	042
Afterburner - Direct Flame.....	021	Liquid Filtration System.....	049
Afterburner - Direct Flame with Heat Exchanger.....	022	Mist Eliminator - High Velocity.....	014
Afterburner - Catalytic.....	019	Mist Eliminator - Low Velocity.....	015
Afterburner - Catalytic with Heat Exchanger.....	020	Process Change.....	046
Alkalized Alumina.....	040	Process Enclosed.....	054
Catalytic Oxidation - Flue Gas Desulfurization.....	039	Process Gas Recovery.....	060
Cyclone - High Efficiency.....	007	Settling Chamber - High Efficiency.....	004
Cyclone - Medium Efficiency.....	008	Settling Chamber - Medium Efficiency.....	005
Cyclone - Low Efficiency.....	009	Settling Chamber - Low Efficiency.....	006
Dust Suppression by Chemical Stabilizers or Wetting Agents.....	062	Spray Tower (Gaseous Control Only).....	052
Electrostatic Precipitator - High Efficiency.....	010	Sulfuric Acid Plant - Contact Process.....	043
Electrostatic Precipitator - Medium Efficiency.....	011	Sulfuric Acid Plant - Double Contact Process.....	044
Electrostatic Precipitator - Low Efficiency.....	012	Sulfur Plant.....	045
Fabric Filter - High Temperature.....	016	Vapor Recovery System (Including Condensers, Hooding and Other Enclosures).....	047
Fabric Filter - Medium Temperature.....	017	Venturi Scrubber (Gaseous Control Only).....	053
Fabric Filter - Low Temperature.....	018	Wet Scrubber - High Efficiency.....	001
Fabric Filter - Metal Screens (Cotton Gins).....	059	Wet Scrubber - Medium Efficiency.....	002
Flaring.....	023	Wet Scrubber - Low Efficiency.....	003
Gas Adsorption Column - Packed.....	050	Wet Suppression by Water Sprays.....	061
Gas Adsorption Column - Tray Type.....	051		
Gas Scrubber (General: Not Classified).....	013		

#### Table of Emission Estimation Method Codes

Not application / Emissions are known to be zero.....	0
Emissions based on source testing.....	1
Emissions based on material balance using engineering expertise and knowledge of process.....	2
Emissions calculated using emission factors from EPA publications No. AP-42 Compilation of Air Pollution Emissions Factors.....	3
Judgment.....	4
Emissions calculated using a special emission factor different from that in AP-42.....	5
Other (Specify in comments).....	6

State of Tennessee  
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 Telephone: (615) 532-0554



APC 101

## NON-TITLE V PERMIT APPLICATION EMISSION POINT DESCRIPTION

Please type or print and submit in duplicate for each stack or emission source. Attach to the Non-Title V Facility Identification Form (APC 100).							
<b>GENERAL IDENTIFICATION AND DESCRIPTION</b>							
<b>1. Organization name</b> Colgate-Palmolive Company						For APC use only	APC Company point no.
<b>2. Emission source no.</b> (As on Non-Title V Facility Identification Form) C-5							APC Log/Permit no.
<b>3. Brief emission point description</b> (Attach a sketch if appropriate): John Deere Emergency Fire Pump Engine (Model 6081HF001).						Distance to nearest property line (Ft.) 370	
<b>STACK AND EMISSION DATA</b>							
<b>4. Stack or emission point data:</b>	Height above grade (Ft.) → 5.4	Diameter (Ft.) 0.5	Temperature (°F) 800	% of time over 125°F 100%	Direction of exit (Up, down or horizontal) Up		
Data at exit conditions: →	Flow (actual Ft. <sup>3</sup> /Min.) 2418	Velocity (Ft./Sec.) 205	Moisture (Grains/Ft. <sup>3</sup> ) Unknown		Moisture (Percent) Unknown		
Data at standard conditions: →	Flow (Dry std. Ft. <sup>3</sup> /Min.) 1017	Velocity (Ft./Sec.) 85	Moisture (Grains/Ft. <sup>3</sup> ) Unknown		Moisture (Percent) Unknown		
<b>5. Air contaminants</b>	Actual emissions				Emissions est. method code	Control devices *	Control efficiency%
	Emissions (Lbs./Hr.)		Concentration	Avg. emissions (Tons/Yr.)			
	Average	Maximum					
Particulate matter	0.31	0.31	**	0.08	5	N/A	N/A
Sulfur dioxide (SO <sub>2</sub> )	0.73	0.73	***	0.18	3	N/A	N/A
Carbon monoxide (CO)	2.03	2.03	PPM	0.51	5	N/A	N/A
Organic compounds	0.89	0.89	PPM	0.22	3	N/A	N/A
Nitrogen oxides (NO <sub>x</sub> )	6.10	6.10	PPM	1.53	5	N/A	N/A
Fluorides							
Greenhouse gases (CO <sub>2</sub> equivalents)	407	407		102	5	N/A	N/A
Hazardous air pollutant (specify)							
Hazardous air pollutant (specify)							
Other (specify) Total HAP	9.63E-03	9.63E-03		2.41E-03	3	N/A	N/A
Other (specify)							
Other (specify)							

(Over)

<b>6. Check types of monitoring and recording instruments that are attached:</b> Opacity monitor (            ), SO <sub>2</sub> monitor (            ), NO <sub>x</sub> monitor (            ), Other (specify in comments) (            )	
<b>7. Comments</b> Emergency fire pump engine subject to NSPS IIII	
<b>8. Control device or Method code description:</b>	Description of operating parameters of device (flow rate, temperature, pressure drop, etc.): N/A

\* Refer to the tables below for estimation method and control device codes.

\*\* Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft<sup>3</sup> (70°F), Wood fired boilers - Grains/Dry Standard Ft<sup>3</sup> (70°F), all other boilers – Lbs. /Million BTU heat input.

\*\*\* Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input

**Table of Pollution Reduction Device or Method Codes**  
**(Alphabetical listing)**

**Note:** For cyclones, settling chambers, wet scrubbers, and electrostatic precipitators; the efficiency ranges correspond to the following percentages:

High: 95-99%                      Medium: 80-95%                      And Low: Less than 80%.

If the system has several pieces of connected control equipment, indicate the sequence. For example: 008'010.97%

If none of the below codes fit, use 999 as a code for other and specify in the comments.

No Equipment.....	000	Limestone Injection – Dry.....	041
Activated Carbon Adsorption.....	048	Limestone Injection – Wet .....	042
Afterburner – Direct Flame .....	021	Liquid Filtration System.....	049
Afterburner – Direct Flame with Heat Exchanger .....	022	Mist Eliminator – High Velocity.....	014
Afterburner – Catalytic.....	019	Mist Eliminator – Low Velocity .....	015
Afterburner – Catalytic with Heat Exchanger.....	020	Process Change.....	046
Alkalized Alumina .....	040	Process Enclosed .....	054
Catalytic Oxidation – Flue Gas Desulfurization .....	039	Process Gas Recovery .....	060
Cyclone – High Efficiency.....	007	Settling Chamber – High Efficiency .....	004
Cyclone – Medium Efficiency .....	008	Settling Chamber – Medium Efficiency .....	005
Cyclone – Low Efficiency.....	009	Settling Chamber – Low Efficiency.....	006
Dust Suppression by Chemical Stabilizers or Wetting Agents .....	062	Spray Tower (Gaseous Control Only).....	052
Electrostatic Precipitator – High Efficiency .....	010	Sulfuric Acid Plant – Contact Process .....	043
Electrostatic Precipitator – Medium Efficiency.....	011	Sulfuric Acid Plant – Double Contact Process .....	044
Electrostatic Precipitator – Low Efficiency .....	012	Sulfur Plant .....	045
Fabric Filter – High Temperature .....	016	Vapor Recovery System (Including Condensers, Hooding and	
Fabric Filter – Medium Temperature.....	017	Other Enclosures) .....	047
Fabric Filter – Low Temperature.....	018	Venturi Scrubber (Gaseous Control Only).....	053
Fabric Filter – Metal Screens (Cotton Gins).....	059	Wet Scrubber – High Efficiency .....	001
Flaring.....	023	Wet Scrubber – Medium Efficiency.....	002
Gas Adsorption Column – Packed .....	050	Wet Scrubber – Low Efficiency.....	003
Gas Adsorption Column – Tray Type.....	051	Wet Suppression by Water Sprays.....	061
Gas Scrubber (General: Not Classified).....	013		

**Table of Emission Estimation Method Codes**

Not application / Emissions are known to be zero.....	0
Emissions based on source testing .....	1
Emissions based on material balance using engineering expertise and knowledge of process .....	2
Emissions calculated using emission factors from EPA publications No. AP-42 Compilation of Air Pollution Emissions Factors .....	3
Judgment.....	4
Emissions calculated using a special emission factor different from that in AP-42 .....	5
Other (Specify in comments) .....	6

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APC 102

## NON-TITLE V PERMIT APPLICATION PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Please type or print and submit in duplicate and attach to the Non-Title V Facility Identification Form (APC 100).			
<b>GENERAL IDENTIFICATION AND DESCRIPTION</b>			
<b>1. Organization name</b> Colgate-Palmolive Company		For APC use only	APC Company – Point no.
<b>2. Emission source no.</b> (As on Non-Title V Facility Identification Form) C-5			APC Log/Permit no.
<b>3. Description of process unit</b> John Deere Emergency Fire Pump Engine (Model 6081HF001).			
<b>PROCESS SOURCE DESCRIPTION AND DATA</b>			
<b>4. Type of source</b>		(Check only one option below)	
Process Source: Apply for a separate Permit for each source. (Check at right and complete lines 5, 6, and 11)		(   )	
Process Source with in process fuel: Products of combustion contact materials heated. Apply for a separate permit for each source. (Check at right and complete lines 5, 6, and 8 through 11)		(   )	
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 7 to 11)		( X )	
<b>5. Type of operation:</b> Continuous (   )                      Batch (   )		Normal batch time	Normal batches/day
<b>6. Process material inputs and In-process solid fuels</b>	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

\* A simple process flow diagram must be attached.

(Over)

BOILER, BURNER, GENERATOR, OR SIMILAR FUEL BURNING PROCESS DESCRIPTION									
7. <b>Boiler or burner data:</b> (Complete lines 7 to 11 using a separate form for each boiler, burner, etc.)									
Number	Stack number**	Type of firing***	Rated horsepower	Rated input capacity (10 <sup>6</sup> BTU/Hr.)	Other rating (specify capacity and units)				
N/A	N/A	N/A	355	2.42	265 kW				
Serial no.	Date constructed	Date manufactured	Date of last modification (explain in comments below)						
RG6081H177026	2006	2006	N/A						
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).									
FUEL USED IN BOILER, BURNER, GENERATOR, OR SIMILAR FUEL BURNING SOURCE									
8. <b>Fuel data:</b> (Complete for a process source with in process fuel or a non-process fuel burning source)									
Primary fuel type (specify)				Standby fuel type(s) (specify)					
Diesel				N/A					
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code		
		Design	Average						
Natural gas:	10 <sup>6</sup> Cu. Ft.	Cu. Ft.	Cu. Ft.	/ / / / /	/ / / / /	1,000			
#2 Fuel oil:	10 <sup>3</sup> Gal. 8.75	Gal. 17.5	Gal. 17.5	0.0015	/ / / / /	138,000 (Btu per gallon)			
#5 Fuel oil:	10 <sup>3</sup> Gal.	Gal.	Gal.		/ / / / /				
#6 Fuel oil:	10 <sup>3</sup> Gal.	Gal.	Gal.		/ / / / /				
Coal:	Tons	Lbs.	Lbs.						
Wood:	Tons	Lbs.	Lbs.	/ / / / /	/ / / / /				
Liquid propane:	10 <sup>3</sup> Gal.	Gal.	Gal.	/ / / / /	/ / / / /	85,000			
Other (specify type & units):									
9. <b>If Wood is used as a fuel, specify types and estimate percent by weight of bark</b>									
N/A									
10. <b>If Wood is used with other fuels, specify percent by weight of wood charged to the burner.</b>									
N/A									
11. <b>Comments</b>									
Emergency fire pump engine subject to NSPS IIII									

**Colgate-Palmolive  
Morristown, Tennessee  
John Deere Emergency Fire Pump Engine  
Emissions Calculations**

**Engine Specifications:**

No. of Fire Pumps: 1  
Fuel type: Diesel  
Engine Size: 355 HP  
Hours of Operation: 500 hr/yr (PTE Based on Federal Guidance)

**Potential Emissions**

Pollutant <sup>1</sup>	Emission Factors (lb/hp-hr)	Emission Rate (lb/hr) <sup>2</sup>	Emission Rate (tpy) <sup>3</sup>	Emission Factor Source
Total PM <sub>10</sub> <sup>6</sup>	8.82E-04	0.31	0.08	40 CFR 60, Subpart IIII
Total PM <sub>2.5</sub> <sup>6</sup>	8.82E-04	0.31	0.08	40 CFR 60, Subpart IIII
SO <sub>2</sub>	2.05E-03	0.73	0.18	AP-42, Tbl. 3.3-1
NO <sub>x</sub> <sup>6</sup>	0.017	6.10	1.53	40 CFR 60, Subpart IIII
CO <sup>6</sup>	5.73E-03	2.03	0.51	40 CFR 60, Subpart IIII
VOC <sup>7</sup>	2.51E-03	0.89	0.22	AP-42, Tbl. 3.3-1
Total HAP	2.71E-05	9.63E-03	2.41E-03	AP-42, Tbl. 3.3-2
CO <sub>2</sub>	1.14	405.18	101.30	40 CFR 98, Tbl. C-1
CH <sub>4</sub>	4.63E-05	1.64E-02	4.11E-03	40 CFR 98, Tbl. C-2
N <sub>2</sub> O	9.26E-06	3.29E-03	8.22E-04	40 CFR 98, Tbl. C-2
CO <sub>2</sub> e <sup>4,5</sup>		407	102	40 CFR 98, Tbl. A-1

**Notes:**

1. Conservatively assumed all Filterable PM<sub>10</sub> emissions are equal to Filterable PM<sub>2.5</sub> emissions.
2. Hourly Emissions Rate (lb/hr) = Emission Factor (lb/hp-hr) \* Maximum Firing Rate (hp)
3. Annual Emissions Rate (tpy) = Hourly Emissions (lb/hr) \* 500 (hr/yr) / 2,000 (lb/ton)
4. Global Warming Potential (GWP) from 40 CFR 98, Tbl. A-1. GWP CO<sub>2</sub> = 1, GWP CH<sub>4</sub> = 25, GWP N<sub>2</sub>O = 298
5. CO<sub>2</sub> Equivalent (CO<sub>2</sub>e) lb/hr, ton/yr = (GWP CO<sub>2</sub> \* CO<sub>2</sub>) + (GWP CH<sub>4</sub> \* CH<sub>4</sub>) + (GWP N<sub>2</sub>O \* N<sub>2</sub>O).
6. Emission rates from 40 CFR 60 Subpart IIII Table 4, converted from (g/Hp-hr).
7. The VOC emission factor includes emission contributions from the exhaust and crankcase.

**Colgate-Palmolive  
Morristown, Tennessee  
Cummins Emergency Fire Pump Engine  
Emissions Calculations**

**Engine Specifications:**

No. of Fire Pumps:	1
Fuel type:	Diesel
Generator Rating:	205 kW
Engine Size:	275 HP
Hours of Operation:	500 hr/yr (PTE Based on Federal Guidance)

**Potential Emissions**

Pollutant <sup>1</sup>	Emission Factors (lb/hp-hr)	Emission Rate (lb/hr) <sup>3</sup>	Emission Rate (tpy) <sup>4</sup>	Emission Factor Source
Total PM <sub>10</sub> <sup>6</sup>	8.82E-04	0.24	0.06	40 CFR 60, Subpart
Total PM <sub>2.5</sub> <sup>6</sup>	8.82E-04	0.24	0.06	40 CFR 60, Subpart
SO <sub>2</sub>	2.05E-03	0.56	0.14	AP-42, Tbl. 3.3-1
NO <sub>x</sub> <sup>6</sup>	0.017	4.73	1.18	40 CFR 60, Subpart
CO <sup>6</sup>	5.73E-03	1.58	0.39	40 CFR 60, Subpart
VOC <sup>7</sup>	2.51E-03	0.69	0.17	AP-42, Tbl. 3.3-1
Total HAP	2.71E-05	7.46E-03	1.86E-03	AP-42, Tbl. 3.3-2
CO <sub>2</sub>	1.14	313.87	78.47	40 CFR 98, Tbl. C-1
CH <sub>4</sub>	4.63E-05	1.27E-02	3.18E-03	40 CFR 98, Tbl. C-2
N <sub>2</sub> O	9.26E-06	2.55E-03	6.37E-04	40 CFR 98, Tbl. C-2
CO <sub>2</sub> e <sup>4,5</sup>	--	315	79	40 CFR 98, Tbl. A-1

**Notes:**

1. Conservatively assumed all Filterable PM<sub>10</sub> emissions are equal to Filterable PM<sub>2.5</sub> emissions.
2. Hourly Emissions Rate (lb/hr) = Emission Factor (lb/hp-hr) \* Maximum Firing Rate (hp)
3. Annual Emissions Rate (tpy) = Hourly Emissions (lb/hr) \* 500 (hr/yr) / 2,000 (lb/ton)
4. Global Warming Potential (GWP) from 40 CFR 98, Tbl. A-1. GWP CO<sub>2</sub> = 1, GWP CH<sub>4</sub> = 25, GWP N<sub>2</sub>O = 298
5. CO<sub>2</sub> Equivalent (CO<sub>2</sub>e) lb/hr, ton/yr = (GWP CO<sub>2</sub> \* CO<sub>2</sub>) + (GWP CH<sub>4</sub> \* CH<sub>4</sub>) + (GWP N<sub>2</sub>O \* N<sub>2</sub>O).
6. Rates from 40 CFR 60 Subpart IIII Table 4, converted from (g/Hp-hr).
7. The VOC emission factor includes emission contributions from the exhaust and crankcase.