

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS	PAGE	1 of 9
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	PROCESSED BY	SMP
	REVIEWED BY	
	DATE	08/24/12

**PERMIT TO CONSTRUCT EVALUATION
DIESEL I. C. ENGINES**

Applicant's Name	THE BOEING CO., C-17 PROGRAM
Company I.D.	800038
Mailing Address	2401 E. WARDLOW ROAD, LONG BEACH, CA 90807
Equipment Address	SAME AS ABOVE

EQUIPMENT DESCRIPTION

Application No. 534306 (New construction Replacing Previous ICE, D243, A/N 345368, F20445)(D569)

INTERNAL COMBUSTION ENGINE, CUMMINS, MODEL NO. CFP9E-F20, DIESEL-FUELED, FOUR CYCLE, SIX CYLINDERS, LEAN BURN, TURBOCHARGED, AFTERCOOLED, 282 BHP, DRIVING AN FAIRBANKS MORSE FIRE PUMP, MODEL 1824BF.

Application No. 528268 (New construction Replacing Previous ICE, D249, A/N 345357, F20451)(D570)

INTERNAL COMBUSTION ENGINE, CUMMINS, MODEL NO. QSB7-G5, DIESEL-FUELED, FOUR CYCLE, FOUR CYLINDERS, LEAN BURN, TURBOCHARGED, AFTERCOOLED, 324 BHP, DRIVING A CUMMINS POWER GENERATOR MODEL NO. 200DSGAE GENSET.

Application No. 534307

RECLAIM/TITLE V SIGNIFICANT PERMIT REVISION

HISTORY

The Boeing Co. (C-17 Program) submitted one application to permit a new diesel powered internal combustion engine (ICE) which will operate a fire-water pump in emergencies. The ICE is an EPA certified engine under certificate no. ACEXL0540AAB.

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The Boeing Co. (C-17 Program) submitted another application to permit a new diesel powered ICE which will power an emergency power generator and replace an existing emergency power generator unit. The equipment is a CARB and EPA certified engine under (CEX-STATCI-11-20).

These Tire 3 compliant Cummins units will be a functionally identical replacement for an existing fire pump with A/N 345368 and an existing emergency power generator with A/N 345357 with reductions in criteria emissions. These engines are emergency power generators, thus they are exempt from Rule 1110.2 requirements. Emergency power engines are also exempt from modeling requirements, as well as R1401 requirements. Offsets are not required since emissions are below 0.5 lb/day.

The applicant currently operates a number of equipment under ID No. 800038 at this Long Beach location. The company manufactures aircrafts at this site.

The District database did not show any notices of violation or complaints for visible emissions and/or odor nuisance against this facility in the last two years. One notice to comply was issued to this facility to report correct emissions reported in the last two years. The facility is operating in compliance upon follow-up inspection.

The facility is located within an industrial area. It is not located within 1000 feet from any school and there will not be any emission or MICR increases exceeding the threshold levels under this project. Hence, these applications will not require a public notification per Rule 212.

This facility is a Title V facility. A Title V renewal permit was issued to this facility on January 20, 2008. The proposed project is considered a “significant permit revision” as described in Regulation XXX evaluation.

PROCESS DESCRIPTION

One engine is a direct drive to an emergency fire pump; the second engine is coupled to an electrical generator. The engines are exercised 1 hour per day, 1 day per week, 50 weeks per year. During the emergencies, the engine may be operated 24 hours per day, 7 days a week. However, they will be issued a permit with a condition limiting operation to less than 200 hours per year. These engines are turbocharged and aftercooled to increase the power of the engines. The turbocharging introduces more fuel in the cylinder with high pressure air. The aftercooling (through heat exchanger) lowers the temperature of the intake air. Decreasing the temperature increases the density, thereby allowing more air into the cylinder. These are four cycle engines which generally emit fewer pollutants than the two stroke engines, due to a higher percentage combustion rate of the fuel.

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OPERATING HOURS

Average: 1 hour/day, 1 day/week, 50 weeks/year
Maximum : 1 hour/day, 1 day/week, 50 weeks/year

EMISSION CALCULATIONS

The majority of the emissions are from the combustion of the fuel (in this case Diesel). Criteria air pollutants from engine exhaust are NO_x, ROG, CO, SO_x, and PM. NO_x formation depends on the temperature and pressure during the combustion. SO_x depends on the sulfur content of the fuel. ROG, CO, and PM are primarily the result of incomplete combustion. Data of the emissions were supplied by the manufacturer during the EPA certification process. The copies of the data are in the files.

Application No. 534306

Operating Information

Hours of operation (HRS/DAY)	1.0
Engine Horsepower (BHP)	282
Engine Speed (RPM)	1760
Exhaust Flow rate	1813
Temperature (Deg. F)	1030

Emission Factors

POLLUTANTS	GM/BHP-HR	LB/HR
ROG/TOG	0.123	0.08
NO _x	2.2	1.37
CO	1.417	0.88
SO _x	0.0071*	0.004
PM/PM10	0.118	0.07

* District default factors from Annual Emission Inventories Guidelines

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Emission Calculations

Pollutant	Avg. HourlyEmissions @ 1 hr/day usage limit (lbs/hr)	Max. HourlyEmissions @ 1 hr/day usage limit (lbs/hr)	Average * Annual Emissions (lbs)	30-day ** Avg. emissions (lbs/day)
ROG/TOG	0.08	0.08	4	0
NOx	1.37	1.37	68	0
CO	0.88	0.88	44	0
SOx	0.004	0.004	0	0
PM/PM10	0.07	0.07	4	0

* Based on an operating limit of 200 hrs/year.

** Based on annual emissions & an operating schedule of 12 months/year and 30 days/month. (lbs/hr x 50/12/30)

Application No. 528268

Operating Information

Hours of operation (HRS/DAY)	1.0
Engine Horsepower (BHP)	324
Engine Speed (RPM)	1760
Exhaust Flow rate	1428
Temperature (Deg. F)	1030

Emission Factors

POLLUTANTS	GM/BHP-HR	LB/HR
ROG/TOG	0.145	0.10
NOx	2.585	1.85
CO	0.67	0.67
SOx	0.0071*	0.004
PM/PM10	0.07	0.005

* District default factors from Annual Emission Inventories Guidelines

EMISSION CALCULATIONS

Pollutant	Avg. HourlyEmissions @ 1 hr/day usage limit (lbs/hr)	Max. HourlyEmissions @ 1 hr/day usage limit (lbs/hr)	Average * Annual Emissions (lbs)	30-day ** Avg. emissions (lbs/day)
ROG/TOG	0.145	0.10	5	0
NOx	2.585	1.85	92.5	0
CO	0.67	0.67	33.5	0
SOx	0.0071*	0.004	0.2	0
PM/PM10	0.07	0.005	0.25	0

* Based on an operating limit of 50 hrs/year.

** Based on annual emissions & an operating schedule of 12 months/year and 30 days/month. (lbs/hr x 50/12/30)

RULES/REGULATION EVALUATION

▣ **RULE 212, PUBLIC NOTIFICATION**

v **SECTION 212(c)(1):**

This section requires a public notice for all new or modified permit units that may emit air contaminants located within 1,000 feet from the outer boundary of a school. These sources are not located within 1,000 feet from the outer boundary of a school. Therefore, public notice will not be required by this section.

v **SECTION 212(c)(2):**

This section requires a public notice for all new or modified facilities which have on-site emission increases exceeding any of the daily maximums as specified in subdivision (g). These ICEs are replacing two existing old ICEs with reductions in the criteria pollutants. As shown in the following table, the emission increases are below the daily maximum limits specified by Rule 212(g). Therefore, these applications will not be subject to this section.

LB/DAY	CO	NOX	PM ₁₀	ROG	SOX	Pb
MAX. LIMIT	220	40	30	30	60	3
INCREASES	0	0	0	0	0	0

v **SECTION 212(c)(3):**

There are no schools within the 1000 feet of this facility. Thus it is exempt from the Tier 3 assessment and Rule 212, per memo from Mr. Mike Mills dated October 26, 2007 (copy in the folders).

❖ **SECTION 212(g):**

This section requires a public notice for all new or modified sources which have on-site emission increases exceeding any of the daily maximums as specified by Rule 212(g). As shown in the following table, the emission increases are below the daily maximum limits specified by Rule 212(g). Therefore, these applications will not be subject to this section.

LB/DAY	CO	NOX	PM ₁₀	ROG	SOX	Pb
MAX. LIMIT	220	40	30	30	60	3
INCREASES	0.88	1.85	0.07	0.10	0.004	0

▣ **RULES 401 & 402, VISIBLE EMISSIONS & NUISANCE**

No visible emissions are expected with proper operation and maintenance of the equipment.

▣ **RULES 404 & 405, PARTICULATE MATTER CONCENTRATION & WEIGHT**

With negligible PM emissions, compliance of the rule is expected.

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▣ **RULE 1110.2, EMISSIONS FROM GASEOUS AND LIQUID FUELED STATIONARY INTERNAL COMBUSTION ENGINES**

The operator will maintain monthly engine operating log to comply with sub-paragraph (f)(2) requirements. Otherwise this engine is exempt from other requirements of subparagraph (d) per (h)(4) and (h)(5).

REGULATION XIII

▣ **RULE 1303(a), BEST AVAILABLE CONTROL TECHNOLOGY (BACT)**

This equipment complied with the U.S. EPA Tier 3 BACT requirements with following emission levels.

Pollutants	BACT Required	BACT Achieved
ROG + NOx	3.0 gram/bhp-hr	2.323/2.73 gram/bhp-hr
PM10	0.15 gram/bhp-hr	0.118/0.07 gram/bhp-hr
CO	2.6 gram/bhp-hr	1.417/0.67 gram/bhp-hr

▣ **RULE 1303(b)(1), MODELING**

Since the proposed I.C. Engines are classified as “emergency engines”, they are exempt from this rule requirements under Rule 1304(a)(4).

▣ **RULE 1303 (b)(2), EMISSION OFFSETS**

Emissions are less than 0.5 lb/day. Offsets are not required.

▣ **RULE 1401, NEW SOURCE REVIEW OF CARCINOGENIC AIR CONTAMINANTS**

The emissions are exempt due to emergency equipment exemption under Rule 1401(g)(1)(F).

▣ **RULE 1470, REQUIREMENTS FOR STATIONARY DIESEL-FUELED INTERNAL COMBUSTION AND OTHER COMPRESSION IGNITION ENGINES**

This ICE (A/N 534306) complies with the following Rule requirements.

Pollutants	BACT Required	BACT Achieved
ROG + NOx	3.0 gram/bhp-hr	2.323 gram/bhp-hr
PM10	0.15 gram/bhp-hr	0.118 gram/bhp-hr
CO	2.6 gram/bhp-hr	1.417 gram/bhp-hr

This ICE (A/N 528268) complies with the following Rule requirements.

Pollutants	BACT Required	BACT Achieved
ROG + NOx	3.0 gram/bhp-hr	2.73 gram/bhp-hr
PM10	0.15 gram/bhp-hr	0.07 gram/bhp-hr
CO	2.6 gram/bhp-hr	0.67 gram/bhp-hr

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40 CFR Part 60, Subpart IIII

This subpart requires new engines < 3000 BHP ordered after July 11, 2005 to meet appropriate Tier 2 or Tier 3 standards as applicable based on the horsepower. Since these are new engines and rated at > 751 BHP each, Tier 3 standards apply and are summarized below:

TIER 3 ENGINES

	NO_x + ROG (Gm/bhp-hr)	CO (Gm/bhp-hr)	PM (Gm/bhp-hr)
Required	3	2.6	0.15
Actual	2.32 (A/N 534306)	1.417 (A/N 534306)	0.118 (A/N 534306)
	2.73 (A/N 528268)	0.67 (A/N 528268)	0.070 (A/N 528268)
Compliance	Yes	Yes	Yes

Other Requirements in the NSPS for New Emergency Engines

	NSPS Requirement	Proposed Equipment	Compliance
New Engine	Ordered After July 11, 2005	Yes	Yes
Emission Standards Pre-2007 model year	Tier 1 standards	No	Not applicable
Emission Standards 2007 model year and later	Meet Tier emission standards (Tier 2 if no Tier 3)	Certified Tier 2 engines Limits are specified in permit	Yes
Fuel Requirement	Ultra low sulfur diesel (15 ppmw)	Included in permit condition	Yes
Monitoring/Recordkeeping/Reporting	Non-resettable hour meter	Included in permit condition	Yes
Recordkeeping	If engine does not meet non-emergency standards	Recordkeeping included in permit condition	Yes
Reporting	None	None	Not applicable

40 CFR, Part 60, Subpart JJJJ

The requirements of this subpart are not applicable to Compression Ignition engines.

40 CFR, Part 63, Subpart ZZZZ

The Boeing Company is an Area Source for HAP. The requirements of this subpart are therefore applicable. Since the engine is a new RICE (manufactured after June 12, 2006), it must meet emission standards in 40 CFR part 60 subpart IIII. The engine meets the emission limits as demonstrated above. In addition, the engine will meet all other applicable NESHAP requirements as summarized in the following table:

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Other Requirements in the NESHAP for New Emergency Engines

	NESHAP Requirement	Proposed Equipment	Compliance
New Engine	Ordered On or After June 12, 2006	After June 12, 2006	Yes
Emission Standards	Meet NSPS standards	Yes	Yes
Operating Limitations	None	200 hrs/yr Included in permit condition	Yes
Fuel Requirement	None	Ultra low sulfur diesel (15 ppmw) Included in permit condition	Yes
Requirements	No limits on hours for emergency service	200 hours per year included in permit condition	Yes
	100 hrs/yr for maintenance and testing	50 hrs/yr for maintenance and testing	Yes
	No peak shaving or demand response program	Included in permit condition. DRP not allowed as per Rule 1470	Yes
Compliance requirements	Initial notification if >500 HP at major source	Engine is located at area source	Yes
Notification	None	None	Yes
Reporting	None	None	Yes

☉ **RULE 2005, NEW SOURCE REVIEW FOR RECLAIM**

(c)(1)(A) Best Available Control Technology

This equipment complied with the U.S. EPA Tier 3 BACT requirements with following emission levels.

Pollutants	BACT Required	BACT Achieved
ROG + NOx	3.0 gram/bhp-hr	2.32/2.73 gram/bhp-hr

(c)(1)(B) Modeling

Modeling is not required since there will be reduction in NOx emissions under this replacement project.

(c)(2) Offsets

The Boeing Company will be required to hold sufficient RTCs to offset the NOx emissions for both engines for the first year of operation.

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(g)(4)

A modeling analysis for plum visibility is not required since there will not be net emission increase of NOx from the proposed project.

REGULATION XXX

The proposed project is considered as a “significant permit revision” to the current Title V permit for this facility.

Rule 3000(b)(31)(I) defines a “significant permit revision” as any Title V permit revision that includes the “Installation of a new permit unit or the modification or reconstruction of an existing permit unit subject to a New Source Performance Standard (NSPS) per 40 CFR Part 60 or a National Emission Standard for HAPs per 40 CFR Part 61 or Part 63.”

Rule 3003(j) specifies that all proposed Title V permit revisions shall be submitted to EPA for review. This is the third permit revision of the Title V permit renewal requested by the facility. The cumulative emission increases resulting from this proposed permit revision are summarized as follows:

Revision	HAP	VOC	NOx	PM ₁₀	SOx	CO
1 st Permit Revision, Replacement of ICE (A/N 506013)	0	0	0	0	0	0
2 nd Permit Revision, Replacement of ICE (A/N 519805)	0	0	0	0	0	0
3 rd Permit Revision, Replacement of ICEs (A/Ns 534306 and 528268)	0	0	0	0	0	0
Cumulative Total	0	0	0	0	0	0
Maximum Daily	30	30	40	30	60	220

CONCLUSIONS/RECOMMENDATIONS

The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as a “significant permit revision”, a public notice is required pursuant to Rule 3006 (a). A proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review pursuant to Rule 3003(j). If EPA does not have any objections within the review period, a revised Title V permit will be issued to this facility.