Section I: AQMD BACT Determinations

Application No.: C-1010958

Equipment Category – I.C. Engine, Emergency, Compression-Ignition

1.	GENERAL INFORMATION			DATE: 2/8/2006	5				
Α.	MANUFACTURER: Caterpillar								
B.	TYPE: Diesel, 4-stroke, turbocharged/aftercooled	С	. MODEL:	3516B					
D.	STYLE: V-16								
E.	APPLICABLE AQMD RULES:								
F.	COST: \$ (NA) SOURCE C	OF COST I	DATA:						
G.	OPERATING SCHEDULE: HRS/DAY		DA	YS/WK	WKS/YR				
2.	EQUIPMENT INFORMATION			APP. NO.: C-101	0958				
A.	FUNCTION: Drives electricity generator used for emergency and peaking power. Enables facility to be on SCE interruptible rate schedule.								
B.	MAXIMUM HEAT INPUT: 110.1 gph	С	. MAXIMUM	THROUGHPUT: 284	48 BHP				
D.	BURNER INFORMATION: NO.:	TYPE:							
E.	PRIMARY FUEL: Diesel	F	. OTHER FL	JEL: None					
G.	OPERATING CONDITIONS: Intermittent								
3.	COMPANY INFORMATION			APP. NO.: C-101	0958				
A.	NAME: Kings County Dept. of Public W	orks			B. SIC CODE:				
C.	ADDRESS: 1400 Lacey Blvd. CITY: Hanford		STATE: C	ZA z	IP:				
D.	CONTACT PERSON: Harry Verheul			E. PHONE NO.: 5	559-582-3211 x2690				
4.	PERMIT INFORMATION			APP. NO.: C-101	0958				
Α.	AGENCY: SJVAPCD	В	. APPLICAT	ION TYPE: modific	cation				
C.	AGENCY CONTACT PERSON: Brian Clerico			D. PHONE NO.: 5	559-230-5892				
E.	PERMIT TO CONSTRUCT/OPERATE INFORMATION:	P/C NO.:			NCE DATE:				
	CHECK IF NO P/C	P/O NO.:	C-10109	58 ISSUAN	NCE DATE: 4/10/2001				
F.	START-UP DATE: Diesel particulate filte	er insta	alled Janua	ary 2002					

5. EMISSION INFORMATION

APP. NO.: C-1010958

A. PERMIT

- A1. PERMIT LIMIT: Engine must be equipped with turbocharger, aftercooler, positive crankcase ventilation or 90% control of crankcase emissions, and oxidation catalyst/particulate filter. Operation is restricted to 614 hours per year. Emission limits (g/bhp-hr): NOx-5.187, VOC-.0026, CO-.035, PM10-.0116. Fuel must be CARB certified to contain no more than .0015 wt. % sulfur.
- A2. BACT/LAER DETERMINATION: Catalytic particulate filter with ultra-low sulfur (15 wt. ppm) fuel.
- A3. BASIS OF THE BACT/LAER DETERMINATION: SJVAPCD BACT guideline for emergency engine converted to "limited use" status.

B. CONTROL TECHNOLOGY

- B1. MANUFACTURER/SUPPLIER: CleanAir Systems
- B2. TYPE: "PERMIT" catalytic particulate filter
- billion between the engine exhaust passes through six particulate filters arranged in parallel within an acoustic enclosure. Each filter is a porous ceramic cylinder with oxidation catalyst applied to its surface. The catalyst allows oxidation of the carbonaceous fraction of the collected particulate to occur when the filter reaches sufficient temperature (approx. 570F), prolonging filter use before pluggage occurs. The catalyst also oxidizes condensible organics, which are included in total particulate as measured by California methods (impinger catch), and also oxidizes CO and VOC.
- B4. CONTROL EQUIPMENT PERMIT APPLICATION DATA: P/C NO.: C-724-8-1 ISSUANCE DATE: 9/20/2001
 P/O NO.: C-724-8-1 ISSUANCE DATE: 1/24/2002
- B5. WASTE AIR FLOW TO CONTROL EQUIPMENT: FLOW RATE:

 ACTUAL CONTAMINANT LOADING: BLOWER HP:
- ^{B6.} WARRANTY: CleanAir guarantees the following removal efficiencies: PM10-85%, VOC-90%, CO-95%. The 85% PM10 removal efficiency is based on weighted-average results at three test loads and does not necessarilly imply that the 85% removal efficiency will be achieved at all engine loads.
- B7. PRIMARY POLLUTANTS: NOx, CO, VOC, PM10
- B8. SECONDARY POLLUTANTS: None
- B9. SPACE REQUIREMENT:

5.	EMISSION INFORMATION	APP. NO.: C-1010958						
B10.	LIMITATIONS: CARB recommends this tech	nnology for a limited set of engine	B11. UNUSED					
	families (see CARB website) and only t							
	or less. It is recommended that ultra-lo	w sulfur fuel be used (15 ppm						
	maximum sulfur). If the engine operate	es at low load and the exhaust						
	temperature does not attain 570F, the fi							
	be cleared by heating to at least 570F w							
	This can be accomplished by running the							
	(CARB recommends 40%) or by otherw							
	For an engine that operates only for sho							
	typical emergency engine testing), CAR							
	every 2 to 4 hours of operation. However,							
	similar filter installed on an emergency							
	case, the engine operates at about 20% I Certification data indicate that the engin							
	that load. Although the minimum temp	-						
	filter reaches only about 385F, the filter							
	year, and the del-P criterion (80" H2O)	~ • •						
B12.								
	normal (mainly peaking) use since then. It typically operates 300-400 hrs per year at or							
		annually and cleaned manually if neede						
B13.	UNUSED	B14. UNUSED						
C.	CONTROL EQUIPMENT COSTS							
C1.	CAPITAL COST: CHECK IF INSTALL	ATION COST IS INCLUDED IN EQUIPMENT COST						
	EQUIPMENT: \$ INSTALLATION: \$	$(NA)^{ ext{SOURCE}}$ of cost data:						
C2.	ANNUAL OPERATING COST: \$ (NA)	SOURCE OF COST DATA:						
D.	DEMONSTRATION OF COMPLIANCE							
D1.	STAFF PERMFORMING FIELD EVALUATION:							
	ENGINEER'S NAME: INSPE	ECTOR'S NAME: Ryan Hayashi DATE: 3/13	3/2003					
D2.	COMPLIANCE DEMONSTRATION: Engine operated	524 hrs in 2002.						
D3.	VARIANCE: NO. OF VARIANCES: None	DATES:						
	CAUSES:							
D4.	VIOLATION: NO. OF VIOLATIONS: None	DATES:						
	CAUSES:							
D5.	MAINTENANCE REQUIREMENTS: See above, B10.		D6. UNUSED					

EMISSION INFORMATION

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D7. SOURCE TEST/PERFORMANCE DATA RESULTS AND ANALYSIS:

DATE OF SOURCE TEST: Jan and Aug 2002

DESTRUCTION EFFICIENCY:

SOURCE TEST/PERFORMANCE DATA:

CAPTURE EFFICIENCY: OVERALL EFFICIENCY:

		Pre-R	etrofit (trofit (Jan 3-4) Post-Retrofit (Jan 30-31)			Durability (Aug 27-29)					
			g/bhp-l	nr	% Removal			% Removal				
	Load	50%	75%	100%	50%	75%	100%	Avg.	50%	75%	100%	Avg.
	Filterable PM	.0636	.0526	.0452	100	97	97		95	95	90	
	Condensibles:											
	Organic	.0023	.0054	.0075	0	67	80		100	100	60	
	Inorganic	.0114	.0091	.0113	80	50	53		50	70	27	
	Total PM	.0772	.0671	.0641	96	88	87	89.3	90	92	75	86.5
ppmvd@15%O2												
	NOx	443	351	351	-5	-3	-7		-3	-1	-7	
	CO	58	41	40	98	97	97		97	97	97	
	VOC	26	19	21	93	93	94		94	96	95	

OPERATING CONDITIONS:

PM tests were triplicate one-hour tests, and gaseous emissions tests were triplicate 40-minute tests. CARB Methods 5 (PM) and 100 (gaseous) were used. Average PM removals are based on weighting factors of 0.2, 0.5, and 0.3 at 50, 75 and 100% load, respectiveley. CARB verifies the filter based on average PM removal.

6. COMMENTS

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This product (CleanAir Systems PERMIT filter) has been verified by CARB to achieve 85% PM removal based on a weighted average of results at 50, 75 and 100% load (see above 5D7). CARB restricts its verification of this technology to certain diesel engines (basically those that produce less than 0.1 g/bhp-hr PM). The filter manufacturer is to evaluate the suitability of the technology in each case based on the engine characteristics and its duty cycle. CARB does not consider the apparent affect of the filter on NOx to be statistically significant.

This listing is not meant to demonstarte that a particulate filter can work well on an emergency engine since this is not an emergency engine. However, the listing is useful in the emergency engine category because it presents data showing the effectiveness of a particulate filter in cleaning diesel engine exhaust.

If the engine is run at only, say, 20% load and can run for only 4 hours before the filter needs to be cleared (see above, B10) and the engine is run two hours at 40% load to clear the filter, the total PM controlled by the filter is about 0.26 lb versus about 21 lb NOx emitted during filter clearing. Therefore, filter clearing by some means other than operating the engine should be required. CleanAir offers to clear the filter if it is shipped to them.

An inlet pressure monito/alarm system should be required so the operator knows when the filter needs to be cleared.