ENGINEERING EVALUATION
Parkmerced Investors LLC
Plant: 19127
Application: 18609

BACKGROUND
Parkmerced Investors LLC has applied to obtain an Authority to Construct (AC) and/or a Permit to Operate (PO) for the following equipment:

S-7		
Emergency Standby Diesel Generator Set	**at**	**125 Cambon Drive**
2008 Cummins, Model: DSHAB		**San Francisco, CA 94132**
364 BHP, 2.04 MMBTU/hr		
S-8		
Emergency Standby Diesel Generator Set	**at**	**150 Font Boulevard**
2008 Cummins, Model: DSHAB		**San Francisco, CA 94132**
364 BHP, 2.04 MMBTU/hr		
S-9		
Emergency Standby Diesel Generator Set	**at**	**100 Font Boulevard**
2008 Cummins, Model: DSHAB		**San Francisco, CA 94132**
364 BHP, 2.04 MMBTU/hr		
S-10		
Emergency Standby Diesel Generator Set	**at**	**50 Chumasero Drive**
2008 Cummins, Model: DSHAB		**San Francisco, CA 94132**
364 BHP, 2.04 MMBTU/hr		
S-11		
Emergency Standby Diesel Generator Set	**at**	**55 Chumasero Drive**
2008 Cummins, Model: DSHAB		**San Francisco, CA 94132**
364 BHP, 2.04 MMBTU/hr		

The Emergency Diesel Engine Generator Sets (S-7, S-8, S-9, S-10, and S-11) are equipped with the best available control technology (BACT) for minimizing the release of air borne 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 (SO_2) and particulate matter (PM_{10}). All of these pollutants are briefly discussed on the District's web site at Baaqmd.gov.

The engines meet the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 3 Off-road standard. The engines will burn commercially available California low sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight. The operation of the engines should not pose any health threat to the surrounding community or the public at large.

The engines are subject to attached condition no. 22850.

EMISSIONS

S-7, S-8, S-9, S-10, and S-11 have been certified by CARB to be cleaner burning engines. Except for SO_2, the emission factors for these engines are from the CARB Certification (CARB Executive Order # U-R-002-0393 for S-7, S-8, and S-9; CARB Executive Order # U-R-002-0449 for S-10 and S-11). 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:

- 364 Brake Horsepower (BHP)
- 50 hr/yr operation for testing and maintenance
- 14.9 gallons/hr max fuel use rate
- Since S-7, S-8, S-9, S-10, and S-11 are the same model and manufacture, emissions will be combined
- NMHC + NOx, CO and PM10 emission factors provided by CARB Certification with Executive Order U-R-002-0393 (for S-7, S-8, and S-9) and CARB Certification with Executive Order U-R-002-0449 (for S-10 and S-11)
- 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.

Annual Average Emissions:

NOx = (5)(50 hr/yr)(364 hp)(2.76 g/hp-hr)(1 lb/454g) = **553.22** lb/yr
= **0.2766** TPY

CO = (5)(50 hr/yr)(364 hp)(2.46 g/hp-hr)(1 lb/454g) = **493.08** lb/yr
= **0.2465** TPY

POC = (5)(50 hr/yr)(364 hp)(0.15 g/hp-hr)(1 lb/454g) = **30.07** lb/yr
= **0.0150** TPY

PM10 = (5)(50 hr/yr)(364 hp)(0.11 g/hp-hr)(1 lb/454g) = **22.05** lb/yr
= **0.0110** TPY

SO2 = (5)(0.000015 lb S/lb fuel)(7.206 lb fuel/gal fuel)(14.9 gal fuel/hr)(64 lb SO2/32 lb S)(50 hr/yr)
= **0.8053** lb/yr
= **0.000403** TPY

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.

NOx = (5) (24 hr/yr)(364 hp)(2.76 g/hp-hr)(1 lb/454g) = **265.54** lb/day

CO = (5) (24 hr/yr)(364 hp)(2.46 g/hp-hr)(1 lb/454g) = **236.68** lb/day

POC = (5) (24 hr/yr)(364 hp)(0.15 g/hp-hr)(1 lb/454g) = **14.43** lb/day

PM10 = (5) (24 hr/yr)(364 hp)(0.11 g/hp-hr)(1 lb/454g) = **10.58** lb/day

SO2 = (5) (0.000015 lb S/lb fuel)(7.206 lb fuel/gal fuel)(14.9 gal fuel/hr)(64 lb SO2/32 lb S)(24 hr/day)
= **0.3865** lb/day

Table 1

Pollutant	Emission Factor (g/kw-hr)	Emission Factor (g/hp-hr)	Annual Emissions (lb/yr)	Annual Emissions (TPY)	Max. Daily (lb/day)
NMHC+NOx	3.90	2.91	583.28	0.292	279.98
NOx	3.71	2.76	553.22	0.2766	265.54
CO	3.30	2.46	493.08	0.2465	236.68
POC	0.20	0.15	30.07	0.0150	14.43
PM10	0.15	0.11	22.05	0.0110	10.58
SO2	-	-	0.8053	0.000403	0.3865

PLANT CUMULATIVE INCREASE

Parkmerced Investors LLC at "3711 19th Ave, San Francisco, CA 94132" is an existing facility. Therefore, the District's database contains information on existing emissions at the plant. Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result at Plant 19127 from the operation of S-7, S-8, S-9, S-10, and S-11.

Table 2

Pollutant	Current plant emissions (TPY)	Increase in plant emissions associated with this application (TPY)	Cumulative emissions (Current + Increase) (TPY)
NO_x	0.33193	0.27661	0.60854
CO	0.29585	0.24654	0.54239
POC	0.01804	0.01503	0.03307
PM_{10}	0.01323	0.01102	0.02425
SO_2	0.00048	0.00040	0.00089

TOXIC RISK SCREENING ANALYSIS

This application required a Toxics Risk Screen because the diesel particulate emissions are greater than the toxic trigger level.

Toxic Pollutant Emitted	Emission Rate (lb/yr)	Risk Screening Trigger (lb/yr)
PM10 (Diesel Particulate) from S-1, S-2, S-3, S-4, S-5, and S-6 (Application no. 18273)	26.46	0.58
PM10 (Diesel Particulate) from S-7	4.41	0.58
PM10 (Diesel Particulate) from S-8	4.41	0.58
PM10 (Diesel Particulate) from S-9	4.41	0.58
PM10 (Diesel Particulate) from S-10	4.41	0.58
PM10 (Diesel Particulate) from S-11	4.41	0.58
Total PM10 (Diesel Particulate)	48.51	0.58

S-7, S-8, S-9, S-10, and S-11 meets Best Available Control Technology for toxics (TBACT) since their diesel particulate emissions are less than 0.1 g/bhp-hr. Engines that meets the TBACT requirement, 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.

Based on 50 hours per year of operation, the emergency generators passed the Health Risk Screening Analysis (HRSA) conducted on September 2, 2008 by the District's Toxic Evaluation Section. The sources pose no significant toxic risk

The proposed operation would result in an increased maximum cancer risk of 0.9 chances in a million and a hazard index of 0.0006 for residences near the facility. For off-site workers, the increased maximum cancer risk is 0.8 chances in a million and the hazard index is 0.0006. For the students who attend St. Thomas More School, the increased maximum cancer risk is 0.01 chances in a million and the hazard index is 0.00003. For the students who attend Brandeis Hillel Day School, the increased maximum cancer risk is 0.02 chances in a million and the hazard index is 0.00007. For the students who attend Bridgemont Junior High and High Schools, the increased maximum cancer risk is 0.02 chances in a million and the hazard index is 0.00005. These health risk values, meet the project risk requirements established in the BAAQMD's Regulation 2, Rule 5.

BACT

BACT is triggered for NOx and CO since the maximum daily emissions of the above 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**
NOx	1. *1.5 g/bhp-hr [107 ppmvd @ 15% O_2]* [a,b] 2. *6.9 g/bhp-hr [490 ppmvd @ 15% O_2]* [a,b,c] 3. *6.9 g/bhp-hr [490 ppmvd @ 15 % O2]*	1. *Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler* [a,b] 2. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler* [a,b,c] 3. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler*
CO	1. *n/s* 2. *2.75 g/bhp-hr [319 ppmvd @ 15% O2]* [b,c]	1. *Catalytic Oxidation* [b] 2. *CARB or EPA (or equivalent) low-CO emitting certified engine* [b,c]

It can be seen from above that S-7, S-8, S-9, S-10, and S-11 satisfy the current BACT 2 standard for NOx and CO (6.9 g/hp-hr and 2.75 g/hp-hr, respectively). The more restrictive BACT 1 standard is not applicable to these engines because they will be limited to operation as emergency standby engines.

OFFSETS

Parkmerced Investors LLC at "3711 19th Ave, San Francisco, CA 94132" is an existing facility. Table 3 summarizes the increase in criteria pollutant emissions that will result from the operation of S-7, S-8, S-9, S-10, and S-11.

Table 3

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	0.33193	0.27661	0.60854	> 10; < 35
CO	0.29585	0.24654	0.54239	NA
POC	0.01804	0.01503	0.03307	> 10; < 35
PM_{10}	0.01323	0.01102	0.02425	> 1
SO_2	0.00048	0.00040	0.00089	> 1

It can be seen from Table 2 above that S-7, S-8, S-9, S-10, and S-11 do not trigger any offset. Therefore, offsets are not warranted for any emission.

NSPS

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

Each engine has a total displacement of 8.9 liters and has 6 cylinders, so each cylinder has a volume of less than 10 liters. S-7, S-8, and S-9 are 2007 model year and are not fire pumps; S-10 and S-11 are 2008 model year and are not fire pumps. 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 300 and 600 hp, these standards are:

NMHC+NOx: 3.0 g/hp-hr
CO: 2.6 g/hp-hr
PM: 0.15 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-002-0449 and CARB Executive Order# U-R-002-0393, the engines will comply with the standards.

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engines 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 engines. The owner/operator is expected to comply with this requirement.

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. The owner/operator is expected to comply with this requirement because CARB diesel is required to be used in California.

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. The owner/operator is expected to comply with this requirement because CARB diesel is required to be used in California.

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

The engines will comply with the requirements of Section 60.4211(c) because they have been certified in accordance with 40 CFR Part 89.

The engines 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 they are limited by permit condition to 50 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 states that owner/operators do not have to submit an initial notification to EPA for emergency engines.

Because the engines do not have a diesel particulate filter, they are not subject to Section 60.4214(c).

The owner/operator is required to comply with certain sections of 40 CFR 60, Subpart A, General Provisions. The owner/operator is expected to comply with this requirement.

NESHAP

These engines are not subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, because they are not located at a major facility for hazardous air pollutants.

CARB STATIONARY DIESEL ENGINE 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.

These emergency standby diesel engines (S-7, S-8, S-9, S-10, and S-11) are in compliance with the above ATCM requirements. The diesel engines will operate for no more than 50 hours per year for maintenance and reliability testing. These engines are subject to the EPA Tier 3 off-road CI engine standards for HC, NOx, NMHC+NOx and CO. As shown in the Table 4, the engines meet these requirements.

Table 4
ATCM Tier 3 Compliance

Pollutant	CARB Certified g/bhp-hr	ATCM Tier 3 g/bhp-hr
NMHC+NOx	2.91	3.00
NOx	N/A	N/A
NMHC (POC)	N/A	N/A
CO	2.46	2.63
PM	0.11	0.15

STATEMENT OF COMPLIANCE

Sources S-7, S-8, S-9, S-10, and S-11 are subject to and expected to be in compliance with the requirements of District Regulation 1-301 (*Public Nuisance*), Regulation 6-303 (*Particulate Matter and Visible Emissions*), Regulation 9-1 (*Sulfur Dioxide*) and Regulation 9-8 (*NOx and CO from Stationary Internal Combustion Engines*). In order to ensure compliance with the requirements of these regulations, the facility will be conditionally permitted to meet the requirements.

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-7, S-8, S-9, S-10, and S-11 are subject to the limitations of Regulation 6-303 (*Particulate Matter and Visible Emissions*). Regulation 6, 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. These low PM10 emitting engines are 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-7, S-8, S-9, S-10, and S-11 are also subject to the SO_2 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 SO_2 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 9-1-302 and 9-1-304 is likely since California law mandates using diesel fuel with a 0.05% by weight sulfur.

Regulation 9-8 "NOx and CO from Stationary Internal Combustion Engines." From Regulation 9-8-110.4, the sources are 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-7, S-8, S-9, S-10, and S-11 are exempt from Regulation 9-8-502; however, they are 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 below.

This application is considered to be ministerial under the District's 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 and standard emission factors in accordance with Permit Handbook Chapter 2.3.

PSD is not triggered.

PUBLIC NOTICE

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:

St. Thomas More School
50 Thomas More Way
San Francisco, CA 94132

Brandeis Hillel Day School
655 Brotherhood Way
San Francisco, CA 94132

Bridgemont High School & Junior High
777 Brotherhood Way
San Francisco, CA 94132

KZV Armenian School
825 Brotherhood Way
San Francisco, CA 94132

[This section will be updated with details on Public Comments once the comment period ends]

PERMIT CONDITIONS

For S-7, S-8, S-9, S-10, and S-11,
CONDITION 22850

1. Operating for reliability-related activities is limited to 50 hours per year per engine.
   [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(B)(3) or Regulation 2-5]

2. The owner or 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 or 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 Parkmerced Investors LLC an AC/PO for the following equipment:

S-7
Emergency Standby Diesel Generator Set at 125 Cambon Drive
2008 Cummins, Model: DSHAB San Francisco, CA 94132
364 BHP, 2.04 MMBTU/hr

S-8
Emergency Standby Diesel Generator Set at 150 Font Boulevard
2008 Cummins, Model: DSHAB San Francisco, CA 94132
364 BHP, 2.04 MMBTU/hr

S-9
Emergency Standby Diesel Generator Set at 100 Font Boulevard
2008 Cummins, Model: DSHAB San Francisco, CA 94132
364 BHP, 2.04 MMBTU/hr

S-10
Emergency Standby Diesel Generator Set at 50 Chumasero Drive
2008 Cummins, Model: DSHAB San Francisco, CA 94132
364 BHP, 2.04 MMBTU/hr

S-11
Emergency Standby Diesel Generator Set at 55 Chumasero Drive
2008 Cummins, Model: DSHAB San Francisco, CA 94132
364 BHP, 2.04 MMBTU/hr

_____ **Date: 08/15/2008**

Kevin Oei
Air Quality Engineering Intern
Engineering Division