

DRAFT
ENGINEERING EVALUATION

DaVita Rx
Application: 18764
Plant: 19262

BACKGROUND

DaVita Rx has applied to obtain an Authority to Construct (AC) and a Permit to Operate (PO) for the following equipment:

S-1

Emergency Standby Diesel Generator Set at 1178 Cherry Avenue
Engine: 2008 John Deere, Model: 6068HF285 San Bruno, California 94066
237 BHP, 1.69 MMBtu/hr

The Emergency Diesel Engine Generator Set (S-1) is equipped with the best available control technology (BACT) for minimizing the release of airborne criteria pollutants and harmful air toxins due to fuel combustion. The criteria pollutants are nitrogen oxides (NOx), carbon monoxide (CO), precursor organic compounds (POC) from unburned diesel fuel, sulfur dioxide (SO₂) and particulate matter (PM₁₀). All of these pollutants are briefly discussed on the District's web site at baaqmd.gov.

The engine meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 3 Off-road standard. The engine will burn commercially available California Ultra Low Sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight.

EMISSIONS CALCULATIONS

S-1 has been certified by CARB to be a cleaner burning engine. Except for SO₂, the emission factors for these engines are from the CARB Certification (CARB Executive Order # U-R-004-0312-1). The SO₂ emissions were calculated based on the maximum allowable sulfur content (0.0015 wt% S) of the diesel fuel with assumption that all of the sulfur present will be converted to SO₂ during the combustion process. The POC emission factor is assumed to be 5% of the total CARB's certified NOx and POC (NMHC+NOx) factor based on District Policy.

Basis:

- 237 Hp output rating
- 33 hr/yr operation for testing and maintenance
- 12.3 gallons/hr max fuel use rate
- NMHC + NOx, CO and PM10 emission factors provided by CARB Certification with Executive Order U-R-004-0312-1
- POC is assumed to be 5% of NMHC + NOx
- NOx is assumed to be 95% of NMHC + NOx
- SO2 emissions are quantified based on the full conversion of 0.0015 wt% (~ 15 ppm) sulfur in the ULS diesel fuel.

Table 1: Emission factors

Pollutant	Emission Factor (g/kw-hr)	Converted Emission Factor (g/hp-hr)
NMHC (POC) +NOx	3.60	2.69
NOx	3.42	2.55
CO	1.30	0.97
POC	0.18	0.13
PM10	0.18	0.134

Annual Average Emissions:

NOx = (33 hr/yr)(237 hp)(2.55 g/hp-hr)(1 lb/454g) = 43.95 lb/yr or 0.022 TPY
CO = (33 hr/yr)(237 hp)(0.97 g/hp-hr)(1 lb/454g) = 16.71 lb/yr or 0.008 TPY
POC = (33 hr/yr)(237 hp)(0.13 g/hp-hr)(1 lb/454g) = 2.31 lb/yr or 0.001 TPY
PM10 = (33 hr/yr)(237 hp)(0.134 g/hp-hr)(1 lb/454g) = 2.31 lb/yr or 0.001 TPY
SO2 = (0.000015 lb S/lb fuel)(7.206 lb fuel/gal fuel)(12.3 gal fuel/hr)(64 lb SO2/32 lb S)(33 hr/yr)
= 0.088 lb/yr or 0.00004 TPY

Maximum Daily Emissions:

Daily emissions are calculated to establish whether a source triggers the requirement for BACT (10 lb/highest day total source emissions for any class of pollutants). 24-hr/day of operation will be assumed since no daily limits are imposed on intermittent and unexpected operations.

$$\begin{aligned} \text{NO}_x &= (24 \text{ hr/day})(237 \text{ hp})(2.55 \text{ g/hp-hr})(1 \text{ lb}/454\text{g}) = 31.96 \text{ lb/day} \\ \text{CO} &= (24 \text{ hr/day})(237 \text{ hp})(0.97 \text{ g/hp-hr})(1 \text{ lb}/454\text{g}) = 12.15 \text{ lb/day} \\ \text{POC} &= (24 \text{ hr/day})(237 \text{ hp})(0.13 \text{ g/hp-hr})(1 \text{ lb}/454\text{g}) = 1.68 \text{ lb/day} \\ \text{PM}_{10} &= (24 \text{ hr/day})(237 \text{ hp})(0.134 \text{ g/hp-hr})(1 \text{ lb}/454\text{g}) = 1.68 \text{ lb/day} \\ \text{SO}_2 &= (0.000015 \text{ lb S/lb fuel})(7.206 \text{ lb fuel/gal fuel})(12.3 \text{ gal fuel/hr})(64 \text{ lb SO}_2/32 \text{ lb S})(24 \text{ hr/day}) \\ &= 0.064 \text{ lb/day} \end{aligned}$$

Table 2: Emissions Summary

From CARB/EPA Certified Data Pollutant	Emission Factor (g/kw-hr)	Emission Factor (g/hp-hr)	Annual Emissions (lb/yr)	Annual Emissions (TPY)	Max. Daily (lb/day)
NMHC+NO _x	3.6	2.69			
NO _x	3.42	2.55	43.95	0.0220	31.96
POC	0.18	0.13	2.31	0.0012	1.68
CO	1.3	0.97	16.71	0.0084	12.15
PM ₁₀	0.18	0.134	2.31	0.0012	1.68
SO ₂ *			0.088	0.00004	0.06

PLANT CUMULATIVE INCREASE

DaVita Rx at "1178 Cherry Avenue in San Bruno, CA 94066" is a new facility. Therefore, the District's database does not contain information on existing emissions at the plant. Table 3 summarizes the cumulative increase in criteria pollutant emissions that will result at Plant 19262 from the operation of S-1.

Table 3: Cumulative Increase

Pollutant	Current plant emissions (TPY)	Increase in plant emissions associated with this application (TPY)	Cumulative emissions (Current + Increase) (TPY)
NO _x	0	0.0220	0.0220
POC	0	0.0012	0.0012
CO	0	0.0084	0.0084
PM ₁₀	0	0.0012	0.0012
SO ₂	0	0.00004	0.00004

BACT

BACT (Best Available Control Technology) is triggered for NO_x and CO since the maximum daily emissions of these pollutants exceed 10 lb/day. Please refer to the discussion on "Daily Emissions" in page 2 of this evaluation. BACT for these sources is presented in the current BAAQMD BACT/TBACT Workbook for this source category as shown below:

Source:	IC Engine - Compression Ignition	Revision:	5
		Document #:	96.1.2
Class:	> or = 175 horsepower output rating	Date:	01/11/02
POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY	
NO_x	1. 1.5 g/bhp-hr [107 ppmvd @ 15% O ₂] <i>a,b</i> 2. 6.9 g/bhp-hr [490 ppmvd @ 15% O ₂] <i>a,b,c</i>	1. Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler <i>a,b</i> 2. Timing Retard < 4° + Turbocharger w/ Intercooler <i>a,b,c</i> 3. Timing Retard < 4° + Turbocharger w/ Intercooler	

	3. 6.9 g/bhp-hr [490 ppmvd @ 15 % O ₂]	
CO	1. n/s 2. 2.75 g/bhp-hr [319 ppmvd @ 15% O ₂] ^{b,c}	1. Catalytic Oxidation ^b 2. CARB or EPA (or equivalent) low-CO emitting certified engine ^{b,c}

References

a. CARB/CAPCOA Clearinghouse
b. BAAQMD NOTE: IC Engine BACT and TBACT is a low emitting, spark-ignited, gas-fueled engine with lean burn combustion or rich burn with non-selective catalytic reduction, or electric motor. A diesel engine will be permitted only if a gas-fueled engine, or electric motor, is not practical (e.g., a remote location without natural gas availability or electric power, or only a diesel engine will meet the portability and/or power/torque/rpm requirements of the application under review, or the engine is used exclusively for emergency use during involuntary loss of power).
c. Timing retard, etc. controls alone may be acceptable only in very limited situations for temporary sources.

It can be seen from above that S-1 satisfies the current BACT 2 standard for NO_x and CO (6.9 g/hp-hr and 2.75 g/hp-hr, respectively). The more restrictive BACT 1 standard is not applicable to S-1 because it will be limited to operation as an emergency standby engine.

OFFSETS

DaVita Rx is a new facility. Table 4 summarizes the increase in criteria pollutant emissions that will result from the operation of S-1.

Table 4

Pollutant	Increase in Emissions At Plant Since April 5, 1991 (TPY)	Increase in Emissions Associated With This Application (TPY)	Total Emissions (Post 4/5/91 + Increase) (TPY)	Regulation 2-2-302 and 2-2-303 Offset Triggers (TPY)
NO _x	0	0.0220	0.0220	> 10; < 35
POC	0	0.0012	0.0012	NA
CO	0	0.0084	0.0084	> 10; < 35
PM10	0	0.0012	0.0012	> 1*
SO ₂	0	0.00004	0.00004	> 1*

*Applies to major facilities with a cumulative increase, minus contemporaneous emission reduction credits, in excess of 1 ton/year since April 5, 1991.

It can be seen from Table 4 above that S-1 does not trigger any offset. Therefore, offsets are not warranted for any emission.

TOXIC RISK SCREENING ANALYSIS

S-1 meets Best Available Control Technology for toxics (TBACT) since the diesel particulate emissions meet the limit of 0.1 g/bhp-hr. For an engine that meets the TBACT requirement, it must also pass the toxic risk screening level of less than ten in a million. Estimates of residential risk assume exposure to annual average toxic air contaminate concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume exposure occurs 8 hours per day, 245 days per year, for 40 years. Risk estimates for students assume a higher breathing rate, and exposure is assumed to occur 10 hours per day, 36 weeks per year, for 9 years.

Table 5: Toxic Trigger Summary

Toxic Pollutant Emitted	Emission Rate (lb/yr)	Risk Screening Trigger (lb/yr)
PM10 (Diesel Particulate Matter) from S-1	2.314	0.58

Per the attached September 23, 2008 memo from Catherine Fortney, results from the health risk screening analysis indicate that the maximum cancer risk is estimated at 9.92 in a million for workers, 0.97 in a million for residents, and 0.57 in a million for students, with all hazard indices less than 1.0 if the engine were to run for 33 hours/year. In accordance with the District's Regulation 2, Rule 5, the above risk level is considered acceptable for an engine such as S-1 that meets TBACT.

STATEMENT OF COMPLIANCE**District Rules:**

Source S-1 is subject to and expected to be in compliance with the requirements of District Regulation 1-301 (*Public Nuisance*), Regulation 6-1-303 (*Particulate Matter and Visible Emissions*), Regulation 9-1 (*Sulfur Dioxide*) and Regulation 9-8 (*NOx and CO from Stationary Internal Combustion Engines*).

From Regulation 1-301, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. For purposes of this section, three or more violation notices validly issued in a 30 day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct.

S-1 is subject to the limitations of Regulation 6-1-303 (*Particulate Matter and Visible Emissions*). Regulation 6, Rule 1 Section 303 states that a person shall not emit for a period or periods aggregating more than three minutes in any hour, a visible emission that is as dark or darker than No. 2 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree, nor shall said emission, as perceived by an opacity sensing device in good working order, where such device is required by District Regulations, be equal to or greater than 40% opacity. This low PM10 emitting engine is not expected to produce visible emissions or fallout in violation of this regulation, and it will be assumed to be in compliance with Regulation 6 pending a regular inspection.

S-1 is also subject to the SO₂ limitations of Regulation 9-1-301 (*Limitation on Ground Level Concentrations of Sulfur Dioxide*), Regulation 9-1-302 (*Limitations Sulfur Dioxide Emissions*) and 9-1-304 (*Burning of Solid and Liquid Sulfur Dioxide Fuel*). From Regulation 9-1-301, the ground level concentrations of SO₂ will not exceed 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Per Regulation 9, Rule 1, Section 302, a person shall not emit from any source a gas stream containing sulfur dioxide in excess of 300 ppm (dry). And Regulation 9, Rule 1, Section 304, states that a person shall not burn any liquid fuel having sulfur content in excess of 0.5% by weight. Compliance with both Regulations 9-1-301, 9-1-302 and 9-1-304 is likely since California law mandates using diesel fuel with a sulfur content of 0.0015% by weight.

From Regulation 9-8-110.4, the source is not subject to the requirements of Regulations 9-8-301 (*Emission Limits on Fossil Derived Fuel Gas*), 9-8-302 (*Emission Limits on Waster Derived Fuel Gas*), and 9-8-502(*Record Keeping*).

S-1 is exempt from Regulation 9-8-502 however; it is subject to the monitoring and record keeping procedures described in Regulation 9-8-530 (*Emergency Standby Engines, Monitoring and Recordkeeping*). The requirements of this Regulation are included in the permit conditions

CARB Stationary Diesel ATCM:

The State Office of Administrative Law approved the Airborne Toxic Control Measure (ATCM) on November 8, 2004. State law requires the local Air Districts to implement and enforce the requirements of the ATCM. Effective January 1, 2005, there is a prohibition on the operation of new diesel emergency standby engines greater than 50 bhp unless the following operating requirements and emission standards are met:

“Stationary Diesel Engine ATCM” section 93115, title 17, CA Code of Regulations.**Diesel PM – General Requirements**

1. Meet 0.15 g/bhp-hr PM standard
2. Operate 50 hours per year, or less, for maintenance and testing (except emergency use and emissions testing)

HC,NOx, NMHC+NOx, CO

1. Meet standards for off-road engines of the same model year and horsepower rating as specified in the OFF-Road Compression Ignition Engine Standards; or if no standards have been established

2. Meet the Tier 1 standards for an off-road engine for the same maximum rated power.

This emergency standby diesel engine is in compliance with the above ATCM requirements. The engine will operate for no more than 33 hours per year for maintenance and reliability testing. It is subject to the EPA Tier 3 off-road CI engine standards for NMHC+NO_x and CO. As shown in Table 6, the engines meet these requirements.

Table 6 : ATCM Tier 3 Compliance

Pollutant	CARB Certified g/bhp-hr	ATCM Tier 3 g/bhp-hr
NMHC+NO _x	2.68	3.0
NO _x	N/A	N/A
NMHC (POC)	N/A	N/A
CO	0.97	2.6
PM	0.13	0.15

California Environmental Quality Act (CEQA):

This project is considered to be ministerial under the District's CEQA Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions in accordance with Permit Handbook Chapter 2.3.

New Source Performance Standards (NSPS):

The engine is subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines because it was manufactured after April 1, 2006, as required by Section 60.4200(a)(2)(i).

The engine has a total displacement of 6.79 liters and has 6 cylinders, so each cylinder has a volume of less than 10 liters. The engine is a 2008 model year engine and is not a fire pump. Section 60.4205(b) requires these engines to comply with the emission standards in Section 60.4202, which refers to 40CFR89.112 and 40CFR89.113 for all pollutants. For engines between 175 and 300 hp, these standards are:

- NMHC+NO_x: 3.0 g/hp-hr
- CO: 2.6 g/hp-hr
- 20% opacity during acceleration mode
- 15% opacity during lugging mode
- 50% opacity during peaks in acceleration or lugging mode

According to CARB Executive Order U-R-004-0312-1, the engine will comply with the standards.

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engine according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine.

Section 60.4207(a) requires that by October 1, 2007, the owner/operator must use fuel that complies with 40 CFR 80.510(a). This means that the fuel must have a maximum sulfur content of 500 parts per million (ppm), a cetane index of 40 or a maximum aromatic content of 35 percent by volume. Section 60.4207(b) requires that by October 1, 2010, the owner/operator must use fuel that complies with 40 CFR 80.510(b). This means that the fuel must have a maximum sulfur content of 15 parts per million (ppm), and the same cetane index or aromatic content as previously stated. California Air Resources Board (CARB) diesel fuel, which has a maximum sulfur content of 15 ppm and a maximum aromatic content of 10 to 20 percent by volume. Staff in the Stationary Source Division of CARB indicate that some verified diesel fuel in California may have a maximum aromatic content greater than 10 percent if the fuel has been demonstrated to have an equal or greater emissions benefit as diesel fuel with maximum aromatic content of 10 percent, but no verified fuel has had an aromatic content greater than 25 percent.

Section 60.4209(a) requires a non-resettable hour meter. This requirement is already in the standard permit conditions.

The engine will comply with the requirements of Section 60.4211(c) because it has been certified in accordance with 40 CFR Part 89.

The engine will comply with the requirement in Section 60.4211(e) to run for less than 100 hours per year for maintenance checks and readiness testing, and the prohibition of running for any reason other than emergency operation, maintenance, and testing because it is limited by permit condition to 33 hours per year for reliability testing and otherwise may only operate for emergencies.

The owner/operator is not required to perform tests in accordance with Section 60.4212 or 60.4213.

Section 60.4214(b) states that owner/operators do not have to submit an initial notification to EPA for emergency engines.

Because the engine does not have a diesel particulate filter, it is not subject to Section 60.4209(b) (installation of a backpressure monitor) or 60.4214(c) (records of corrective action taken after high backpressure).

The owner/operator is required to comply with certain sections of 40 CFR 60, Subpart A, General Provisions. These are listed in the permit conditions. [Subpart III, Table 8]

National Emission Standards for Hazardous Air Pollutants (NESHAP):

This engine is not subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, because it is not located at a major facility for hazardous air pollutants.

PUBLIC NOTIFICATION

This facility is less than 1,000 feet from the nearest school and is therefore subject to the public notification requirements of Regulation 2-1-412. A public notice will be prepared and sent to all addresses within 1000 feet of the diesel generator set and parents and guardians of students of the following schools:

San Mateo County Office of Education Special Education Services (K-12):

Palos Verde School
1290 Commodore Drive West
San Bruno, CA 94066

El Portal School
1280 Commodore Drive West
San Bruno, CA 94066

Because the diesel generator set is within 500 feet of the nearest school, the engine will be conditioned not to operate for maintenance or testing purposes from 7:30AM to 3:30PM on days when school is in session.

PERMIT CONDITIONS

Condition# 22833

1. The owner/operator shall not exceed 33 hours per year per engine for reliability-related testing. [Basis: "Regulation 2-5]
2. The owner/operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, State or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited. [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]
3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained. [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection(e)(4)(G)(1)]
4. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry (60 months if the facility has been issued a Title V Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.
 - a. Hours of operation for reliability-related activities (maintenance and testing).

- b. Hours of operation for emission testing to show compliance with emission limits.
- c. Hours of operation (emergency).
- d. For each emergency, the nature of the emergency condition.
- e. Fuel usage for each engine(s).

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(I), (or, Regulation 2-6-501)]

5. At School and Near-School Operation: If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply:

The owner/operator shall not operate each stationary emergency standby diesel-fueled engine for non-emergency use, including maintenance and testing, during the following periods:

- a. Whenever there is a school sponsored activity (if the engine is located on school grounds)
- b. Between 7:30 a.m. and 3:30 p.m. on days when school is in session.

"School" or "School Grounds" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). "School" or "School Grounds" includes any building or structure, playground, athletic field, or other areas of school property but does not include unimproved school property. [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1) or (e)(2)(B)(2)]

End of Conditions

RECOMMENDATION

Issue DaVita Rx an Authority to Construct and Permit to Operate the following source:

<p>S-1 Emergency Standby Diesel Generator Set Engine: 2008 John Deere, Model: 6068HF285 237 BHP, 1.69 MMBtu/hr</p>	<p>at</p>	<p>1178 Cherry Avenue San Bruno, California 94066</p>
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Jessica K. Garcia
 Air Quality Engineering Intern
 Engineering Division

 10/2/08
Date