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	APPL. NO. 540642	DATE 10/10/2013
	PROCESSED BY T. Iwata	CHECKED BY

NASA/JPL
4800 Oak Grove Dr.
Pasadena, CA 91109
ID no.: 11887

EQUIPMENT DESCRIPTION:

SECTION D:

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions	Conditions
Process 1: INTERNAL COMBUSTION EQUIPMENT					
System 10: BUILDING 302					
INTERNAL COMBUSTION ENGINE, EMERGENCY POWER, DIESEL FUEL, CUMMINS, MODEL NO. QSX15-G9, DIESEL PARTICULATE FILTER AND DIAGNOSTIC BACK PRESSURE MONITOR, JOHNSON MATTHEY, MODEL NO. CRT, WITH AFTERCOOLER, TURBOCHARGER, 755 BHP A/N 540642	D168		NOX: PROCESS UNIT	NOx + ROG: 4.8 G/BHP-HR DIESEL (4), CO: 2.6 G/BHP-HR DIESEL (4), PM: 0.15 G/BHP-HR DIESEL (4), NOX: 469 LBS/1000 GAL DIESEL (1), PM (9)	B61.1, B61.3, D12.2, E193.1, E448.2, H23.9, K67.10

BACKGROUND:

NASA/JPL submitted application no 540642 to permit a new emergency, diesel-fueled internal combustion engine. The engine was issued an AQMD certification permit, under A/N 455700 and meets current BACT emission limits for major-source facilities, EPA's Tier 2 emission standards. The engine will be a replacement for D15, used to power an electrical generator for emergency electrical power.

On November 8, 2012, a P/C was issued for the engine. On January 16, 2013, the new engine was installed and the old engine (D15) was removed. By February 2013, the engine was fully operational. It was operated 8 hours from February to June 30, 2013. A P/O will now be issued for the engine. D168 will be moved from Section H to Section D and engine D15 will be removed from Section D.

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The facility was last inspected on June 11, 2013. The inspection results are still pending. On December 11, 2012, a NC (no. D28694) was issued to the facility to ensure that elapsed time meters only display total engine run time. The facility resolved the NC and was found to be operating in compliance with the NC.

NASA/JPL is a Title V facility. A Title V renewal permit was issued to this facility on October 18, 2011. NASA/JPL has proposed to revise their Title V renewal permit by issuing a Permit to Operate for an internal combustion engine, device no. D168. This permit revision is considered as an “administrative permit revision” to the Title V renewal permit, as described in the Regulation XXX evaluation. This revision will be included with the de minimis significant revision under TV revision plan A/N 555611 to add a new defluxing degreaser (D169) by issuing a P/C in Section H.

PROCESS DESCRIPTION:

The engine will be used to provide emergency electrical power for building operations. Aside from emergency use, the engine will be operated less than 50 hours in any one year for maintenance and testing purposes. Annual hours of operation shall not exceed 200 hours. A Johnson Matthey CRT diesel particulate filter has been installed on the engine. The filter has been CARB-verified to reduce PM emissions by 85% or greater. The diesel particulate filter system includes a diagnostic back pressure monitor that monitors engine back pressure and alarms the operator when pressure exceeds the manufacturer’s maximum settings. Regeneration of the filter is required after 24 consecutive cold starts and 30-minute idle sessions or whenever a warning signal is received from the monitor. During the regeneration period, the engine exhaust temperature is required to be at least 465 deg. F. Condition no. E193-1 is for the proper operation of the diesel particulate filter.

EMISSIONS CALCULATIONS:

Uncontrolled emissions data (AQMD certification):

Pollutant	Manufacturer Engine Rate (g/bhp-hr)
HC	0.11
NO _x	4.59
CO	0.45
PM	0.075

CRT Particulate Filter System control efficiency: PM = 85%

Controlled emissions data:

Pollutant	Manufacturer Engine Rate (g/bhp-hr)
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HC	0.11
NO _x	4.59
CO	0.45
PM	0.011

Operating schedule = 1 hr/wk, 1 day/wk

BHP = 755

1 lb = 454 g

PM₁₀ = PM

R1=R2 Hourly HC emissions = $0.11 * 1/454 * 755 = 0.18$ lb/hr

Daily HC emissions = 0.18 lb/day

R1=R2 Hourly NO_x emissions = $4.59 * 1/454 * 755 = 7.63$ lb/hr

Daily NO_x emissions = 7.63 lb/day

Annual NO_x emissions = 7.63 lb/hr x 50 hr/year = 382 lb/year

R1=R2 Hourly CO emissions = $0.45 * 1/454 * 755 = 0.75$ lb/hr

Daily CO emissions = 0.75 lb/day

R1 Hourly PM₁₀ emissions = $0.075 * 1/454 * 755 = 0.127$ lb/hr

Daily PM₁₀ emissions = 0.127 lb/day

R2 Hourly PM₁₀ emissions = $0.011 * 1/454 * 755 = 0.018$ lb/hr

Daily PM₁₀ emissions = 0.018 lb/day

RULE ANALYSIS

Rule 212 (c)(1): This section requires a public notice for all new or modified permit units that emit air contaminants located within 1,000 feet from the outer boundary of a school. The facility is not located within 1,000 feet of the outer boundary of a school. The closest school is located over 1,700 feet from the facility. Public notice not required by this section.

Rule 212 (c)(2): This section requires a public notice for all new or modified facilities that have on-site emission increases exceeding any of the daily maximums as specified by Rule 212(g). The emission increase from the engine does not cause an exceedance of the daily maximums. All criteria pollutants are <1 lb/day, except NO_x = 7.63 lb/day [less than the 212(g) threshold of 40 lb/day]. Public notice not required by this section.

Rule 212(c)(3): This section requires a public notice for any new or modified permit unit with an increase in emissions of toxic air contaminants listed in Table I of Rule 1401 resulting in an MICR greater than 1E-6 per permit unit or greater than 10E-6 per facility. Diesel PM from

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diesel-fueled IC engines are considered carcinogenic. Hourly PM emissions from the previous engine (0.06 lb/hr) are greater than those from the new engine (0.018 lb/hr) and hence, there will not be an increase in the cancer risk from operating the new engine. Additionally, the cancer risk from the new engine, based on PM emissions of 0.018 lb/hr, are 3.98E-08 and 3.27E-08 at the residential and commercial receptors, respectively. A public notice is not required for this project since there will not be a cancer risk equal or greater than one in a million.

Rule 212(g): This section requires a public notice for all new or modified sources that result in emission increases exceeding any of the daily maximums specified by Rule 212(g). The emission increase from the engine is below the daily maximums. Public notice is not required by this section.

	Maximum Daily Emissions (lb/day)					
	ROG	NO_x	PM₁₀	SO₂	CO	Pb
Emission increase	0	7.6	0	0	0.75	0
MAX Limit	30	40	30	60	220	3
Compliance Status	Yes	Yes	Yes	Yes	Yes	Yes

Rules 401 & 402: AQMD database has no records of visible emissions or nuisance complaints against this facility. Compliance with these requirements is expected with the proper operation of the equipment.

Rule 431.2: NASA/JPL uses a diesel fuel in which the sulfur content does not exceed 15 ppm by weight (0.0015% by weight). Compliance is expected.

Rule 1110.2: Emergency engines limited to 200 hrs/yr operation are exempt from (d) requirements under (i)(2).

Rule 1303(a): BACT is compliance with EPA's Tier 2 emission limits. The AQMD-certified engine is designed and manufactured to operate under specific BACT emission limits. Compliance with BACT is expected.

	NO_x + ROG (Gm/bhp-hr)	CO (Gm/bhp-hr)	PM (Gm/bhp-hr)
Required	4.8	2.6	0.15
Actual	4.62	0.09	0.011
Compliance	3Yes	Yes	Yes

Rules 1303(b)(1) & 1303(b)(2): Emergency ICEs are exempt from modeling requirements and emission offsets under 1304(a)(4)- emergency equipment.

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Rule 1303(b)(4): The facility is expected to be in full compliance with all applicable rules and regulations of the District.

Rule 1401: Exempt under (g)(1)(F) – emergency IC engines.

Rule 1470: Under (c)(1), compliant fuel will be used in the engine and under (c)(2)(B) & (C), the engine will be operated in compliance with these sections.

RULE 2005: The ICE meets the requirements of Rule 2005(c), that is, it will (1) be operated with current BACT, (2) is exempt from modeling requirements [Rule 2005(k)(5)] and (3) the facility holds sufficient RECLAIM trading credits to offset the annual emission increase for the first year of operation of the ICE.

40 CFR60, Subpart IIII: This subpart requires new engines less than 3,000 BHP ordered after July 11, 2005 to meet appropriate Tier 2 or Tier 3 standards, as applicable based on their horsepower rating. See *Rule 1303(a)* above for emission standards.

Additional NSPS Requirements 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 not Tier 3)	Certified Tier 2 emission limits are specified in permit	Yes
Fuel Requirement	Ultra low-sulfur diesel (15 ppmv)	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 CFR60, Subpart JJJJ: The requirements of this subpart are not applicable to compression ignition engines.

40 CFR63, Subpart ZZZZ: NASA/JPL 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:

Other Requirements in the NESHAP for New Emergency Engines:

	NESHAP Requirement	Proposed Equipment	Compliance
New Engine	Ordered On or After June	After June 12, 2006	Yes

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	NESHAP Requirement	Proposed Equipment	Compliance
	12, 2006		
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 ppm), included in permit condition	Yes
Requirements	No limits on hours for emergency service	200 hrs/yr, 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

REGULATION XXX:

The proposed project is considered as an “administrative permit revision” to the Title V permit issued to this facility. Rule 3000(b)(1) defines an “administrative permit revision” as a revision to issue a final permit to operate for equipment previously issued a Title V permit to construct, with no change in permit terms and conditions except for the removal of permit to construct terms or conditions which are no longer applicable. This revision will be included with the de minimis significant revision under TV revision plan A/N 555611 to add a new defluxing degreaser (D169) by issuing a P/C in Section H.

Revision	HAP	VOC	NO _x *	PM10	SO _x	CO
1 st : Convert P/Cs to P/Os for two ICES (Device nos. D165 & D166), move from Section H to Section D (administrative) and add ICE (Device no. D168) to Section H (significant revision).	0	0	7.6	0	0	0.75
2 nd : Convert P/C to P/O for ICE (Device no. D168), move from Section H to Section D (administrative), remove ICE (Device no. D15) from Section D and add airtight degreaser (Device no. D169) (de minimis significant revision).	0	0.42	0	0	0	0
Cumulative Total	0	0.42	7.6	0	0	0.75
Maximum Daily	30	30	40*	30	60	220

* RECLAIM pollutant, not subject to emission accumulation requirements

RECOMMENDATION

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The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as an “administrative permit revision”, it is exempt from the public participation requirements under Rule 3006 (b) and the EPA 45-day review pursuant to Rule 3003(j). However, since this revision is included with the de minimis significant revision under TV revision plan A/N 555611 to add a new defluxing degreaser (D169) by issuing a P/C in Section H, it will be sent to the EPA. Approval of the proposed draft Title V permit with applicable conditions is recommended with a P/O for the ICE. Device D168 is moved from Section H to Section D and D15 is inactivated and removed from Section D. Issue revised Sections D & H.

CONDITIONS:

B61.1:

The operator shall not use fuel oil containing the following specified compounds:

<u>Compound</u>	<u>Weight Percent</u>
Sulfur less than or equal to	0.05

B61.3:

The operator shall not use fuel oil containing the following specified compounds:

<u>Compound</u>	<u>PPM BY WEIGHT</u>
Sulfur less than or equal to	15

D12.2:

The operator shall install and maintain a(n) non-resettable elapsed time meter to accurately indicate the elapsed operating time of the engine.

E193.1:

The operator shall operate and maintain this equipment according to the following requirements:

The diagnostic back pressure monitor shall be programmed to send an audible or remote alarm to the operator whenever the back pressure of the diesel particulate filter exceeds the maximum back pressure settings specified by the manufacturer.

The exhaust temperature of the engine shall be at least 465 degrees Fahrenheit, except during cold engine start-up which shall not exceed 30 minutes.

The diesel particulate filter shall be regenerated after every 24 consecutive cold starts and 30-minute idle sessions, or, whenever a warning signal is received from the back pressure monitor, whichever occurs first. The exhaust temperature of the engine shall be at least 465 degrees Fahrenheit during regeneration of the diesel particulate filter.

The engine shall not be operated for more than 720 minutes when it is operating below the regeneration temperature of 465 degrees Fahrenheit.

The operator shall keep adequate records of inspections, replacements and manual regenerations of the diesel particulate filter. All records shall be prepared in a format which is acceptable to the District, retained on the premises for at least five years and made available to District personnel upon request.

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E448.2:

The operator shall comply with the following requirements:

The engine shall not be operated more than 200 hours in any one year, which includes 50 hours in any one year for maintenance and testing.

Operation beyond the allotted time for engine maintenance and testing shall be allowed only in the event of a loss of grid power or up to 30 minutes prior to a rotating outage, provided that the utility distribution company has ordered rotating outages in the control area where the engine is located or has indicated that it expects to issue such an order at a certain time and the engine is located in a utility service block that is subject to the rotating outage.

In the event as described in the paragraph above, the engine shall be terminated immediately after the utility distribution company advises that a rotating outage is no longer imminent or in effect. This engine shall not be used as part of an interruptible service contract in which a facility receives a payment or reduced rates in return for reducing electric load on the grid when requested by the utility or the grid operator.

H23.9:

This equipment is subject to the applicable requirements of the following rules or regulations:

<u>Contaminant</u>	<u>Rule</u>	<u>Rule/Subpart</u>
Sulfur compounds	District Rule	431.2
PM	District Rule	1470

K67.10:

The operator shall keep records, in a manner approved by the District, for the following parameter(s) or item(s):

An engine operating log shall be kept and maintained on file to record when this engine is started manually. The log shall list the date of operation, the timer reading in hours at the beginning and end of operation and the reason of operation.

By January 15th of each year, the operator shall total and record the total hours of operation (including hours for both manual operation and automatic operation) for the previous year.

All records required by this permit shall be kept in a format that is acceptable to the District, shall be retained on the premises for at least three years and shall be made available to any District representative upon request.