Robert Sarvey
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Tracy, Ca. 95376
(209) 835-7162

STATE OF CALIFORNIA

State Energy Resources
Conservation and Development Commission

In the matter of Eastshore Energy Center	))))))	Docket Number 06-AFC-6 Air Quality Testimony of Robert Sarvey, Declaration Exhibits And Exhibit List

12-7-07

Date

Signature

PROOF OF SERVICE (REVISED 12/4/07) FILED WITH ORIGINAL MAILED FROM SACRAMENTO ON 12/7/07

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STATE OF CALIFORNIA

State Energy Resources
Conservation and Development Commission

In the matter of Eastshore Energy Center	)))))	Docket Number 06-AFC-6 Petition for Intervention

1) Pursuant to Title 20 of the California Code of Regulations, section 1207, petitioner Robert Sarvey petitions to intervene in the above captioned proceeding

2) Petitioner whishes to present evidence that the air quality impacts of the project are a significant impact to the surrounding community. Petitioner has family members and friends who live and work near the project.

3) Petitioner does wish to present evidence and cross examine witnesses

4) Petitioner will be represented by himself.

11-20-07

Date

Signature

Robert Sarvey
501 W. Grantline Rd
Tracy, CA, 95376
209 835-7162

STATE OF CALIFORNIA
State Energy Resources
Conservation and Development Commission

In the Matter of:	)	
	)	Docket No. 06-AFC-6
	)	
Eastshore Energy Center	)	FINANCIAL HARDSHIP
	)	PETITION
	)	
	)	

Robert Sarvey hereby petitions to be excused from filing 12 copies with the Commission Docket Unit and serving papers on all other parties of record.

Compliance with the above requirements creates an undue financial hardship for the petitioner in that petitioner is an individual not supported by governmental or non profit funding.

11-20-07

Date

Signature

Exhibit 700
Air Quality
Testimony of Robert Sarvey

Testimony of Robert Sarvey on the Eastshore Project 06-AFC-6

The Eastshore Project is unique as it has the highest 24 hour PM-10 impact and the highest 24 hour PM 2.5 impact of any project approved by the CEC. The project also has the second highest 24 hour NO_2 impact and the second highest annual PM 2.5 impact of any project previously approved by the Commission. The Table below demonstrates the magnitude of this projects impacts compared with other recent CEC Projects.

Ambient Air Quality Impacts from recently approved CEC projects

Project Name	1 Hour NO2 Impact	24 Hour PM-10 Impact	Annual PM-10 Impact	24 Hour PM-2.5 Impact	Annual PM 2.5 Impact
Blythe	368	3.1	.4		
Blythe II	182	6.1	.4		
EAEC	236	7.0	.6		
Eastshore	314	27.5	3.1	17.0	3.1
El Segundo	93	9.4	1.4		
Contra Costa	93	5.0	.2		
High Desert	235	9.0	1.0		
Inland	88	9.9	1.4		
Los Esteros	225	1.3	.12		
MEGS	1.7	.52	.13	.52	.13
Morro Bay	214	24.2	2.7		
Metcalf	188	9.3	1.1		
Niland	142	1.3	.05	1.3	.1
Otay Mesa	130	4.6	.8		
Palomar	24	4.8	.8		
Panoche	136	2.8	.52		
Pastoia	35	2.5	.42		
Roseville	275	16.7	.46		
Russell City	226	2.9	.15	2.9	.15
SFERP	111	1.2	.1	1.2	.1
San Joaquin	21	3.8	.22		
Sutter	241	.55	.09	.55	.09
Tesla	120	5.1	.5		
Tracy	24	2.1	.03		
Walnut Cr.	165	6.7	.57	6.7	.57
Turlock	8	2.0	.27		
Western Mid	59	9.2	3.4		
Woodland	30	4.8	1.1		

Values in Red are maximum impacts plus background that violate a standard

All parties agree that the project contributes to existing violations of PM-10 and Ozone standards. The Eastshore project also has the distinction of being the only CEC project to violate three ambient air quality standards. The projects annual PM-10 impact of 3.1 ug/m3 when combined with background levels of 20 ug/m3 exceeds the states annual standard for PM-10. (Exhibit 200 AQ table 16) The projects annual PM 2.5 impact of 3.1 ug/m3 when combined with ambient background levels of 9.4 ug/m3 violates the Federal Annual PM 2.5 Standard. The projects maximum N02 impact is 314 mg/u3 and when combined with the background concentration of 143 ug/m3 it exceeds the new State Standard for NO2. That standard is 338 ug/m3 and it is not to be exceeded (Exhibit 701). The new standard was adopted by the Air Resources Board on February 23, 2007. It is expected that the OAL will approve the standard before the end of the year which will be before the project is certified.

Staff and applicants air quality impact analyses agree on the routine project impacts for NO2, SO2 and CO. The applicants particulate matter analysis predicts higher PM-10 and PM 2.5 impacts than staff's analysis. The applicant's analysis utilizes a maximum PM-10 emission rate of 2.3 pounds per hour per engine but the FDOC has lowered that emission limit to 1.3 - 1.9 pounds per hour. The applicant has projected PM-10 impacts to be the same as PM 2.5 impacts which is correct since almost all of the projects particulate matter emissions are PM 2.5 (Exhibit 702 page 3.2-10) It is not clear in the record what emission rate staff utilized in their analysis but staff's analysis estimates a PM-10 24 hour impact of 27.5ug/m3 and a PM 2.5 24 hour impact of 17ug/m3. Staff's PM 2.5 value is questionable considering the fact that the projects equipment will emit almost 100% PM 2.5. (Exhibit 702) Staff's routine operational impacts estimates have no evidentiary value since their methodology and inputs are not explained in their testimony or contained elsewhere in the record.

The proposed mitigation for these very large particulate matter impacts is SO2 emission reduction credits or a woodstove program. While this may be acceptable for the regional impacts of the project it does not mitigate the significant local impacts reflected in the Staff's and applicants analysis. The woodstove program could possibly mitigate some of the projects local impacts but that would require identification of the location of these retrofits and an air quality impact analysis of their benefit which is not

present in the mitigation plan. There is additional mitigation which is both feasible and cost effective for this unprecedented local particulate matter impact. The project should be required to achieve a lower PM-10/2.5 limit. The ARB recommends a .029g/bhp limit on PM-10/2.5 emissions for this type of equipment. (GUIDANCE FOR THE PERMITTING OF ELECTRICAL GENERATION TECHNOLOGIES, Table V-4, page 34) The ARB recommended a .029 g/bhp PM-10 limit in its comments on the Eastshore PDOC. (Exhibit 703) The CEC staff also recommended a .029 g/hp PM-10 limit in its comments on the PDOC. (Exhibit 704) The NEO California Power Plant in the San Joaquin Valley has a permit limit of 0.029 g/bhp-hr that corresponds to 0.27 lb/hr and the two engines were tested when the facility started up in 2001 and the results of the San Joaquin tests demonstrated that those engines could meet that permit limit. (Exhibit 201 page 10) The BAAQMD has adopted a 1.3 to 1.9 pounds per hour permit limit for PM-10/2.5. This project does not comply with established BACT limits which have been achieved in practice. Due to the high PM-10/2.5 concentrations the Commission Decision should impose a lower particulate matter limit to mitigate the enormous local PM ambient air quality impacts from the Eastshore Project. The Commission should also require a higher stack height to increase dispersion and lower particulate matter concentrations from the project.

The project also has the potential to exceed the new state standard for NO_2 of 338 ug/m3. (Exhibit 200 page 4.1-23) The project has no mitigation for NOx emissions since the project owner has elected to utilize VOC emission reduction credits to offset the projects NOx emissions. This is a significant impact since any time the project achieves or gets near its maximum concentration it has the potential to cause a violation of the new State NO_2 standard. (Exhibit 705) The new NO_2 standard was set to protect asthmatics, children, and people with respiratory illnesses. The projects maximum impacts occur in a populated area therefore there is a potential for significant impacts to neighbors, workers and students near the project. Mitigation such as increasing the stack height should be utilized to lessen these significant NO_2 impacts.

Despite the urgency of the Greenhouse Gas Crisis and recent court decisions staff attempts to quantify the Greenhouse gas emissions but provides no mitigation for these emissions. The engines that are used in this project lack the emissions testing to quantify

the projects emissions and the Staff's attempt to quantify them lack any evidentiary value without specific source testing on these engines.

Conclusions

This project has the highest particulate matter impacts of any project recently approved by the California Energy Commission. These impacts will be local in nature and the projects proposed mitigation is regional mitigation that is ill suited to mitigate a significant air quality impact to local residents and workers. The project's impacts when combined with background ambient conditions will violate three ambient air quality standards which is unprecedented. The project fails to meet the requirements of BAAQMD rule 2-2-301 for BACT. There is mitigation that is feasible and cost effective available. The Commission should require lower particulate matter emission limits and require the applicant to increase the height of the exhaust stacks for the project to improve dispersion and reduce the extremely high localized impacts of the Eastshore Project. In the alternative the commission should require the project owner to modify this project and utilize equipment with lower emission rates and better dispersion characteristics.

Resume of Robert Sarvey

Academic Background

BA Business Administration California State University Hayward 1975
MBA Taxation California State University Hayward 1985

Experience

San Joaquin Valley Air Pollution Control District Citizens Advisory Board Industry Representative: Analyzed proposed air quality regulations and made recommendations to the Governing Board for approval.

GWF Peaker Plant 01-AFC-16: Participated as an Intervenor in the project and helped negotiate and implement a 1.3 million dollar community benefits program. Successfully negotiated for the use of local emission reduction credits with GWF to offset local air quality impacts.

East Altamont Energy Center 01-AFC-14: Participated as an Intervenor and helped develop the conditions of certification for hazardous materials transportation, air quality, and worker safety and fire protection. Provided testimony for emergency response and air quality issues.

Tesla Power Project 01- AFC-04: Participated as an Intervenor and provided air quality testimony on local land use and air quality impacts. Participated in the development of the air quality mitigation for the project,

Modesto Irrigation District 03-SPEE-01: Participated as Intervenor and helped negotiate a $300,000 air quality mitigation agreement between MID and the City of Ripon.

Los Esteros : Participated as an Intervenor and also participated in air quality permitting with the BAAQMD. Responsible for lowering the projects permit limit for PM-10 emissions by 20%.

SFERP 4-AFC-01: Participated as an Intervenor and also participated in the FDOC evaluation. My comments to the BAAQM D resulted in the projects PM -10 emission rate to be reduced from 3.0 pounds per hour to 2.5 pounds per hour by the District. Provided testimony on the air quality impacts of the project.

Long Beach Project: Provided the air quality analysis which was the basis for a settlement agreement reducing the projects NOx emissions from 3.5ppm to 2.5ppm.

ATC Explosive Testing at Site 300: Filed challenge to Authority to Construct for a permit to increase explosive testing at Site 300 a DOE facility above Tracy. The permit was to allow the DOE to increase outdoor explosions at the site from 100 pounds per charge to 300 pounds per charge and also grant an increased annual limit on explosions from 1,000 pounds of explosive to 8,000 pounds of explosives per year. Succeeded in getting the ATC revoked.

DECLARATION OF
Robert Sarvey, MBA, BS

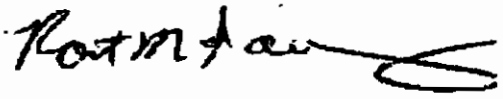
I Robert Sarvey declare as follows

1) **I prepared the testimony of Robert Sarvey on the air quality impacts of the Eastshore Project.**

2) **It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.**

3) **I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.**

I declare under penalty of perjury that the forgoing is true and correct to the best of my knowledge and belief.



Signed 12/7/07

Exhibit List

Exhibit 700 Testimony, Declaration and Resume of Robert Sarvey
Docketed on December 7, 2007
Received in evidence on December 17, 2007

Exhibit 701 ARB New Release "Air Board Approves Stronger Nitrogen Dioxide Standards"
Docketed on December 7, 2007
Received in to Evidence on December 17, 2007

Exhibit 702 EPA AP-42 Emission Factors for Reciprocating Engines
Docketed on December 7, 2007
Received in to Evidence on December 17, 2007

Exhibit 703 BAAQMD Reply Comments to ARB on PDOC Comments
Docketed on December 7, 2007
Received in to Evidence on December 17, 2007

Exhibit 704 BAAQMD Reply comments to CEC PDOC Comments
Docketed on December 7, 2007
Received in to Evidence on December 17, 2007

Exhibit 705 ARB Fremont Chapel Way Maximnm 1 hour average Data
http://www.arb.ca.gov/aqmis2/display.php?param=NO2&year=2006&report=SITE1YR&statistic=DMAX&site=2293&db=haqd
Docketed on December 7, 2007
Received in to Evidence on December 17, 2007

Exhibit 701

ARB News Release

Air Board Approves Stronger Nitrogen Dioxide Standards

Release 07-10
FOR IMMEDIATE RELEASE
February 23, 2007

CONTACT: Jerry Martin
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(916) 322-2990
www.arb.ca.gov

Air Board Approves Stronger Nitrogen Dioxide Standards

SACRAMENTO - Today the California Air Resources Board (ARB) approved new, stricter standards for nitrogen dioxide (NO2), a pollutant associated with increased asthma and cardiovascular disease. NO2 is a pungent gas that, when combined with fine airborne particulate matter, contributes to the reddish-brown haze characteristic of smoggy air in California.

"Today's action continues California's leadership on air quality programs and health protection," said ARB Chairman Dr. Robert F. Sawyer. "The standards are set with a margin of safety to protect the youngest Californians and other vulnerable populations."

The Children's Environmental Health Protection Act (Senate Bill 25, Escutia), passed by the state legislature in 1999, requires the ARB, in consultation with the Office of Environmental Health Hazard Assessment (OEHHA), to "review all existing health-based ambient air quality standards to determine whether, based on public health, scientific literature and exposure pattern data, these standards adequately protect the health of the public, including infants and children, with an adequate margin of safety." As a result of the review requirement, the ARB today adopted the new NO2 standards:

- The 1-hour-average state standard for NO2 is lowered from 0.25 parts per million (ppm) to 0.18 ppm, not to be exceeded.
- A new annual-average state standard is established for NO2 at 0.030 ppm, not to be exceeded.

NO2 is a concern particularly for asthmatics and for infants and children. Higher concentrations of NO2 occur near roadways compared to ambient background levels, and raise health concerns. Finally, NO2 besides being a common outdoor air pollutant, is becoming an increasing health concern in indoor environments, where the average person spends most of their time.

Sources of NO2 include high temperature combustion processes such as motor vehicle engines and power plants. It can also be the product of atmospheric processes where nitrogen oxides react with ozone to create NO2. Indoor concentrations are caused by sources such as gas appliances, and un-vented heating systems.

Today's changes to the state NO2 standards are not expected to alter the attainment status for most areas of California. All are in compliance for the state 1-hour standard. The South Coast Air Quality Management District has occasionally exceeded the new annual standard, but current control efforts should produce future compliance.

For more information on the new NO2 standards, please see: http://www.arb.ca.gov/research/aaqs/no2-rs/no2-rs.htm

The Air Resources Board is a department of the California Environmental Protection Agency. ARB's mission is to promote and protect public health, welfare, and ecological resources through effective reduction of air pollutants while recognizing and considering effects on the economy. The ARB oversees all air pollution control efforts in California to attain and maintain health based air quality standards.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce

Exhibt 702
AP-42 Emission Factors for Reciprocating Engines
http://www.epa.gov/ttn/chief/ap42/ch03/final/c03s02.pdf

3.2 Natural Gas-fired Reciprocating Engines

3.2.1 General[1-3]

Most natural gas-fired reciprocating engines are used in the natural gas industry at pipeline compressor and storage stations and at gas processing plants. These engines are used to provide mechanical shaft power for compressors and pumps. At pipeline compressor stations, engines are used to help move natural gas from station to station. At storage facilities, they are used to help inject the natural gas into high pressure natural gas storage fields. At processing plants, these engines are used to transmit fuel within a facility and for process compression needs (e.g., refrigeration cycles). The size of these engines ranges from 50 brake horsepower (bhp) to 11,000 bhp. In addition, some engines in service are 50 - 60 years old and consequently have significant differences in design compared to newer engines, resulting in differences in emissions and the ability to be retrofitted with new parts or controls.

At pipeline compressor stations, reciprocating engines are used to power reciprocating compressors that move compressed natural gas (500 - 2000 psig) in a pipeline. These stations are spaced approximately 50 to 100 miles apart along a pipeline that stretches from a gas supply area to the market area. The reciprocating compressors raise the discharge pressure of the gas in the pipeline to overcome the effect of frictional losses in the pipeline upstream of the station, in order to maintain the required suction pressure at the next station downstream or at various downstream delivery points. The volume of gas flowing and the amount of subsequent frictional losses in a pipeline are heavily dependent on the market conditions that vary with weather and industrial activity, causing wide pressure variations. The number of engines operating at a station, the speed of an individual engine, and the amount of individual engine horsepower (load) needed to compress the natural gas is dependent on the pressure of the compressed gas received by the station, the desired discharge pressure of the gas, and the amount of gas flowing in the pipeline. Reciprocating compressors have a wider operating bandwidth than centrifugal compressors, providing increased flexibility in varying flow conditions. Centrifugal compressors powered by natural gas turbines are also used in some stations and are discussed in another section of this document.

A compressor in storage service pumps gas from a low-pressure storage field (500 - 800 psig) to a higher pressure transmission pipeline (700 - 1000 psig) and/or pumps gas from a low-pressure transmission line (500 - 800 psig) to a higher pressure storage field (800 - 2000 psig).

Storage reciprocating compressors must be flexible enough to allow operation across a wide band of suction and discharge pressures and volume variations. The compressor must be able to compress at high compression ratios with low volumes and compress at low compression ratios with high volumes. These conditions require varying speeds and load (horsepower) conditions for the reciprocating engine powering the reciprocating compressor.

Reciprocating compressors are used at processing plants for process compression needs (e.g. refrigeration cycles). The volume of gas compressed varies, but the pressure needed for the process is more constant than the other two cases mentioned above.

3.2.2 Process Description[1-3]

Natural gas-fired reciprocating engines are separated into three design classes: 2-cycle (stroke) lean-burn, 4-stroke lean-burn, and 4-stroke rich-burn. Two-stroke engines complete the power cycle in a

single crankshaft revolution as compared to the two crankshaft revolutions required for 4-stroke engines. All engines in these categories are spark-ignited.

In a 2-stroke engine, the air-to-fuel charge is injected with the piston near the bottom of the power stroke. The intake ports are then covered or closed, and the piston moves to the top of the cylinder, compressing the charge. Following ignition and combustion, the power stroke starts with the downward movement of the piston. As the piston reaches the bottom of the power stroke, exhaust ports or valves are opened to exhaust, or scavenge, the combustion products, and a new air-to-fuel charge is injected. Two-stroke engines may be turbocharged using an exhaust-powered turbine to pressurize the charge for injection into the cylinder and to increase cylinder scavenging. Non-turbocharged engines may be either blower scavenged or piston scavenged to improve removal of combustion products. Historically, 2-stroke designs have been widely used in pipeline applications. However, current industry practices reflect a decline in the usage of new 2-stroke engines for stationary applications.

Four-stroke engines use a separate engine revolution for the intake/compression cycle and the power/exhaust cycle. These engines may be either naturally aspirated, using the suction from the piston to entrain the air charge, or turbocharged, using an exhaust-driven turbine to pressurize the charge. Turbocharged units produce a higher power output for a given engine displacement, whereas naturally aspirated units have lower initial costs and require less maintenance.

Rich-burn engines operate near the stoichiometric air-to-fuel ratio (16:1) with exhaust excess oxygen levels less than 4 percent (typically closer to 1 percent). Additionally, it is likely that the emissions profile will be considerably different for a rich-burn engine at 4 percent oxygen than when operated closer to stoichiometric conditions. Considerations such as these can impact the quantitative value of the emission factor presented. It is also important to note that while rich-burn engines may operate, by definition, with exhaust oxygen levels as high as 4 percent, in reality, most will operate within plus or minus 1 air-to-fuel ratio of stoichiometry. Even across this narrow range, emissions will vary considerably, sometimes by more than an order of magnitude. Air-to-fuel ratios were not provided in the gathered emissions data used to develop the presented factors.

Lean-burn engines may operate up to the lean flame extinction limit, with exhaust oxygen levels of 12 percent or greater. The air to fuel ratios of lean-burn engines range from 20:1 to 50:1 and are typically higher than 24:1. The exhaust excess oxygen levels of lean-burn engines are typically around 8 percent, ranging from 4 to 17 percent. Some lean-burn engines are characterized as clean-burn engines. The term "clean-burn" technology is a registered trademark of Cooper Energy Systems and refers to engines designed to reduce NO_x by operating at high air-to-fuel ratios. Engines operating at high air-to-fuel ratios (greater than 30:1) may require combustion modification to promote stable combustion with the high excess air. These modifications may include a turbo charger or a precombustion chamber (PCC). A turbo charger is used to force more air into the combustion chamber, and a PCC is used to ignite a fuel-rich mixture that propagates into the main cylinder and ignites the very lean combustion charge. Lean-burn engines typically have lower oxides of nitrogen (NO_x) emissions than rich-burn engines.

3.2.3 Emissions

The primary criteria pollutants from natural gas-fired reciprocating engines are oxides of nitrogen (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC). The formation of nitrogen oxides is exponentially related to combustion temperature in the engine cylinder. The other pollutants, CO and VOC species, are primarily the result of incomplete combustion. Particulate matter (PM) emissions include trace amounts of metals, non-combustible inorganic material, and condensible,

semi-volatile organics which result from volatized lubricating oil, engine wear, or from products of incomplete combustion. Sulfur oxides are very low since sulfur compounds are removed from natural gas at processing plants. However, trace amounts of sulfur containing odorant are added to natural gas at city gates prior to distribution for the purpose of leak detection.

It should be emphasized that the actual emissions may vary considerably from the published emission factors due to variations in the engine operating conditions. This variation is due to engines operating at different conditions, including air-to-fuel ratio, ignition timing, torque, speed, ambient temperature, humidity, and other factors. It is not unusual to test emissions from two identical engines in the same plant, operated by the same personnel, using the same fuel, and have the test results show significantly different emissions. This variability in the test data is evidenced in the high relative standard deviation reported in the data set.

3.2.3.1 Nitrogen Oxides -

Nitrogen oxides are formed through three fundamentally different mechanisms. The principal mechanism of NO_x formation with gas-fired engines is thermal NO_x. The thermal NO_x mechanism occurs through the thermal dissociation and subsequent reaction of nitrogen (N_2) and oxygen (O_2) molecules in the combustion air. Most NO_x formed through the thermal NO_x mechanism occurs in high-temperature regions in the cylinder where combustion air has mixed sufficiently with the fuel to produce the peak temperature fuel/air interface. The second mechanism, called prompt NO_x, occurs through early reactions of nitrogen molecules in the combustion air and hydrocarbon radicals from the fuel. Prompt NO_x reactions occur within the flame and are usually negligible compared to the level of NO_x formed through the thermal NO_x mechanism. The third mechanism, fuel NO_x, stems from the evolution and reaction of fuel-bound nitrogen compounds with oxygen. Natural gas has negligible chemically bound fuel nitrogen (although some molecular nitrogen is present).

Essentially all NO_x formed in natural gas-fired reciprocating engines occurs through the thermal NO_x mechanism. The formation of NO_x through the prompt NO_x mechanism may be significant only under highly controlled situations in rich-burn engines when the thermal NO_x mechanism is suppressed. The rate of NO_x formation through the thermal NO_x mechanism is highly dependent upon the stoichiometric ratio, combustion temperature, and residence time at the combustion temperature. Maximum NO_x formation occurs through the thermal NO_x mechanism near the stoichiometric air-to-fuel mixture ratio since combustion temperatures are greatest at this air-to-fuel ratio.

3.2.3.2 Carbon Monoxide and Volatile Organic Compounds -

CO and VOC emissions are both products of incomplete combustion. CO results when there is insufficient residence time at high temperature to complete the final step in hydrocarbon oxidation. In reciprocating engines, CO emissions may indicate early quenching of combustion gases on cylinder walls or valve surfaces. The oxidation of CO to carbon dioxide (CO_2) is a slow reaction compared to most hydrocarbon oxidation reactions.

The pollutants commonly classified as VOC can encompass a wide spectrum of volatile organic compounds that are photoreactive in the atmosphere. VOC occur when some of the gas remains unburned or is only partially burned during the combustion process. With natural gas, some organics are carryover, unreacted, trace constituents of the gas, while others may be pyrolysis products of the heavier hydrocarbon constituents. Partially burned hydrocarbons result from poor air-to-fuel mixing prior to, or during, combustion, or incorrect air-to-fuel ratios in the cylinder during combustion due to maladjustment of the engine fuel system. Also, low cylinder temperature may yield partially burned hydrocarbons due to excessive cooling through the walls, or early cooling of the gases by expansion of the combustion volume caused by piston motion before combustion is completed.

3.2.3.3 Particulate Matter[4] -

PM emissions result from carryover of noncombustible trace constituents in the fuel and lubricating oil and from products of incomplete combustion. Emission of PM from natural gas-fired reciprocating engines are generally minimal and comprise fine filterable and condensible PM. Increased PM emissions may result from poor air-to-fuel mixing or maintenance problems.

3.2.3.4 Carbon Dioxide, Methane, and Nitrous Oxide[5] -

Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are referred to as greenhouse gases. Such gases are largely transparent to incoming solar radiation; however, they absorb infrared radiation re-emitted by the Earth. Where available, emission factors for these pollutants are presented in the emission factors tables of this section.

3.2.4 Control Technologies

Three generic control techniques have been developed for reciprocating engines: parametric controls (timing and operating at a leaner air-to-fuel ratio); combustion modifications such as advanced engine design for new sources or major modification to existing sources (clean-burn cylinder head designs and prestratified charge combustion for rich-burn engines); and postcombustion catalytic controls installed on the engine exhaust system. Post-combustion catalytic technologies include selective catalytic reduction (SCR) for lean-burn engines, nonselective catalytic reduction (NSCR) for rich-burn engines, and CO oxidation catalysts for lean-burn engines.

3.2.4.1 Control Techniques for 4-Cycle Rich-burn Engines[4,6] -

Nonselective Catalytic Reduction (NSCR) -

This technique uses the residual hydrocarbons and CO in the rich-burn engine exhaust as a reducing agent for NO_x. In an NSCR, hydrocarbons and CO are oxidized by O_2 and NO_x. The excess hydrocarbons, CO, and NO_x pass over a catalyst (usually a noble metal such as platinum, rhodium, or palladium) that oxidizes the excess hydrocarbons and CO to H_2O and CO_2, while reducing NO_x to N_2. NO_x reduction efficiencies are usually greater than 90 percent, while CO reduction efficiencies are approximately 90 percent.

The NSCR technique is effectively limited to engines with normal exhaust oxygen levels of 4 percent or less. This includes 4-stroke rich-burn naturally aspirated engines and some 4-stroke rich-burn turbocharged engines. Engines operating with NSCR require tight air-to-fuel control to maintain high reduction effectiveness without high hydrocarbon emissions. To achieve effective NO_x reduction performance, the engine may need to be run with a richer fuel adjustment than normal. This exhaust excess oxygen level would probably be closer to 1 percent. Lean-burn engines could not be retrofitted with NSCR control because of the reduced exhaust temperatures.

Prestratified Charge -

Prestratified charge combustion is a retrofit system that is limited to 4-stroke carbureted natural gas engines. In this system, controlled amounts of air are introduced into the intake manifold in a specified sequence and quantity to create a fuel-rich and fuel-lean zone. This stratification provides both a fuel-rich ignition zone and rapid flame cooling in the fuel-lean zone, resulting in reduced formation of NO_x. A prestratified charge kit generally contains new intake manifolds, air hoses, filters, control valves, and a control system.

3.2.4.2 Control Techniques for Lean-burn Reciprocating Engines[4,6] -

Selective Catalytic Reduction[4,6] -

Selective catalytic reduction is a postcombustion technology that has been shown to be effective in reducing NO_x in exhaust from lean-burn engines. An SCR system consists of an ammonia storage, feed, and injection system, and a catalyst and catalyst housing. Selective catalytic reduction systems selectively reduce NO_x emissions by injecting ammonia (either in the form of liquid anhydrous ammonia or aqueous ammonium hydroxide) into the exhaust gas stream upstream of the catalyst. Nitrogen oxides, NH_3, and O_2 react on the surface of the catalyst to form N_2 and H_2O. For the SCR system to operate properly, the exhaust gas must be within a particular temperature range (typically between 450 and 850°F). The temperature range is dictated by the catalyst (typically made from noble metals, base metal oxides such as vanadium and titanium, and zeolite-based material). Exhaust gas temperatures greater than the upper limit (850°F) will pass the NO_x and ammonia unreacted through the catalyst. Ammonia emissions, called NH_3 slip, are a key consideration when specifying a SCR system. SCR is most suitable for lean-burn engines operated at constant loads, and can achieve efficiencies as high as 90 percent. For engines which typically operate at variable loads, such as engines on gas transmission pipelines, an SCR system may not function effectively, causing either periods of ammonia slip or insufficient ammonia to gain the reductions needed.

Catalytic Oxidation -

Catalytic oxidation is a postcombustion technology that has been applied, in limited cases, to oxidize CO in engine exhaust, typically from lean-burn engines. As previously mentioned, lean-burn technologies may cause increased CO emissions. The application of catalytic oxidation has been shown to be effective in reducing CO emissions from lean-burn engines. In a catalytic oxidation system, CO passes over a catalyst, usually a noble metal, which oxidizes the CO to CO_2 at efficiencies of approximately 70 percent for 2SLB engines and 90 percent for 4SLB engines.

3.2.5 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section since that date are summarized below. For further detail, consult the memoranda describing each supplement or the background report for this section. These and other documents can be found on the Clearinghouse for Inventories/Emission Factors (CHIEF) electronic bulletin board (919-541-5742), or on the new Emission Factor and Inventory Group (EFIG) home page (http://www.epa.gov/ttn/chief).

Supplement A, February 1996

- In the table for uncontrolled natural gas prime movers, the Source Classification Code (SCC) for 4-cycle lean-burn was changed from 2-01-002-53 to 2-02-002-54. The SCC for 4-cycle rich-burn was changed from 2-02-002-54 to 2-02-02-002-53.
- An SCC (2-02-002-53) was provided for 4-cycle rich-burn engines, and the "less than" symbol (<) was restored to the appropriate factors.

Supplement B, October 1996

- The introduction section was revised.
- Text was added concerning process description of turbines.

- Text concerning emissions and controls was revised.
- References in various tables were editorially corrected.
- The inconsistency between a CO_2 factor in the table and an equation in the footnote was corrected.

Supplement F, July 2000

- Turbines used for natural gas compression were removed from this section and combined with utility turbines in Section 3.1. Section 3.2 now only contains information on natural gas-fired reciprocating engines.
- All emission factors were updated based on emissions data points taken from 70 emission reports containing over 400 source tests. Many new emission factors have been incorporated in this section for speciated organic compounds, including hazardous air pollutants.

TABLE 3.2-1 UNCONTROLLED EMISSION FACTORS FOR 2-STROKE LEAN-BURN ENGINES[a]
(SCC 2-02-002-52)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	3.17 E+00	A
NO_x[c] <90% Load	1.94 E+00	A
CO[c] 90 - 105% Load	3.86 E-01	A
CO[c] <90% Load	3.53 E-01	A
CO_2[d]	1.10 E+02	A
SO_2[c]	5.88 E-04	A
TOC[f]	1.64 E+00	A
Methane[g]	1.45 E+00	C
VOC[h]	1.20 E-01	C
PM10 (filterable)[i]	3.84 E-02	C
PM2.5 (filterable)[i]	3.84 E-02	C
PM Condensable[j]	9.91 E-03	E
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[k]	6.63 E-05	C
1,1,2-Trichloroethane[k]	5.27 E-05	C
1,1-Dichloroethane	3.91 E-05	C
1,2,3-Trimethylbenzene	3.54 E-05	D
1,2,4-Trimethylbenzene	1.11 E-04	C
1,2-Dichloroethane	4.22 E-05	D
1,2-Dichloropropane	4.46 E-05	C
1,3,5-Trimethylbenzene	1.80 E-05	D
1,3-Butadiene[k]	8.20 E-04	D
1,3-Dichloropropene[k]	4.38 E-05	C
2,2,4-Trimethylpentane[k]	8.46 E-04	B
2-Methylnaphthalene[k]	2.14 E-05	C
Acenaphthene[k]	1.33 E-06	C

Table 3.2-1. UNCONTROLLED EMISSION FACTORS FOR 2-STROKE LEAN-BURN ENGINES

(Continued)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Acenaphthylene[k]	3.17 E-06	C
Acetaldehyde[k,l]	7.76 E-03	A
Acrolein[k,l]	7.78 E-03	A
Anthracene[k]	7.18 E-07	C
Benz(a)anthracene[k]	3.36 E-07	C
Benzene[k]	1.94 E-03	A
Benzo(a)pyrene[k]	5.68 E-09	D
Benzo(b)fluoranthene[k]	8.51 E-09	D
Benzo(e)pyrene[k]	2.34 E-08	D
Benzo(g,h,i)perylene[k]	2.48 E-08	D
Benzo(k)fluoranthene[k]	4.26 E-09	D
Biphenyl[k]	3.95 E-06	C
Butane	4.75 E-03	C
Butyr/Isobutyraldehyde	4.37 E-04	C
Carbon Tetrachloride[k]	6.07 E-05	C
Chlorobenzene[k]	4.44 E-05	C
Chloroform[k]	4.71 E-05	C
Chrysene[k]	6.72 E-07	C
Cyclohexane	3.08 E-04	C
Cyclopentane	9.47 E-05	C
Ethane	7.09 E-02	A
Ethylbenzene[k]	1.08 E-04	B
Ethylene Dibromide[k]	7.34 E-05	C
Fluoranthene[k]	3.61 E-07	C
Fluorene[k]	1.69 E-06	C
Formaldehyde[k,l]	5.52 E-02	A

Table 3.2-1. UNCONTROLLED EMISSION FACTORS FOR 2-STROKE LEAN-BURN ENGINES
(Concluded)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Indeno(1,2,3-c,d)pyrene[k]	9.93 E-09	D
Isobutane	3.75 E-03	C
Methanol[k]	2.48 E-03	A
Methylcyclohexane	3.38 E-04	C
Methylene Chloride[k]	1.47 E-04	C
n-Hexane[k]	4.45 E-04	C
n-Nonane	3.08 E-05	C
n-Octane	7.44 E-05	C
n-Pentane	1.53 E-03	C
Naphthalene[k]	9.63 E-05	C
PAH[k]	1.34 E-04	D
Perylene[k]	4.97 E-09	D
Phenanthrene[k]	3.53 E-06	C
Phenol[k]	4.21 E-05	C
Propane	2.87 E-02	C
Pyrene[k]	5.84 E-07	C
Styrene[k]	5.48 E-05	A
Toluene[k]	9.63 E-04	A
Vinyl Chloride[k]	2.47 E-05	C
Xylene[k]	2.68 E-04	A

[a] Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM10, "uncontrolled" means no combustion or add-on controls; however, the factor may include turbocharged units. For all other pollutants, "uncontrolled" means no oxidation control; the data set may include units with control techniques used for NOx control, such as PCC and SCR for lean burn engines, and PSC for rich burn engines. Factors are based on large population of engines. Factors are for engines at all loads, except as indicated. SCC = Source Classification Code. TOC = Total Organic Compounds. PM10 = Particulate Matter ≤ 10 microns (μm) aerodynamic diameter. A "<" sign in front of a factor means that the corresponding emission factor is based on one-half of the method detection limit.

[b] Emission factors were calculated in units of (lb/MMBtu) based on procedures in EPA

Method 19. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf. To convert from (lb/MMBtu) to (lb/hp-hr) use the following equation:

$$\text{lb/hp-hr} = (\text{lb/MMBtu})(\text{heat input, MMBtu/hr})(1/\text{operating HP, 1/hp})$$

[c] Emission tests with unreported load conditions were not included in the data set.

[d] Based on 99.5% conversion of the fuel carbon to CO_2. CO_2 [lb/MMBtu] = (3.67)(%CON)(C)(D)(1/h), where %CON = percent conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.75), D = density of fuel, 4.1 E+04 lb/10^6 scf, and h = heating value of natural gas (assume 1020 Btu/scf at 60°F).

[e] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content in natural gas of 2,000 gr/10^6 scf.

[f] Emission factor for TOC is based on measured emission levels of 43 tests.

[g] Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor. Measured emission factor for methane compares well with the calculated emission factor, 1.48 lb/MMBtu vs. 1.45 lb/MMBtu, respectively.

[h] VOC emission factor is based on the sum of the emission factors for all speciated organic compounds less ethane and methane.

[i] Considered ≤ 1 μm in aerodynamic diameter. Therefore, for filterable PM emissions, PM10(filterable) = PM2.5(filterable).

[j] No data were available for condensable PM emissions. The presented emission factor reflects emissions from 4SLB engines.

[k] Hazardous Air Pollutant as defined by Section 112(b) of the Clean Air Act.

[l] For lean burn engines, aldehyde emissions quantification using CARB 430 may reflect interference with the sampling compounds due to the nitrogen concentration in the stack. The presented emission factor is based on FTIR measurements. Emissions data based on CARB 430 are available in the background report.

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES[a]
(SCC 2-02-002-54)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	4.08 E+00	B
NO_x[c] <90% Load	8.47 E-01	B
CO[c] 90 - 105% Load	3.17 E-01	C
CO[c] <90% Load	5.57 E-01	B
CO_2[d]	1.10 E+02	A
SO_2[c]	5.88 E-04	A
TOC[f]	1.47 E+00	A
Methane[g]	1.25 E+00	C
VOC[h]	1.18 E-01	C
PM10 (filterable)[i]	7.71 E-05	D
PM2.5 (filterable)[i]	7.71 E-05	D
PM Condensable[j]	9.91 E-03	D
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[k]	<4.00 E-05	E
1,1,2-Trichloroethane[k]	<3.18 E-05	E
1,1-Dichloroethane	<2.36 E-05	E
1,2,3-Trimethylbenzene	2.30 E-05	D
1,2,4-Trimethylbenzene	1.43 E-05	C
1,2-Dichloroethane	<2.36 E-05	E
1,2-Dichloropropane	<2.69 E-05	E
1,3,5-Trimethylbenzene	3.38 E-05	D
1,3-Butadiene[k]	2.67E-04	D
1,3-Dichloropropene[k]	<2.64 E-05	E
2-Methylnaphthalene[k]	3.32 E-05	C
2,2,4-Trimethylpentane[k]	2.50 E-04	C
Acenaphthene[k]	1.25 E-06	C

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES
(Continued)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Acenaphthylene[k]	5.53 E-06	C
Acetaldehyde[k,l]	8.36 E-03	A
Acrolein[k,l]	5.14 E-03	A
Benzene[k]	4.40 E-04	A
Benzo(b)fluoranthene[k]	1.66 E-07	D
Benzo(e)pyrene[k]	4.15 E-07	D
Benzo(g,h,i)perylene[k]	4.14 E-07	D
Biphenyl[k]	2.12 E-04	D
Butane	5.41 E-04	D
Butyr/Isobutyraldehyde	1.01 E-04	C
Carbon Tetrachloride[k]	<3.67 E-05	E
Chlorobenzene[k]	<3.04 E-05	E
Chloroethane	1.87 E-06	D
Chloroform[k]	<2.85 E-05	E
Chrysene[k]	6.93 E-07	C
Cyclopentane	2.27 E-04	C
Ethane	1.05 E-01	C
Ethylbenzene[k]	3.97 E-05	B
Ethylene Dibromide[k]	<4.43 E-05	E
Fluoranthene[k]	1.11 E-06	C
Fluorene[k]	5.67 E-06	C
Formaldehyde[k,l]	5.28 E-02	A
Methanol[k]	2.50 E-03	B
Methylcyclohexane	1.23 E-03	C
Methylene Chloride[k]	2.00 E-05	C
n-Hexane[k]	1.11 E-03	C
n-Nonane	1.10 E-04	C

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES
(Continued)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
n-Octane	3.51 E-04	C
n-Pentane	2.60 E-03	C
Naphthalene[k]	7.44 E-05	C
PAH[k]	2.69 E-05	D
Phenanthrene[k]	1.04 E-05	D
Phenol[k]	2.40 E-05	D
Propane	4.19 E-02	C
Pyrene[k]	1.36 E-06	C
Styrene[k]	<2.36 E-05	E
Tetrachloroethane[k]	2.48 E-06	D
Toluene[k]	4.08 E-04	B
Vinyl Chloride[k]	1.49 E-05	C
Xylene[k]	1.84 E-04	B

[a] Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM10, "uncontrolled" means no combustion or add-on controls; however, the factor may include turbocharged units. For all other pollutants, "uncontrolled" means no oxidation control; the data set may include units with control techniques used for NOx control, such as PCC and SCR for lean burn engines, and PSC for rich burn engines. Factors are based on large population of engines. Factors are for engines at all loads, except as indicated. SCC = Source Classification Code. TOC = Total Organic Compounds. PM-10 = Particulate Matter ≤ 10 microns (μm) aerodynamic diameter. A "<" sign in front of a factor means that the corresponding emission factor is based on one-half of the method detection limit.

[b] Emission factors were calculated in units of (lb/MMBtu) based on procedures in EPA Method 19. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf. To convert from (lb/MMBtu) to (lb/hp-hr) use the following equation:

$$\text{lb/hp-hr} = (\text{lb/MMBtu})(\text{heat input, MMBtu/hr})(1/\text{operating HP, 1/hp})$$

[c] Emission tests with unreported load conditions were not included in the data set.

[d] Based on 99.5% conversion of the fuel carbon to CO_2. CO_2 [lb/MMBtu] = (3.67)(%CON)(C)(D)(1/h), where %CON = percent conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.75), D = density of fuel, 4.1 E+04 lb/10^6 scf, and

h = heating value of natural gas (assume 1020 Btu/scf at 60°F).

[e] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content in natural gas of 2,000 gr/10^6 scf.

[f] Emission factor for TOC is based on measured emission levels from 22 source tests.

[g] Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor. Measured emission factor for methane compares well with the calculated emission factor, 1.31 lb/MMBtu vs. 1.25 lb/MMBtu, respectively.

[h] VOC emission factor is based on the sum of the emission factors for all speciated organic compounds less ethane and methane.

[i] Considered ≤ 1 μm in aerodynamic diameter. Therefore, for filterable PM emissions, PM10(filterable) = PM2.5(filterable).

[j] PM Condensable = PM Condensable Inorganic + PM-Condensable Organic

[k] Hazardous Air Pollutant as defined by Section 112(b) of the Clean Air Act.

[l] For lean burn engines, aldehyde emissions quantification using CARB 430 may reflect interference with the sampling compounds due to the nitrogen concentration in the stack. The presented emission factor is based on FTIR measurements. Emissions data based on CARB 430 are available in the background report.

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN ENGINES[a]
(SCC 2-02-002-53)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	2.21 E+00	A
NO_x[c] <90% Load	2.27 E+00	C
CO[c] 90 - 105% Load	3.72 E+00	A
CO[c] <90% Load	3.51 E+00	C
CO_2[d]	1.10 E+02	A
SO_2[e]	5.88 E-04	A
TOC[f]	3.58 E-01	C
Methane[g]	2.30 E-01	C
VOC[h]	2.96 E-02	C
PM10 (filterable)[i,j]	9.50 E-03	E
PM2.5 (filterable)[j]	9.50 E-03	E
PM Condensable[k]	9.91 E-03	E
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[l]	2.53 E-05	C
1,1,2-Trichloroethane[l]	<1.53 E-05	E
1,1-Dichloroethane	<1.13 E-05	E
1,2-Dichloroethane	<1.13 E-05	E
1,2-Dichloropropane	<1.30 E-05	E
1,3-Butadiene[l]	6.63 E-04	D
1,3-Dichloropropene[l]	<1.27 E-05	E
Acetaldehyde[l,m]	2.79 E-03	C
Acrolein[l,m]	2.63 E-03	C
Benzene[l]	1.58 E-03	B
Butyr/isobutyraldehyde	4.86 E-05	D
Carbon Tetrachloride[l]	<1.77 E-05	E

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN ENGINES
(Concluded)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Chlorobenzene[l]	<1.29 E-05	E
Chloroform[l]	<1.37 E-05	E
Ethane[n]	7.04 E-02	C
Ethylbenzene[l]	<2.48 E-05	E
Ethylene Dibromide[l]	<2.13 E-05	E
Formaldehyde[l,m]	2.05 E-02	A
Methanol[l]	3.06 E-03	D
Methylene Chloride[l]	4.12 E-05	C
Naphthalene[l]	<9.71 E-05	E
PAH[l]	1.41 E-04	D
Styrene[l]	<1.19 E-05	E
Toluene[l]	5.58 E-04	A
Vinyl Chloride[l]	<7.18 E-06	E
Xylene[l]	1.95 E-04	A

[a] Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM-10, "uncontrolled" means no combustion or add-on controls; however, the factor may include turbocharged units. For all other pollutants, "uncontrolled" means no oxidation control; the data set may include units with control techniques used for NOx control, such as PCC and SCR for lean burn engines, and PSC for rich burn engines. Factors are based on large population of engines. Factors are for engines at all loads, except as indicated. SCC = Source Classification Code. TOC = Total Organic Compounds. PM10 = Particulate Matter ≤ 10 microns (μm) aerodynamic diameter. A "<" sign in front of a factor means that the corresponding emission factor is based on one-half of the method detection limit.

[b] Emission factors were calculated in units of (lb/MMBtu) based on procedures in EPA Method 19. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf. To convert from (lb/MMBtu) to (lb/hp-hr) use the following equation:

$$\text{lb/hp-hr} = (\text{lb/MMBtu})(\text{heat input, MMBtu/hr})(1/\text{operating HP, 1/hp})$$

[c] Emission tests with unreported load conditions were not included in the data set.

[d] Based on 99.5% conversion of the fuel carbon to CO_2. CO_2 [lb/MMBtu] = (3.67)(%CON)(C)(D)(1/h), where %CON = percent conversion of fuel carbon to CO_2,

C = carbon content of fuel by weight (0.75), D = density of fuel, 4.1 E+04 lb/10^6 scf, and h = heating value of natural gas (assume 1020 Btu/scf at 60°F).

[e] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content in natural gas of 2,000 gr/10^6 scf.

[f] Emission factor for TOC is based on measured emission levels from 6 source tests.

[g] Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor.

[h] VOC emission factor is based on the sum of the emission factors for all speciated organic compounds. Methane and ethane emissions were not measured for this engine category.

[i] No data were available for uncontrolled engines. PM10 emissions are for engines equipped with a PCC.

[j] Considered ≤ 1 μm in aerodynamic diameter. Therefore, for filterable PM emissions, PM10(filterable) = PM2.5(filterable).

[k] No data were available for condensable emissions. The presented emission factor reflects emissions from 4SLB engines.

[l] Hazardous Air Pollutant as defined by Section 112(b) of the Clean Air Act.

[m] For rich-burn engines, no interference is suspected in quantifying aldehyde emissions. The presented emission factors are based on FTIR and CARB 430 emissions data measurements.

[n] Ethane emission factor is determined by subtracting the VOC emission factor from the NMHC emission factor.

References For Section 3.2

1. *Engines, Turbines, And Compressors Directory*, American Gas Association, Catalog #XF0488.

2. *Standards Support And Environmental Impact Statement, Volume I: Stationary Internal Combustion Engines*, EPA-450/2-78-125a, U. S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, July 1979.

3. *Alternative Control Techniques Document - NO_x Emissions From Stationary Reciprocating Engines*, EPA-453/R-93-032, July 1993.

4. *Handbook - Control Technologies For Hazardous Air Pollutants*, EPA-625/6-91-014, June 1991.

5. *Limiting Net Greenhouse Gas Emissions In The United States, Volume II: Energy Responses*, Report for the Office of Environmental Analysis, Office of Policy, Planning and Analysis, Department of Energy (DOE), DOE/PE-0101 Volume II, September 1991.

6. C. Castaldini, *NO_x Reduction Technologies For Natural Gas Industry Prime Movers*, GRI-90/0215, Gas Research Institute, Chicago, IL, August 1990.

7. *Emission Factor Documentation for AP-42 Section 3.2, Natural Gas-Fired Reciprocating Engines*, EPA Contract No. 68-D2-0160, Alpha-Gamma Technologies, Inc., Raleigh, North Carolina, July 2000.

Exhibt 703
BAAQMD Reply Comments To ARB comments on Eastshore PDOC

BAY AREA
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October 17, 2007

Mr. Chris Gallenstein
Staff Air Pollution Specialist
California Air Resources Board
PO Box 2815
Sacramento CA 95812

Re: Eastshore Energy Center
BAAQMD Application 15195

Dear Mr. Gallenstein:

The Bay Area Air Quality Management District (District) has received your comments regarding the District's Preliminary Determination of Compliance (PDOC) for the proposed project.

Comment 1: Source Description should include that each engine is turbocharged.

The District has amended the FDOC to change the source description to the following:

S-1 Natural Gas Fired Turbocharged Engine Generator Set, 8.4 MW (gross), 11,660 HP, Wartsila Model 20V34SG, abated by A-1 Selective Catalytic Reduction System and A-15 Oxidation Catalyst

Comment 2: Recommendation that the District consider a lower PM10/PM2.5 permit limit. "Achieved in Practice" BACT for PM should be set at 0.029 g/bhp-hr.

The District is aware of a permit issued by the SJVAPCD for a similar facility with smaller engines that has a permit limit corresponding to 0.029 g/bhp-hr. Initially, the District was unable to obtain emissions data demonstrating compliance with this limit. The CARB staff was able to obtain emissions testing data that demonstrated compliance with this limit. Two of fourteen engines were tested at startup for particulate matter and were in compliance with this permit limit. No further ongoing emissions testing was conducted at the facility. The District considered using a similar permit limit for this project, but based on a review of all available emissions data it was determined that the SJVAPCD permit limit did not have adequate compliance margin for this source category.

The PDOC did not set a numerical BACT permit limit for this source category. BACT for particulate matter was the use of PUC quality natural gas and good combustion practice. The District recognizes that a numerical BACT limit is not normally set for natural gas combustion sources. The District agrees that these

are large engines with the potential to emit significant quantities of particulate matter and it is appropriate to set a reasonable BACT based permit limit for particulate matter. The BACT permit limit should not apply to all lean burn natural gas fired engines, but only to large engines in a similar size range to these engines (11,660 hp).

Based on comments received from the CEC and the CARB, the District has reviewed all available emissions data and set an "achieved in practice" permit limit for these large engines. Particulate emissions are limited to 1.3 lb/hr per engine, with a provision allowing emissions from a particular engine to be as high as 1.9 lb/hr in certain cases as long as a facility-wide 1.3 lb/hr average is maintained. The 1.3 lb/hr average emissions limit will be reflected in a daily emissions cap of 461.65 lb/day for all engines combined, which corresponds to 1 cold start and an average emission rate during normal operation of 1.3 lb/hr. The District recognizes that there may be variability in particulate matter test results due to the source test method and the proposed permit language allows for an engine to emit up to 1.9 lb/hr as long as the daily emissions limit is not exceeded for all fourteen engines. The owner/operator must retest an engine if it exceeds 1.3 lb/hr and provide the District documentation that the high emitting engine has been installed, operated and maintained properly. Additional documentation of the particulate permit condition and its basis is available in the Final Determination of Compliance for the project.

If you have any questions regarding this matter, please contact me, at (415) 749-4623.

Very truly yours,

Brian Lusher

Brian K. Lusher
Air Quality Engineer II

Enclosure
BKL:bkl

Brian Lusher

From: Chris Gallenstein [cgallens@arb.ca.gov]
Sent: Tuesday, May 29, 2007 10:45 AM
To: Brian Lusher
Cc: Matthew Layton; Kitty Howard; Simona Altman; Wayne Sobieralski
Subject: Comments on Eastshore PDOC

Brian:
We have reviewed the Preliminary Determination of Compliance for Eastshore Energy Center, dated April 30, 2007, and have the following comments:
1. The equipment description for the engines should include that they are turbocharged.
2. BACT for the engines for PM10 should be limited to 0.029 grams/bhp-hr.
If you have any questions concerning these comments, please contact me at (916) 324-8017 or via email.
Chris Gallenstein
Staff Air Pollution Specialist

Exhibt 704
BAAQMD Reply Comments To CEC comments on Eastshore PDOC

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

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Direct Dial: (415) 749-4761
FAX: (415) 749-5111

PUBLIC RECORDS REQUEST FORM

ATTENTION REQUESTOR: To expedite your request for District records, please fill out this form completely. Specifically identify the type of records you are requesting from the list below. **NOTE:** There is a limit of one facility or one site address per request form.

REQUESTOR INFORMATION

NAME: Robert Sarvey			DATE: 11-27/07
COMPANY:			
MAILING ADDRESS: 501 W. Grantline Rd.			
CITY: Tracy	STATE: Ca.	ZIP CODE: 95376	PHONE NUMBER: 209 835-7162

REQUESTED FACILITY INFORMATION

FACILITY NAME: East Shore energy Center Plant ID # 8041		
FACILITY ADDRESS: 25101 Clawiter Rd		
CITY:Hayward	STATE:Ca	ZIP CODE:95376
TIME PERIOD OF DOCUMENTS REQUESTED:2007	From:1/107	To:11/27/07

REQUESTED RECORDS *(Check **no more than three** applicable items)*

Complaint Information	**Notice Of Violation Information**	OTHER: * * *
☐ Complaint Printout	☐ NOV Printout	Please provide any comments received from the CEC, ARB, EPA on the PDOC for the Eastshore Project application number 15195. Please provide the BAAQMD responses to these comments. Pleae provide any other corespondecne from these agencies. if possible please fax these documents to 209 835-7162. any electronic document can be emailed to Sarveybob@aol.com
☒ Specific Complaint #	☐ Specific NOV #	
Episode Information	☐ AB2588 Inventory	
☐ Episode Printout	☐ Source Test Reports	
☐ Specific Episode #	☐ Lab Report #	
Permit Application Information	☐ Review Permit Files *	
☐ Permit Application Printout	☐ Review Enforcement Files **	
☐ Specific Application #	☐ Review Rule Development Files **	
☐ Permit Conditions	☐ Asbestos Notifications	

* Subject to facility review (i.e., trade secrets).
** You will be contacted to schedule an appointment date to review records.

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT
SINCE 1955

October 17, 2007

Mr. Paul Richins
Environmental Protection Office Manager
California Energy Commission
1516 Ninth Street
Sacramento CA 95814-5512

Re: Eastshore Energy Center
BAAQMD Application 15195

Dear Mr. Richens:

The Bay Area Air Quality Management District (District) has received your comments regarding the District's Preliminary Determination of Compliance (PDOC) for the proposed project.

Comment 1 Recommendation that the District consider a lower PM10/PM2.5 permit limit.

The District appreciates your comment on the PM10/PM2.5 permit limit. The District did consider the 0.02 g/bhp-hr value shown in the CARB document, "Guidance for the Permitting of Electrical Generation Technologies" dated July 2002 when developing the permit limit for the project. After researching the basis of this value it was determined that this was a recommended value that was not based on any actual emissions testing. The value was published by the SJVAPCD in their BACT guidelines as an "achieved in practice" limit. The District contacted the SJVAPCD BACT coordinator and was unable to obtain any emissions data supporting the 0.02 g/bhp-hr value.

The District is aware of a permit issued by the SJVAPCD for a similar facility with smaller engines that has a permit limit corresponding to 0.029 g/bhp-hr. Initially, the District was unable to obtain emissions data demonstrating compliance with this limit. The CARB staff was able to obtain emissions testing data that demonstrated compliance with this limit. Two of fourteen engines were tested at startup for particulate matter and were in compliance with this permit limit. No further ongoing emissions testing was conducted at the facility. The District considered using a similar permit limit for this project, but based on a review of all available emissions data it was determined that the SJVAPCD permit limit did not have adequate compliance margin for this source category.

The PDOC did not set a numerical BACT permit limit for this source category. BACT for particulate matter was the use of PUC quality natural gas and good combustion practice. The District recognizes that a numerical BACT limit is not normally set for natural gas combustion sources. The District agrees that these are large engines with the potential to emit significant quantities of particulate matter and it is appropriate to set a reasonable BACT based permit limit for particulate

matter. The BACT permit limit should not apply to all lean burn natural gas fired engines, but only to large engines in a similar size range to these engines (11,660 hp).

Based on comments received from the CEC and the CARB, the District has reviewed all available emissions data and set an "achieved in practice" permit limit for these large engines. Particulate emissions are limited to 1.3 lb/hr per engine, with a provision allowing emissions from a particular engine to be as high as 1.9 lb/hr in certain cases as long as a facility-wide 1.3 lb/hr average is maintained. The 1.3 lb/hr average emissions limit will be reflected in a daily emissions cap of 461.65 lb/day for all engines combined, which corresponds to 1 cold start and an average emission rate during normal operation of 1.3 lb/hr. The District recognizes that there may be variability in particulate matter test results due to the source test method and the proposed permit language allows for an engine to emit up to 1.9 lb/hr as long as the daily emissions limit is not exceeded for all fourteen engines. The owner/operator must retest an engine if it exceeds 1.3 lb/hr and provide the District documentation that the high emitting engine has been installed, operated and maintained properly. Additional documentation of the particulate permit condition and its basis is available in the Final Determination of Compliance for the project.

If you have any questions regarding this matter, please contact Brian K. Lusher, Air Quality Engineer II, at (415) 749-4623.

Very truly yours,

B. C. FOR

Jack P. Broadbent
Executive Officer/APCO

Enclosure
JPB:bkl

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

May 25, 2007

Mr. Jack P. Broadbent
Executive Officer/Air Pollution Control Officer
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Dear Mr. Broadbent

EASTSHORE ENERGY CENTER (06-AFC-06) PRELIMINARY DETERMINATION OF COMPLIANCE APPLICATION NO. 15195

Energy Commission staff appreciates the opportunity to provide written public comments on the Preliminary Determination of Compliance (PDOC) issued by the District on April 25, 2007 for the Eastshore Energy Center (EEC). We believe that impact avoidance (i.e., preventing emissions) is the preferred approach to mitigate impacts subject to the requirements of the California Environmental Quality Act.

The PDOC includes an ammonia slip emission limit of 10 parts per million by volume dry basis (ppmvd). Energy Commission staff supports this limit because it addresses one of staff's primary concerns with the project, as shown in our Issue Identification Report (December 28, 2006) and the proposed ammonia slip limit is consistent with guidance from the California Air Resources Board. The project had been proposed with an ammonia slip of 20 ppm.

Energy Commission staff recommends that the project be required to meet lower emissions limits for particulate matter less than 10 and 2.5 microns (PM10 and PM2.5). The Bay Area is designated as an area that does not attain the State Ambient Air Quality Standards for PM10 and PM2.5. The Energy Commission staff must determine whether the PM10 and PM2.5 emissions from EEC would significantly contribute to existing violations of the standards, and lower limits are one way of minimizing the contribution of EEC to the existing PM10 and PM2.5 problems of the area. Additionally, District Rule 2-2-301 requires that PM10 emissions be limited to the lowest achievable rate. The District proposes an hourly PM10/2.5 limit of 2.2 lb/hr, which would be roughly equivalent to 0.086 grams-per-brake horsepower-hour (g/bhp-hr).

Energy Commission staff believes that a much lower PM10 limit should be strongly considered for these natural gas-fired engines. A limit of 0.02 g/bhp-hr is shown in Table I-2 of the California Air Resources Board's (CARB) "*Guidance for the Permitting of Electrical Generation Technologies*" dated July 2002. The 0.02 g/bhp-hr recommendation is for natural gas-fueled reciprocating engine units under 50 megawatts (MW), such as those proposed for EEC. The 0.02 g/bhp-hr level is also

considered "achieved in practice" according to written guidance from the San Joaquin Valley Air Pollution Control District.

Emission source tests at the Barrick Gold generating facility near Reno, Nevada and the NEO California Power facility in Chowchilla, California provide evidence that the 0.02 g/bhp-hr PM10 levels are achievable from natural gas-fired engines. The Barrick generating units are identical to EEC in size, manufacturer, model number and emissions controls, while the NEO facility in Chowchilla, and its sister facility in Redbluff, California use smaller 2.8 MW natural gas-fired engines. The District should work with CARB to determine lowest achievable rate and establish an hourly PM10 limit that is consistent with CARB guidance and the level of the limit should reflect how emissions of less than 0.6 lb/hr or 0.02 g/bhp-hr per engine are achievable.

We appreciate the District working with Energy Commission staff on this licensing case. If you have any questions regarding our comments, please contact Matt Layton at (916) 654-3868.

Sincerely,

Richard York for Paul Richins

PAUL RICHINS
Environmental Protection Office Manager

cc: Docket (01-AFC-07)
Proof of Service List
Agency List

Brian Lusher

From: Brian Lusher
Sent: Tuesday, September 11, 2007 5:53 PM
To: Agreenberg (E-mail)
Subject: RICE NESHAP

Alvin,

Page 33807 of fr12jn06.pdf states, "We have determined that it is appropriate to use NMHC and formaldehyde or CO emissions as a surrogate for HAP emissions."


emisdbm7_RICE_NE SHAP_Backgroun...


fr12jn06.pdf

Here is the website,

http://www.epa.gov/ttn/atw/rice/ricepg.html

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Brian Lusher

From: Brian Lusher
Sent: Tuesday, October 02, 2007 5:50 PM
To: 'agreenberg@risksci.com'
Subject: TAC testing

Contacts: Agreenberg

Dr. Greenburg,

Where are you going to end up on TAC testing?

Western 102
Source Test Result..

Check out Tab 4. There is one high emitting engine with a maximum individual run of 0.14 lb/hr. We used 0.2 lb/hr from each engine so we are conservative for this compound. Especially, since the majority of engines are an order of magnitude lower.

Enjoy,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Eastshore Energy Center
Plant No. 18041
Application No. 15185
BAAQMD Rev 1, 6/4/07

Test Result from Barrick Goldstrike Mines-Western 102 Project AP4911-1364: Units 1-14

Source Test Dates: October 21-23, 2005, November 20-23, 2005
Testing Firm: Air Pollution Testing, Inc.

Unit S2.001					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0090	0.0089	0.0083	0.0087	0.0087	0.35	73.35	0.00012	0.00277
Fuel Use (scfh)					71908	77000			

Unit S2.002					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0054	0.0092	0.0095	0.0080	0.0081	0.35	73.29	0.00011	0.00277
Fuel Use (scfh)					71857	77000			

Unit S2.003					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Fector	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0093	0.0010	0.0012	0.0038	0.0010	0.35	72.68	0.00001	0.00277
Fuel Use (scfh)					71250	77000			

Unit S2.004					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0190	0.0240	0.0280	0.0237	0.0240	0.35	72.72	0.00033	0.00277
Fuel Use (scfh)					71293	77000			

Unit S2.005					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Avarage	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0160	0.0220	0.0530	0.0303	0.0300	0.35	73.27	0.00041	0.00277
Fuel Use (scfh)					71831	77000			

Unit S2.006					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0230	0.0240	0.0055	0.0175	0.0170	0.35	73.57	0.00023	0.00277
Fuel Use (scfh)					72132	77000			

Unit S2.007					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0220	0.0140	0.0110	0.0157	0.0160	0.35	73.53	0.00022	0.00277
Fuel Use (scfh)					72089	77000			

Unit S2.008					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0490	0.0210	0.0140	0.0280	0.0280	0.35	73.35	0.00038	0.00277
Fuel Use (scfh)					71914	77000			

Unit S2.009					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0220	0.0220	0.0052	0.0164	0.0160	0.35	73.56	0.00022	0.00277
Fuel Use (scfh)					72118	77000			

Unit S2.010					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0450	0.0780	0.1400	0.0877	0.0870	0.35	72.28	0.00120	0.00277
Fuel Use (scfh)					70860	77000			

Unit S2.011					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0190	0.0180	0.0140	0.0170	0.0170	0.35	72.78	0.00023	0.00277
Fuel Use (scfh)					71352	77000			

Unit S2.012

Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	Test Report Average (lb/hr)	Nevada Permit Limit (lb/hr)	Average Firing Rate (MMBtu/hr)	Emission Factor (lb/MMBtu)	Eastshore Application (lb/MMBtu)
HCHO	0.0049	0.0048	0.0027	0.0041	0.0041	0.35	73.22	0.00006	0.00277
Fuel Use (scfh)					71783	77000			

Unit S2.013

Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	Test Report Average (lb/hr)	Nevada Permit Limit (lb/hr)	Average Firing Rate (MMBtu/hr)	Emission Factor (lb/MMBtu)	Eastshore Application (lb/MMBtu)
HCHO	0.0067	0.0057	0.0052	0.0059	0.0059	0.35	73.60	0.00008	0.00277
Fuel Use (scfh)					72157	77000			

Unit S2.014

Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	Test Report Average (lb/hr)	Nevada Permit Limit (lb/hr)	Average Firing Rate (MMBtu/hr)	Emission Factor (lb/MMBtu)	Eastshore Application (lb/MMBtu)
HCHO	0.0099	0.0120	0.0095	0.0105	0.0100	0.35	72.54	0.00014	0.00277
Fuel Use (scfh)					71115	77000			

Average All Units

Pollutant	Test Report Average (lb/hr)	Nevada Permit Limit (lb/hr)	Emission Factor (lb/MMBtu)	Eastshore Application (lb/MMBtu)
HCHO	0.02	0.35	0.00027	0.00277

Maximum All Units

Pollutant	Test Report Maximum (lb/hr)	Nevada Permit Limit (lb/hr)	Emission Factor (lb/MMBtu)	Eastshore Application (lb/MMBtu)
HCHO	0.09	0.35	0.0012	0.00277

Maximum Test Run

Pollutant		Nevada Permit Limit (lb/hr)
HCHO	(lb/hr) 0.14	0.35

Eastshore Energy Center
Plant No. 18041
Application No. 15185
BAAQMD Rev 0, 1/25/07

Engine HP: 11660
Max Firing Rate: 72.8 MMBtu

	PM-10 (lb/hr)	PM-10 (lb/MMBtu)	PM-10 (g/bhp-hr)
Vendor Guarantee	2.2	0.0302	0.088
Average of All 14 Tests at Western 102	0.33	0.0045	0.013
Two Highest Engines	0.6	0.0082	0.023
1 lb/hr	1	0.0137	0.039
0.8 lb/hr	0.8	0.0110	0.031
AP-42, Total PM-10	0.73	0.0100	
Tehama County Limit (No Source Test to Verify)	0.51		
SJVAPCD Limit (No Source Test to Verify)	0.75		0.02
Western 102 located outside Reno (Identical Engine Model) Max Firing Rate 78.54 MMBtu/hr	2.59	0.0329	0.029
			0.101

Unit S2.014

Pollutant	Nevada Permit Limi (lb/hr)	Firing Rate (MMBtu/hr)	Emission Factor (lb/MMBtu)	Eastshore Application (lb/MMBtu)	Approximat (g/bhp-hr)	Approximate oncentration (ppm)
PM/PM10	2.59	78.54	0.0330	0.0337	0.101	
NOx	1.49	78.54	0.0190	0.01913		5.2
CO	2.42	78.54	0.0308	0.03026		13.7
POC	2.42	78.54	0.0308	0.03326		24.0
HCHO	0.35	78.54	0.0045	0.0027		1.850
Fuel Use (scfh)	77000					

Eastshore Energy Center
Plant No. 18041
Application No. 15185
BAAQMD Rev 1, 10/1/07

Test Result from Barrick Goldstrike Mines-Western 102 Project AP4911-1364: Units 1-14

Source Test Dates: October 21-23, 2005, November 20-23, 2005
Testing Firm: Air Pollution Testing, Inc.

HCHO Test Results

	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)
Unit S2.001	0.0090	0.0089	0.0083	0.0087
Unit S2.002	0.0054	0.0092	0.0095	0.0080
Unit S2.003	0.0093	0.0010	0.0012	0.0038
Unit S2.004	0.0190	0.0240	0.0280	0.0237
Unit S2.005	0.0160	0.0220	0.0530	0.0303
Unit S2.006	0.0230	0.0240	0.0055	0.0175
Unit S2.007	0.0220	0.0140	0.0110	0.0157
Unit S2.008	0.0490	0.0210	0.0140	0.0280
Unit S2.009	0.0220	0.0220	0.0052	0.0164
Unit S2.010	0.0450	0.0780	0.1400	0.0877
Unit S2.011	0.0190	0.0180	0.0140	0.0170
Unit S2.012	0.0049	0.0048	0.0027	0.0041
Unit S2.013	0.0067	0.0057	0.0052	0.0059
Unit S2.014	0.0099	0.0120	0.0095	0.0105
Average All Engines				0.0198
Standard Deviation of The Averages				0.0213
Maximum of The Averages				0.0877
Minimum of the Averages				0.0038
Confidence Interval 95% of The Averages				0.0111
Standard Deviation of All Test Runs				0.0244
Maximum Single Test Run				0.1400
Minimum Single Test Run				0.0010
Confidence Interval 95% All Test Runs				0.0074
Average of All Test Runs				0.0198

Eastshore Maximum lb/hr = 0.00277 lb/MMBtu x 72.8 MMBtu/hr (max. firing rate) = 0.2 lb/hr

Brian Lusher

From: Brian Lusher
Sent: Wednesday, July 25, 2007 8:54 AM
To: 'Brewster Birdsall'
Subject: RE: Draft Permit Conditions

Brewster,

We are still not sure how to address commissioning and startup emissions. After today meeting I will know more information.

Commissioning Limits are primarily designed from running to many engines simultaneously with no controls.

#7 moved to #17

I will fix #21 as it also needs the averaging provision and the six weeks.

Additional toxics testing was added to get one initial test of all compounds, and to hav the applicant rerun the health risk assessment with actual source test data to demonstra that the facility clearly meets Regulation 2, Rule 5.

This language will continue to be refined...

Regards,

Brian Lusher

-----Original Message-----
From: Brewster Birdsall [mailto:BBirdsall@aspeneg.com]
Sent: Tuesday, July 24, 2007 5:20 PM
To: Brian Lusher
Cc: Keith Golden; Matthew Layton
Subject: RE: Draft Permit Conditions

Thank you Brian - minor questions:
- in condition #6, the PM limit during commissioning remains 757.8 lb/day. Do we want to tighten that to reflect the new MMBtu and hp-hr limits of condition #14(c)?
- did you eliminate a condition (old #7) to source test and determine startup/shutdown emissions (maybe it was moved into #17)?
- in condition #21, should the "all engines...within six weeks" language from #14(c) be there too?
- it looks like you added an additional toxics test in #24, right?

Thanks again for sharing.
- Brewster

-----Original Message-----
From: Brian Lusher [mailto:blusher@baaqmd.gov]
Sent: Tuesday, July 24, 2007 2:15 PM
To: Brewster Birdsall; mlayton@energy.state.ca.us
Subject: Draft Permit Conditions

BACT for PM would remain PUC natural gas and good combustion practice, not a numerical limilt.

The average for engines tested must meet 0.03 g/bhp-hr, maximum any single engine 2.2 lb/hr.

<<Draft Eastshore Energy Center Permit Conditions 072407 1400.doc>>

Let me know if you have comments,

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Brian Lusher

From: Brian Lusher
Sent: Monday, August 27, 2007 4:11 PM
To: 'Bpfanner (E-mail)
Subject: PSA Workshop on Sept. 6th

Bill,

I am requesting that you put Air Quality 1st on the Agenda for the Evening Session. That way I can escape earlier anc hear all of the other issues involved.

I will also be attending the RCEC proceeding on Sept. 5th.

Thanks,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Brian Lusher

From: Brian Lusher
Sent: Wednesday, October 17, 2007 4:40 PM
To: 'Bpfanner (E-mail); Matthew Layton (E-mail)
Cc: Brian Bateman; Barry Young; Bob Nishimura
Subject: Eastshore Energy Center FDOC PDF

Bill,

Here is the FDOC in a PDF file. The CEC will also receive a hard copy via the mail.

A15185_FDOC_101 72007.pdf

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Brian Lusher

From: Brian Lusher
Sent: Wednesday, October 24, 2007 2:17 PM
To: bpfanner@energy.state.ca.us
Subject: Typo in FDOC PDF

Bill,

CEC staff let me know of a typo in Condition 14 that inadvertenly referenced Condtion 18 when it should have been Condition 19.

The only change is the 18 now becoming a 19 in Condition 14.

Here is a revised pdf.

Sorry about this error.

Regards,

Brian Lusher

Brian Lusher

From: Brian Lusher
Sent: Thursday, September 27, 2007 2:34 PM
To: Brewster Birdsall (E-mail)
Subject: Condition Text

DRAFT Permit Conditions 092607..

Brewster,

This has not been approved by District Management.

Please do not distribute.

Thanks,

Brian Lusher

V Permit Conditions

The following permit conditions are proposed to ensure that the proposed project complies with all applicable District, State, and Federal Regulations. The conditions limit operational parameters such as fuel use, stack gas emission concentrations, and mass emission rates. The proposed permit conditions also specify abatement device operation and performance levels. To aid enforcement efforts, conditions specifying emission monitoring, source testing, and record keeping requirements are included. Furthermore, pollutant mass emission limits (in units of ton/yr) are proposed to insure that annual emission rate limitations are not exceeded.

To provide maximum operational flexibility, no limitations are proposed for the type, or quantity of engine generator set start-ups or shutdowns. Instead, the facility must comply with short term emission limits and annual (consecutive twelve-month) mass emission limits at all times. Compliance with CO and NO_x limitations will be verified by continuous emission monitors (CEMs) that will be in operation during all engine generator set operating modes, including start-up and shutdown. If the CO and NO_x CEMs are not capable of accurately assessing engine start-up and shutdown mass emission rates due to variable O_2 content and the differing response times of the O_2 and NO_x monitors, then start-up and shutdown mass emission rates will be based upon annual source test results. Compliance with POC, SO_2, and PM_{10} mass emission limits will be verified by using District approved emission factors developed or validated by site-specific source testing.

In addition to permit conditions that apply to steady-state operation of each natural gas fired engine generator set, conditions are being proposed that govern equipment operation during the initial commissioning period when the natural gas engine generator sets will operate without their SCR systems and/or oxidation catalysts in place. Commissioning activities include, but are not limited to the testing of the natural gas fired engines, and adjustment of control systems. Proposed permit conditions 1 through 6 apply to this commissioning period and are intended to minimize emissions during the commissioning period.

Eastshore Energy Center Permit Conditions

(A) Definitions:

Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours
Year:	Any consecutive twelve-month period of time
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf
Operating Hours:	Period of time during which fuel is flowing to a unit, measured in hours and minutes.
MM BTU:	Million British Thermal Units
Engine BHP during operation	(Electrical generator MW) x (1341 bhp/MW) x (1.0319 loss factor)
Engine Start-up:	An engine start-up that occurs when the SCR catalyst bed is below operating temperature as specified by the abatement device manufacturer. The maximum time for startup shall be 30 minutes.
Corrected Concentration:	The concentration of pollutants shall be corrected to a standard value of 15% O_2 by volume on a dry basis. The following equation shall be used to calculate the corrected concentration. $X@15\%O_2 = (20.95 - 15)/(20.95 - \text{Stack } O_2\%) \times X@\text{Stack } O_2\%$
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities during the commissioning period recommended by the equipment manufacturers and the Eastshore Energy Center construction contractor to insure safe and reliable steady state operation of the engines, abatement equipment, and associated electrical delivery systems
Commissioning Period:	The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when an engine is first fired, whichever occurs first. The period shall terminate when the source has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange. The commissioning period shall not exceed 180 days under any circumstances. The period shall be determined separately for each engine generator set.
CEM	Continuous Emission Monitor
CEC CPM:	California Energy Commission Compliance Program Manager
Engine Shutdown:	The time period corresponding to the control system request to shutdown a specific engine until the engine generator set ceases operation. The maximum time for a shutdown shall be 8.5 minutes.

Total Particulate Matter	Sum of the filterable and condensable fractions of an EPA Method 5/Method 202 (or other District approved method) sampling train. When using EPA Method 5/Method 202 to demonstrate compliance with these permit conditions, EPA Method 5/Method 202 shall be used to determine the stack gas concentration of particulate matter. The mass emission rate shall be calculated using EPA Method 19 to determine the stack gas flowrate during the source test run.
PM_{10}	Particulate matter with an aerodynamic diameter of 10 microns or smaller. As applicable, source test methods (District approved) must include the condensable fraction when measuring the stack gas particulate concentration and mass emission rate.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 microns or smaller. As applicable, source test methods (District approved) must include the condensable fraction when measuring the stack gas particulate concentration and mass emission rate.
SO_2	Sulfur Dioxide (SO_2)

(B) Applicability:

Conditions 1 through 6 shall only apply during the commissioning period as defined above. Unless otherwise indicated, Conditions 7 through 24 shall apply after the commissioning period has ended. Conditions 25 through 29 shall apply at all times.

(C) Conditions:

Conditions for the Engines S-1 through S-14 during the Commissioning Period

1. The owner/operator of the Eastshore Energy Center (EEC) shall minimize emissions of carbon monoxide and nitrogen oxides from S-1 through S-14 Lean Burn Internal Combustion Engines to the maximum extent possible during the commissioning period.

   a. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall tune each engine S-1 through S-14 after first fire to minimize the emissions of carbon monoxide and nitrogen oxides during commissioning.

   b. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall install, adjust, and operate A-1 through A-14, SCR Systems, and A-15 through A-28, Oxidation Catalyst systems, to minimize the emissions during commissioning.

   c. The owner/operator of the EEC shall submit a plan to the District Engineering Division and the CEC CPM prior to the firing of any of the engines that shall describe the process to be followed during the commissioning of each engine. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, engine tuning activities (such as air/fuel ratio settings, engine timing, turbocharger pressure); the installation, tuning, and operation of the SCR systems and oxidation catalysts; the installation, calibration, and testing of the CO and NO_x continuous emission monitors; and any activities requiring the firing of the IC engines without abatement by their respective abatement devices. None of the engines shall be fired sooner than 28 days after the District receives the commissioning plan.

   (Basis: BACT, Offsets)

2. During the commissioning period, the owner/operator of the EEC shall demonstrate compliance with Condition 6 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:
   a. Firing hours for each engine
   b. Fuel flow rates to each engine
   c. Stack gas nitrogen oxide emission concentrations at P-1 through P-14
   d. Stack gas carbon monoxide emission concentrations at P-1 through P-14
   e. Stack gas oxygen concentrations at P-1 through P-14

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the engines. The owner/operator shall use District-approved methods to calculate heat input rates, NO_x mass emission rates, carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each calendar day. All records shall be retained on site for at least 2 years from the date of entry and made available to District staff upon request.
(Basis: BACT, Offsets)

3. The owner/operator shall install, calibrate, and make operational continuous emission monitors for NO_x, CO and O_2 for each engine prior to first firing of that engine. After first firing of an individual engine, the detection range of the continuous emission monitor for that engine shall be adjusted as necessary to accurately measure the resulting range of CO and NO_x emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.
(Basis: BACT, Offsets)

4. The owner/operator shall operate the facility such that the total number of firing hours of each Engine S-1 through S-14 without abatement of nitrogen oxide and CO emissions by its SCR System and Oxidation Catalyst System shall not exceed 300 hours per engine during the commissioning period. Such operation of S-1 through S-14 without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District Engineering Division and Enforcement and Compliance Division and the unused balance of the 300 firing hours per engine without abatement shall expire.
(Basis: BACT, Offsets)

5. The owner/operator shall use District approved calculation methods to estimate the total mass emissions of NO_x (as NO_2), CO, POC, PM_{10}, and SO_2 that are emitted by Engines S-1 through S-14 and S-15 during the commissioning and facility startup period. These emissions count towards the consecutive twelve-month emission limitations specified in Condition 14. Emission totals shall include emissions during the startup and shutdown of the engines.
(Basis: BACT, Offsets)

6. The owner/operator shall not operate the engines S-1 through S-14 in a manner such that the combined pollutant emissions from these sources will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the engines S-1 through S-14.

NO_x (as NO_2)	3058.4 pounds per calendar day
CO	4033.5 pounds per calendar day
POC (as CH_4)	975.1 pounds per calendar day
Total Particulate Matter	757.8 pounds per calendar day
PM_{10}	757.8 pounds per calendar day
$PM_{2.5}$	757.8 pounds per calendar day
SO_2	79.53 pounds per calendar day

(Basis: BACT, Offsets)

Conditions for the Engines S-1 through S-14 Post Commissioning Period

7. The owner/operator shall ensure that S-1 through S-14 IC Engines are fired on PUC natural gas exclusively. (Basis: BACT for PM_{10}, Cumulative Increase for SO_2)

8. The Owner/operator shall operate each engine such that the heat input rate for each engine S-1 through S-14 is less than or equal to 72.8 MMBtu/hr (HHV, 72.08 MMBtu/hr for Annual Average), averaged over an hour period, including startup/shutdown periods. The owner shall obtain heating value data for the natural gas on a weekly basis from the gas supplier. The weekly heating value data shall be used to calculate a monthly average for heating value that may be used to demonstrate compliance with these conditions. (Basis: BACT, Cumulative Increase)

9. The Owner/operator shall operate each engine such that the heat input rate for each engine S-1 through S-14 is less than or equal to 1730 MMBTU/day per calendar day, including startups/shutdowns. (Basis: Cumulative Increase)

10. The Owner/operator shall operate each engine such that the heat input rate for all engines S-1 through S-14 combined is less than or equal to 4,036,480 MMBTU/yr on a rolling 12-month average basis, including startups/shutdowns. (Basis: Offsets)

11. The owner/operator shall limit the total annual operating hours for engines S-1 through S-14 to 56,000 hours. (Basis: Offsets, Cumulative Increase)

12. The owner/operator shall properly operate and maintain the A-1 to A-14 Selective Catalytic Reduction (SCR) Systems, except as provided during the Commissioning Period, whenever fuel is combusted at the corresponding source S-1 through S-14, respectively, and the individual catalyst bed has reached minimum operating temperature specified by the abatement device manufacturer. The owner/operator shall not inject ammonia into the SCR units (A-1 through A-14) until the catalyst bed reaches the minimum operating temperature specified by the abatement device manufacturer (Basis: BACT for NO_x).

13. The owner/operator shall ensure that the cumulative combined emissions from S-1 through S-14 Engines and S-15 do not exceed the following limits during any consecutive twelve-month period, including emissions generated during engine startups and shutdowns:
    54.35 tons of NO_x (as NO_2) per rolling 12 month period;
    84.45 tons of CO per rolling 12 month period;
    76.11 tons of POC (as CH4) per rolling 12 month period;
    40.31 tons of Total Particulate Matter per rolling 12 month period; and
    40.31 tons of PM_{10} per rolling 12 month period; and
    40.31 tons of $PM_{2.5}$ per rolling 12 month period; and
    6.63 tons of SO_2 per rolling 12 month period.
    (Basis: Offsets, Cumulative Increase)

14. The owner/operator shall comply with requirements (a) through (e) below under all operating scenarios, except during engine startup and shutdown (although startup and shutdown emissions shall be included in determining compliance with the facility-wide daily Total Particulate Matter emissions limit as set forth in subsection (c)).

(a) The nitrogen oxide concentration at each point P-1 through P-14 shall not exceed 5 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for NO_x)
(b) The carbon monoxide concentration at each point P-1 through P-14 shall not exceed 13 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for CO)
(c) Total Particulate Matter, PM_{10}, and $PM_{2.5}$ emissions from all fourteen engines shall not exceed 461.65 lb/day. Total Particulate Matter, PM_{10}, and $PM_{2.5}$ emissions from all fourteen engines shall not exceed 40.31 tons/year. (Basis: BACT, Cumulative Increase)
(d) The POC concentration at each point P-1 through P-14 with the corresponding engine operating at 75% or more of full load shall not exceed 25 ppmv on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for POC)
(e) Ammonia (NH_3) emission concentrations at each point P-1 through P-14 shall not exceed 10 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 3-hour period. The owner/operator shall quantify, by continuous recording, the ammonia injection rate to A-1 through A-14 SCR Systems. The correlation between the engine heat input and the SCR System ammonia injection rates as determined in accordance with Condition 18 shall be used to calculate the corresponding ammonia emission concentration at emission points P-1 through P-14. The facility will notify the Engineering Division Permit Evaluation Manager in writing when any engine operates for 3 consecutive hours at an average calculated ammonia slip rate equal to or greater than 10 ppmvd corrected to 15% O_2 (in addition to any reporting required by District Regulation 1). The notification shall be provided to the District within one week of an engine operating at an average calculated slip rate equal to or greater than 10 ppmvd corrected to 15% O_2. If the parametric monitoring indicates a corresponding ammonia slip of 10 ppm corrected to 15% O_2 for 3 consecutive hours, then the District may require a District approved source test for ammonia slip to demonstrate ongoing compliance and to update the parametric monitoring correlation as necessary. (Basis: Regulation 2, Rule 5)

15. The owner/operator shall demonstrate compliance with Conditions 13 and 14 by using properly operated and maintained continuous monitors during all hours of operation including equipment startup and shutdown periods for all of the following parameters:
(a) Firing Hours and Fuel Flow Rates for each source
(b) Carbon Dioxide (CO_2) or Oxygen (O_2) concentrations, Nitrogen Oxides (NO_x) concentrations, and Carbon Monoxide (CO) concentrations at emission points P-1 through P-14
(c) Ammonia injection rate at A-1 through A-14 SCR Systems
(d) Corrected NO_x concentrations, NO_x mass emissions (as NO_2), corrected CO concentrations, and CO mass emissions at each emission point for every 1-hour period
(e) Total Heat Input Rate for every clock hour
(f) The cumulative total Heat Input (MMBTU) for each calendar day for each engine

(g) Calculate NO_x mass emissions (as NO_2) and CO mass emissions, for each calendar day for each engine, and for the previous consecutive twelve-month period using CEM data.
(h) Calculate the mass emissions of PM-10, POC, and SO_2 for each calendar day for each engine and for the previous twelve-month period using District approved emission factors.
The owner/operator shall record all of the parameters identified in (a) through (c) above every fifteen (15) minutes (excluding normal calibration periods) and shall summarize all of the above parameters in accordance with the relevant permit limits. The owner/operator shall use the parameters measured pursuant to (a) through (c) above and District approved calculation methods to calculate the parameters identified in (d) through (h) above for each engine:
(Basis: 1-520.1, 9-9-501, BACT (except for SO_2), Offsets, Cumulative Increase)

16. The owner/operator shall demonstrate compliance with the 1.3 lb/hr Total Particulate Matter emissions limit in Condition 14(c) by performing tests for Total Particulate Matter emissions as required by these conditions. If Total Particulate Matter emissions for an engine generator set exceed 1.9 lb/hr, then that engine generator set shall be deemed to be in violation of Condition 14(c). If Total Particular Matter emissions for any engine generator set exceed 1.3 lb/hr, but do not exceed 1.9 lb/hr, then that engine generator set shall not be considered to be in violation of Condition 14(c) if the owner/operator can demonstrate, subject to approval by the APCO, that the engine has been installed, operated, and maintained properly in accordance with all manufacturer's specifications and instructions. The owner/operator shall so demonstrate by:
(i) retesting emissions within 45 days after receiving the final test report from the initial test exceeding 1.3 lb/hr (in accordance with the source testing requirements set forth in Condition 20);
(ii) submitting to the APCO, within 30 days after receiving the final test report from the initial test exceeding 1.3 lb/hr, adequate documentation to verify that the engine has been installed, operated, and maintained properly in accordance with all manufacturers' specifications and instructions.

Within 30 days of receipt of the results of the retest and the documentation required by subsections (i) and (ii) above, the APCO shall make a determination whether the engine has been installed, operated, and maintained in accordance with manufacturers' specifications and instructions. If the APCO determines that the engine has been properly installed, operated, and maintained, then the engine shall be deemed not to be in violation of the single-engine hourly emission limit in Condition 14(c) (although emission from the engine will still be counted for purposes of the facility-wide limit). If the APCO determines that the given engine has not been properly installed, operated, and maintained, then the engine shall be deemed to be in violation of Condition 14(c). Engines that operate pursuant to the provisions of this Condition 16 shall continue to be tested on a regular basis according to these Conditions.

17. Within 136 days of the beginning of the commissioning period for each engine at EEC, the Owner/operator shall conduct a District-approved initial source test for Total Particulate Matter, and POC on the corresponding emission point P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. The Owner/operator shall conduct a District-approved initial source

test for SO_2 on one of the fourteen emission points with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: 2-1-411).

18. Prior to the end of the commissioning period, the Owner/operator shall conduct a District and CEC CPM approved source test to establish emissions during startup and shutdown. The source test shall determine NO_x, CO, POC and PM_{10} emissions during cold startup and shutdown of the engines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. Twenty (20) working days before the execution of the source tests, the Owner/operator shall submit to the District and the CEC CPM a detailed source test plan designed to satisfy the requirements of this Condition, including specification of the number of tests. The Owner/operator shall notify the District and the CEC CPM at least seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District within 60 days of the date that source testing is completed at the facility.

19. The owner/operator shall conduct an initial District-approved source test to determine the SCR System ammonia injection rate and the corresponding NH_3 emission concentration at two of the fourteen emission points P-1 through P-14. The source test shall be conducted over the expected operating load range of the engines (including, but not limited to, 75% and 100% load) to establish the ammonia injection rates necessary to achieve NO_x emission limits while maintaining ammonia slip levels. A correlation between NO_x ppmv stack exit concentration, ammonia injection rate, heat input, and ammonia exit concentration shall be established for the two engines that were source tested. The test data shall be used as input for the calculation for the remaining engines. Ongoing compliance shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. (Basis: Regulation 2, Rule 5).

20. The owner/operator shall obtain approval for all source test procedures from the Technical Services Division prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as approved by the Technical Services Division. Twenty (20) working days before the execution of source testing, the Owner/operator shall submit to the District and the CEC CPM a detailed source test plan designed to satisfy the requirements of any of these Conditions, including specification of the number of tests. The Owner/operator shall notify the District at least seven (7) working days prior to the planned source test date. Source test results shall be submitted to the District and the CEC CPM within 60 days of completing the tests.
(Basis: BACT)

21. The owner/operator shall conduct a District approved source test no later than 365 days after the initial Total Particulate Matter source test. The District approved source test shall determine the NH_3 emission concentration from two of the fourteen emission points to demonstrate ongoing compliance and to verify the parametric monitoring correlation. The District approved source test shall measure the Total Particulate Matter mass emission rate and POC emission concentration at emission points P-1 through P-14 with the corresponding

source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: Cumulative Increase, BACT)

22. After completion of the initial source test and the first annual source test, the owner/operator shall conduct a District approved source test on each engine every 8,760 hours of operation or every 3 years whichever comes first. The District approved source test shall determine the NH_3 emission concentration from two of the fourteen emission points to demonstrate ongoing compliance and to verify the parametric monitoring correlation. The District approved source test shall measure the Total Particulate Matter mass emission rate and POC emission concentration at emission points P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: Cumulative Increase, BACT)

23. The owner/operator shall not allow the maximum projected annual toxic air contaminant emissions from all emission points P-1 through P-14 combined to exceed the following limits:

1,3-Butadiene	872 pounds per year
Formaldehyde	11,200 pounds per year

    unless the following requirement is satisfied:

    The owner/operator shall perform a health risk assessment to determine the total facility risk using the emission rates determined by source testing and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. The owner/operator shall submit the risk analysis to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will not result in a significant cancer risk, the District and the CEC CPM may administratively adjust the carcinogenic compound emission limits listed above. (Basis: Regulation 2, Rule 5)

24. Within 136 days of start-up of the facility, the owner/operator shall conduct an initial District-approved source test on one of the fourteen emission points P-1 through P-14 with the corresponding engine operating at least 80% of full load to demonstrate compliance with Condition 23 and to demonstrate that the facility complies with Regulation 2, Rule 5. The initial District approved source test for toxic air contaminants shall quantify the emission rates from one engine of the following compounds: 1,3 Butadiene, Formaldehyde, Acetaldehyde, Benzene, Toluene, Xylene, and Polycyclic Aromatic Hydrocarbons. The toxic air contaminant source test results will be converted into emission factors in units of lb/MMBtu, and the annual firing rates for each of the fourteen engines will be used to calculate annual emissions of toxic air contaminants from the facility. The owner/operator shall use the results of the initial source test for toxic air contaminants to perform a health risk assessment to determine the total facility risk using District approved procedures and unit risk factors.
    (Basis: Regulation 2, Rule 5)

25. The owner/operator shall conduct an additional District approved source test within 3 years of the initial test on one of the fourteen emission points P-1 through P-14 with the corresponding engine operating at least 80% of full load to demonstrate compliance with Condition 23. The toxic air contaminant source test results will be converted into emission factors in units of lb/MMBtu, and the annual firing rates for each of the fourteen engines will be used to calculate annual emissions of toxic air contaminants from the facility.
(Basis: Regulation 2, Rule 5)

Conditions for S-15 Emergency Standby Generator at all times

26. Operation of S-15 for reliability-related activities is limited to 50 hours per year. (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(2)(A)(3).)

27. The owner/operator shall operate engine S-15 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 hours 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, 17 C.C.R. § 93115(e)(2)(A)(3).)

28. The owner/operator shall operate engine S-15 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, 17 C.C.R. § (e)(4)(G)(1).)

29. 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. 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 of S-15 for reliability-related activities (maintenance and testing).
    b. Hours of operation of S-15 for emission testing to show compliance with emission limits.
    c. Hours of emergency operation of S-15.
    d. For each emergency, the nature of the emergency condition.
    e. Fuel usage for S-15.

    (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(4)(I).)

30. At School and Near-School Operation: If S-15 is located on school grounds or within 500 feet of any school grounds, the owner/operator shall not operate it for non-emergency use, including maintenance and testing, during the following periods:
    a. Whenever a school-sponsored activity is taking place at the school (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, 17 C.C.R. § 93115(e)(2)(A)(1).)

Brian Lusher

From: Brian Lusher
Sent: Tuesday, July 24, 2007 2:12 PM
To: Brewster Birdsall (E-mail); 'mlayton@energy.state.ca.us'
Subject: Draft Permit Conditions

BACT for PM would remain PUC natural gas and good combustion practice, not a numerical limilt.

The average for engines tested must meet 0.03 g/bhp-hr, maximum any single engine 2.2 lb/hr.

Draft Eastshore Energy Center ...

Let me know if you have comments,

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Eastshore Energy Center Permit Conditions

(A) Definitions:

Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours
Year:	Any consecutive twelve-month period of time
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf
Operating Hours:	Period of time during which fuel is flowing to a unit, measured in hours and minutes.
MM BTU:	Million British Thermal Units
Engine BHP during operation	(Electrical generator MW) x (1341 bhp/MW) x (1.0319 loss factor)
Engine Start-up:	An engine start-up that occurs when the SCR catalyst bed is below operating temperature as specified by the abatement device manufacturer. The maximum time for startup shall be 30 minutes.
Corrected Concentration:	The concentration of pollutants shall be corrected to a standard value of 15% O_2 by volume on a dry basis. The following equation shall be used to calculate the corrected concentration. $X@15\%O_2 = (20.95 - 15)/(20.95 - \text{Stack } O_2\%) \times X@\text{Stack } O_2\%$
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities during the commissioning period recommended by the equipment manufacturers and the Eastshore Energy Center construction contractor to insure safe and reliable steady state operation of the engines, abatement equipment, and associated electrical delivery systems
Commissioning Period:	The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when an engine is first fired, whichever occurs first. The period shall terminate when the source has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange. The commissioning period shall not exceed 180 days under any circumstances. The period shall be determined separately for each engine generator set.
CEM	Continuous Emission Monitor
CEC CPM:	California Energy Commission Compliance Program Manager
Engine Shutdown:	The time period corresponding to the control system request to shutdown a specific engine until the engine generator set ceases operation. The maximum time for a shutdown shall be 8.5 minutes.

Total Particulate Matter	Sum of the filterable and condensable fractions of an EPA Method 5/Method 202 (or other District approved method) sampling train. When using EPA Method 5/Method 202 to demonstrate compliance with these permit conditions, EPA Method 5/Method 202 shall be used to determine the stack gas concentration of particulate matter. The mass emission rate shall be calculated using EPA Method 19 to determine the stack gas flowrate during the source test run.
PM_{10}	Particulate matter with an aerodynamic diameter of 10 microns or smaller. As applicable, source test methods (District approved) must include the condensable fraction when measuring the stack gas particulate concentration and mass emission rate.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 microns or smaller. As applicable, source test methods (District approved) must include the condensable fraction when measuring the stack gas particulate concentration and mass emission rate.
SO_2	Sulfur Dioxide (SO_2)

(B) Applicability:

Conditions 1 through 6 shall only apply during the commissioning period as defined above. Unless otherwise indicated, Conditions 7 through 24 shall apply after the commissioning period has ended. Conditions 25 through 29 shall apply at all times.

(C) Conditions:

Conditions for the Engines S-1 through S-14 during the Commissioning Period

1. The owner/operator of the Eastshore Energy Center (EEC) shall minimize emissions of carbon monoxide and nitrogen oxides from S-1 through S-14 Lean Burn Internal Combustion Engines to the maximum extent possible during the commissioning period.

   a. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall tune each engine S-1 through S-14 after first fire to minimize the emissions of carbon monoxide and nitrogen oxides during commissioning.

   b. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall install, adjust, and operate A-1 through A-14, SCR Systems, and A-15 through A-28, Oxidation Catalyst systems, to minimize the emissions during commissioning.

   c. The owner/operator of the EEC shall submit a plan to the District Engineering Division and the CEC CPM prior to the firing of any of the engines that shall describe the process to be followed during the commissioning of each engine. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, engine tuning activities (such as air/fuel ratio settings, engine timing, turbocharger pressure); the installation, tuning, and operation of the SCR systems and oxidation catalysts; the installation, calibration, and testing of the CO and NO_x continuous emission monitors; and any activities requiring the firing of the IC engines without abatement by their respective abatement devices. None of the engines shall be fired sooner than 28 days after the District receives the commissioning plan.

   (Basis: BACT, Offsets)

2. During the commissioning period, the owner/operator of the EEC shall demonstrate compliance with Condition 6 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:
   a. Firing hours for each engine
   b. Fuel flow rates to each engine
   c. Stack gas nitrogen oxide emission concentrations at P-1 through P-14
   d. Stack gas carbon monoxide emission concentrations at P-1 through P-14
   e. Stack gas oxygen concentrations at P-1 through P-14

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the engines. The owner/operator shall use District-approved methods to calculate heat input rates, NO_x mass emission rates, carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each calendar day. All records shall be retained on site for at least 2 years from the date of entry and made available to District staff upon request.
(Basis: BACT, Offsets)

3. The owner/operator shall install, calibrate, and make operational continuous emission monitors for NO_x, CO and O_2 for each engine prior to first firing of that engine. After first firing of an individual engine, the detection range of the continuous emission monitor for that engine shall be adjusted as necessary to accurately measure the resulting range of CO and NO_x emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.
(Basis: BACT, Offsets)

4. The owner/operator shall operate the facility such that the total number of firing hours of each Engine S-1 through S-14 without abatement of nitrogen oxide and CO emissions by its SCR System and Oxidation Catalyst System shall not exceed 300 hours per engine during the commissioning period. Such operation of S-1 through S-14 without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District Engineering Division and Enforcement and Compliance Division and the unused balance of the 300 firing hours per engine without abatement shall expire.
(Basis: BACT, Offsets)

5. The owner/operator shall use District approved calculation methods to estimate the total mass emissions of NO_x (as NO_2), CO, POC, PM_{10}, and SO_2 that are emitted by Engines S-1 through S-14 and S-15 during the commissioning and facility startup period. These emissions count towards the consecutive twelve-month emission limitations specified in Condition 14. Emission totals shall include emissions during the startup and shutdown of the engines.
(Basis: BACT, Offsets)

6. The owner/operator shall not operate the engines S-1 through S-14 in a manner such that the combined pollutant emissions from these sources will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the engines S-1 through S-14.

NO_x (as NO_2)	3058.4 pounds per calendar day
CO	4033.5 pounds per calendar day
POC (as CH_4)	975.1 pounds per calendar day
Total Particulate Matter	757.8 pounds per calendar day
PM_{10}	757.8 pounds per calendar day
$PM_{2.5}$	757.8 pounds per calendar day
SO_2	79.53 pounds per calendar day

(Basis: BACT, Offsets)

Conditions for the Engines S-1 through S-14 Post Commissioning Period

7. The owner/operator shall ensure that S-1 through S-14 IC Engines are fired on PUC natural gas exclusively. (Basis: BACT for PM_{10}, Cumulative Increase for SO_2)

8. The Owner/operator shall operate each engine such that the heat input rate for each engine S-1 through S-14 is less than or equal to 72.8 MMBtu/hr (HHV, 72.1 MMBtu/hr for Annual Average), averaged over an hour period, including startup/shutdown periods. The owner shall obtain heating value data for the natural gas on a weekly basis from the gas supplier. The weekly heating value data shall be used to calculate a monthly average for heating value that may be used to demonstrate compliance with these conditions. (Basis: BACT, Cumulative Increase)

9. The Owner/operator shall operate each engine such that the heat input rate for each engine S-1 through S-14 is less than or equal to 1730 MMBTU/day per calendar day, including startups/shutdowns. (Basis: Cumulative Increase)

10. The Owner/operator shall operate each engine such that the heat input rate for all engines S-1 through S-14 combined is less than or equal to 4,036,480 MMBTU/yr on a rolling 12-month average basis, including startups/shutdowns. (Basis: Offsets)

11. The owner/operator shall limit the total annual operating hours for engines S-1 through S-14 to 56,000 hours. (Basis: Offsets, Cumulative Increase)

12. The owner/operator shall properly operate and maintain the A-1 to A-14 Selective Catalytic Reduction (SCR) Systems, except as provided during the Commissioning Period, whenever fuel is combusted at the corresponding source S-1 through S-14, respectively, and the individual catalyst bed has reached minimum operating temperature specified by the abatement device manufacturer. The owner/operator shall not inject ammonia into the SCR units (A-1 through A-14) until the catalyst bed reaches the minimum operating temperature specified by the abatement device manufacturer (Basis: BACT for NO_x).

13. The owner/operator shall ensure that the cumulative combined emissions from S-1 through S-14 Engines and S-15 do not exceed the following limits during any consecutive twelve-month period, including emissions generated during engine startups and shutdowns:
    54.35 tons of NO_x (as NO_2) per rolling 12 month period;
    84.45 tons of CO per rolling 12 month period;
    76.11 tons of POC (as CH4) per rolling 12 month period;
    21.40 tons of PM_{10} per rolling 12 month period; and
    21.40 tons of $PM_{2.5}$ per rolling 12 month period; and
    6.63 tons of SO_2 per rolling 12 month period.
    (Basis: Offsets, Cumulative Increase)

14. The owner/operator shall comply with requirements (a) through (e) below under all operating scenarios, except during an engine start-up or shutdown. (Basis: BACT)

(a) The nitrogen oxide concentration at each point P-1 through P-14 shall not exceed 5 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for NO_x)
(b) The carbon monoxide concentration at each point P-1 through P-14 shall not exceed 13 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for CO)
(c) Total Particulate Matter, PM_{10}, and $PM_{2.5}$ emissions determined from the average of all engines tested shall not exceed 0.03 g/bhp-hr or 0.011 lb/MMBtu. Total Particulate Matter, PM_{10} and $PM_{2.5}$ emissions from each engine S-1 through S-14 shall not exceed 2.2 lb/hr. All engines subject to particulate source testing shall be tested within a six-week period from the completion of particulate testing on the first engine. The particulate test result for each engine shall be the average of three valid test runs. The particulate test results for all engines tested shall be averaged together and compared to the limit presented in this condition to determine compliance. (Basis: Voluntary Limit, Cumulative Increase)
(d) The POC concentration at each point P-1 through P-14 with the corresponding engine operating at 75% or more of full load shall not exceed 25 ppmv on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for POC)
(e) Ammonia (NH_3) emission concentrations at each point P-1 through P-14 shall not exceed 10 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 3-hour period. The owner/operator shall quantify, by continuous recording, the ammonia injection rate to A-1 through A-14 SCR Systems. The correlation between the engine heat input and the SCR System ammonia injection rates as determined in accordance with Condition 18 shall be used to calculate the corresponding ammonia emission concentration at emission points P-1 through P-14. The facility will notify the Engineering Division Permit Evaluation Manager in writing when any engine operates for 3 consecutive hours at an average calculated ammonia slip rate equal to or greater than 10 ppmvd corrected to 15% O_2 (in addition to any reporting required by District Regulation 1). The notification shall be provided to the District within one week of an engine operating at an average calculated slip rate equal to or greater than 10 ppmvd corrected to 15% O_2. If the parametric monitoring indicates a corresponding ammonia slip of 10 ppm corrected to 15% O_2 for 3 consecutive hours, then the District may require a District approved source test for ammonia slip to demonstrate ongoing compliance and to update the parametric monitoring correlation as necessary. (Basis: Regulation 2, Rule 5)

15. The owner/operator shall demonstrate compliance with Conditions 14 and 15 by using properly operated and maintained continuous monitors during all hours of operation including equipment startup and shutdown periods for all of the following parameters:
(a) Firing Hours and Fuel Flow Rates for each source
(b) Carbon Dioxide (CO_2) or Oxygen (O_2) concentrations, Nitrogen Oxides (NO_x) concentrations, and Carbon Monoxide (CO) concentrations at emission points P-1 through P-14
(c) Ammonia injection rate at A-1 through A-14 SCR Systems
(d) Corrected NO_x concentrations, NO_x mass emissions (as NO_2), corrected CO concentrations, and CO mass emissions at each emission point for every 1-hour period

(e) Total Heat Input Rate for every clock hour
(f) The cumulative total Heat Input (MMBTU) for each calendar day for each engine
(g) Calculate NO_x mass emissions (as NO_2) and CO mass emissions, for each calendar day for each engine, and for the previous consecutive twelve-month period using CEM data.
(h) Calculate the mass emissions of PM-10, POC, and SO_2 for each calendar day for each engine and for the previous twelve-month period using District approved emission factors.
The owner/operator shall record all of the parameters identified in (a) through (c) above every fifteen (15) minutes (excluding normal calibration periods) and shall summarize all of the above parameters in accordance with the relevant permit limits. The owner/operator shall use the parameters measured pursuant to (a) through (c) above and District approved calculation methods to calculate the parameters identified in (d) through (h) above for each engine:
(Basis: 1-520.1, 9-9-501, BACT (except for SO_2), Offsets, Cumulative Increase)

16. Within 136 days of the beginning of the commissioning period for each engine at EEC, the Owner/operator shall conduct a District-approved initial source test for Total Particulate Matter, and POC on the corresponding emission point P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. The Owner/operator shall conduct a District-approved initial source test for SO_2 on one of the fourteen emission points with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: 2-1-411).

17. Prior to the end of the commissioning period, the Owner/operator shall conduct a District and CEC CPM approved source test to establish emissions during startup and shutdown. The source test shall determine NO_x, CO, POC and PM_{10} emissions during cold startup and shutdown of the engines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. Twenty (20) working days before the execution of the source tests, the Owner/operator shall submit to the District and the CEC CPM a detailed source test plan designed to satisfy the requirements of this Condition, including specification of the number of tests. The Owner/operator shall notify the District and the CEC CPM at least seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District within 60 days of the date that source testing is completed at the facility.

18. The owner/operator shall conduct an initial District-approved source test to determine the SCR System ammonia injection rate and the corresponding NH_3 emission concentration at two of the fourteen emission points P-1 through P-14. The source test shall be conducted over the expected operating load range of the engines (including, but not limited to, 75% and 100% load) to establish the ammonia injection rates necessary to achieve NO_x emission limits while maintaining ammonia slip levels. A correlation between NO_x ppmv stack exit concentration, ammonia injection rate, heat input, and ammonia exit concentration shall be established for the two engines that were source tested. The test data shall be used as input for the calculation for the remaining engines. Ongoing compliance shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. (Basis: Regulation 2, Rule 5).

19. The owner/operator shall obtain approval for all source test procedures from the Technical Services Division prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as approved by the Technical Services Division. Twenty (20) working days before the execution of source testing, the Owner/operator shall submit to the District and the CEC CPM a detailed source test plan designed to satisfy the requirements of any of these Conditions, including specification of the number of tests. The Owner/operator shall notify the District at least seven (7) working days prior to the planned source test date. Source test results shall be submitted to the District and the CEC CPM within 60 days of completing the tests.
(Basis: BACT)

20. The owner/operator shall conduct a District approved source test no later than 365 days after than the initial Total Particulate Matter source test. The District approved source test shall determine the NH_3 emission concentration from two of the fourteen emission points to demonstrate ongoing compliance and to verify the parametric monitoring correlation. The District approved source test shall measure the Total Particulate Matter mass emission rate and POC emission concentration at emission points P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: Cumulative Increase, BACT)

21. After completion of the initial source test and the first annual source test, the owner/operator shall conduct a District approved source test on each engine every 8,760 hours of operation or every 3 years whichever comes first. The District approved source test shall determine the NH_3 emission concentration from two of the fourteen emission points to demonstrate ongoing compliance and to verify the parametric monitoring correlation. The District approved source test shall measure the Total Particulate Matter mass emission rate and POC emission concentration at emission points P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: Cumulative Increase, BACT)

22. The owner/operator shall not allow the maximum projected annual toxic air contaminant emissions from all emission points P-1 through P-14 combined to exceed the following limits:

1,3-Butadiene	872 pounds per year
Formaldehyde	11,200 pounds per year

unless the following requirement is satisfied:

The owner/operator shall perform a health risk assessment to determine the total facility risk using the emission rates determined by source testing and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. The owner/operator shall submit the risk analysis to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will not result in a significant cancer risk, the District and the CEC CPM may administratively adjust the carcinogenic compound emission limits listed above. (Basis: Regulation 2, Rule 5)

23. Within 136 days of start-up of the facility, the owner/operator shall conduct an initial District-approved source test on one of the fourteen emission points P-1 through P-14 with the corresponding engine operating at least 80% of full load to demonstrate compliance with Condition 22 and to demonstrate that the facility complies with Regulation 2, Rule 5. The initial District approved source test for toxic air contaminants shall quantify the emission rates from one engine of the following compounds: 1,3 Butadiene, Formaldehyde, Acetaldehyde, Benzene, Toluene, Xylene, and Polycyclic Aromatic Hydrocarbons. The toxic air contaminant source test results will be converted into emission factors in units of lb/MMBtu, and the annual firing rates for each of the fourteen engines will be used to calculate annual emissions of toxic air contaminants from the facility. The owner/operator shall use the results of the initial source test for toxic air contaminants to perform a health risk assessment to determine the total facility risk using District approved procedures and unit risk factors.
(Basis: Regulation 2, Rule 5)

24. The owner/operator shall conduct an additional District approved source test within 3 years of the initial test on one of the fourteen emission points P-1 through P-14 with the corresponding engine operating at least 80% of full load to demonstrate compliance with Condition 22. The toxic air contaminant source test results will be converted into emission factors in units of lb/MMBtu, and the annual firing rates for each of the fourteen engines will be used to calculate annual emissions of toxic air contaminants from the facility.
(Basis: Regulation 2, Rule 5)

Conditions for S-15 Emergency Standby Generator at all times

25. Operation of S-15 for reliability-related activities is limited to 50 hours per year. (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(2)(A)(3).)

26. The owner/operator shall operate engine S-15 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 hours 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, 17 C.C.R. § 93115(e)(2)(A)(3).)

27. The owner/operator shall operate engine S-15 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, 17 C.C.R. § (e)(4)(G)(1).)

28. 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. 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 of S-15 for reliability-related activities (maintenance and testing).
    b. Hours of operation of S-15 for emission testing to show compliance with emission limits.
    c. Hours of emergency operation of S-15.
    d. For each emergency, the nature of the emergency condition.
    e. Fuel usage for S-15.

    (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(4)(I).)

29. At School and Near-School Operation: If S-15 is located on school grounds or within 500 feet of any school grounds, the owner/operator shall not operate it for non-emergency use, including maintenance and testing, during the following periods:
    a. Whenever a school-sponsored activity is taking place at the school (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, 17 C.C.R. § 93115(e)(2)(A)(1).)

Brian Lusher

From: Brian Lusher
Sent: Thursday, September 27, 2007 9:39 AM
To: 'Chris Gallenstein (E-mail)'
Subject: Eastshore Draft FDOC

Contacts: 'Chris Gallenstein (E-mail)'

Chris,

This has not been approved by District Management.

Please do not distribute.

Eastshore FDOC
DRAFT V0 092607...

Regards,

Brian Lusher

Brian Lusher

From: Brian Lusher
Sent: Tuesday, July 24, 2007 2:09 PM
To: 'Chris Gallenstein (E-mail) ' (E-mail)
Subject: Draft Permit Conditions for Eastshore Energy Center

Chris,

Here is the proposed language with the 0.03 g/bhp-hr average for all fourteen engines, and a maximum of 2.2 lb/hr for a individual engine. BACT would remain PUC natural gas and good combustion practice and not a numerical limit.

Draft Eastshore Energy Center ...

Let me know if you have comments on this language.

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Eastshore Energy Center Permit Conditions

(A) Definitions:

Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours
Year:	Any consecutive twelve-month period of time
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf
Operating Hours:	Period of time during which fuel is flowing to a unit, measured in hours and minutes.
MM BTU:	Million British Thermal Units
Engine BHP during operation	(Electrical generator MW) x (1341 bhp/MW) x (1.0319 loss factor)
Engine Start-up:	An engine start-up that occurs when the SCR catalyst bed is below operating temperature as specified by the abatement device manufacturer. The maximum time for startup shall be 30 minutes.
Corrected Concentration:	The concentration of pollutants shall be corrected to a standard value of 15% O_2 by volume on a dry basis. The following equation shall be used to calculate the corrected concentration. $X@15\%O_2 = (20.95 - 15)/(20.95 - \text{Stack } O_2\%) \times X@\text{Stack } O_2\%$
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities during the commissioning period recommended by the equipment manufacturers and the Eastshore Energy Center construction contractor to insure safe and reliable steady state operation of the engines, abatement equipment, and associated electrical delivery systems
Commissioning Period:	The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when an engine is first fired, whichever occurs first. The period shall terminate when the source has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange. The commissioning period shall not exceed 180 days under any circumstances. The period shall be determined separately for each engine generator set.
CEM	Continuous Emission Monitor
CEC CPM:	California Energy Commission Compliance Program Manager
Engine Shutdown:	The time period corresponding to the control system request to shutdown a specific engine until the engine generator set ceases operation. The maximum time for a shutdown shall be 8.5 minutes.

Total Particulate Matter	Sum of the filterable and condensable fractions of an EPA Method 5/Method 202 (or other District approved method) sampling train. When using EPA Method 5/Method 202 to demonstrate compliance with these permit conditions, EPA Method 5/Method 202 shall be used to determine the stack gas concentration of particulate matter. The mass emission rate shall be calculated using EPA Method 19 to determine the stack gas flowrate during the source test run.
PM_{10}	Particulate matter with an aerodynamic diameter of 10 microns or smaller. As applicable, source test methods (District approved) must include the condensable fraction when measuring the stack gas particulate concentration and mass emission rate.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 microns or smaller. As applicable, source test methods (District approved) must include the condensable fraction when measuring the stack gas particulate concentration and mass emission rate.
SO_2	Sulfur Dioxide (SO_2)

(B) Applicability:

Conditions 1 through 6 shall only apply during the commissioning period as defined above. Unless otherwise indicated, Conditions 7 through 24 shall apply after the commissioning period has ended. Conditions 25 through 29 shall apply at all times.

(C) Conditions:

Conditions for the Engines S-1 through S-14 during the Commissioning Period

1. The owner/operator of the Eastshore Energy Center (EEC) shall minimize emissions of carbon monoxide and nitrogen oxides from S-1 through S-14 Lean Burn Internal Combustion Engines to the maximum extent possible during the commissioning period.

   a. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall tune each engine S-1 through S-14 after first fire to minimize the emissions of carbon monoxide and nitrogen oxides during commissioning.

   b. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall install, adjust, and operate A-1 through A-14, SCR Systems, and A-15 through A-28, Oxidation Catalyst systems, to minimize the emissions during commissioning.

   c. The owner/operator of the EEC shall submit a plan to the District Engineering Division and the CEC CPM prior to the firing of any of the engines that shall describe the process to be followed during the commissioning of each engine. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, engine tuning activities (such as air/fuel ratio settings, engine timing, turbocharger pressure); the installation, tuning, and operation of the SCR systems and oxidation catalysts; the installation, calibration, and testing of the CO and NO_x continuous emission monitors; and any activities requiring the firing of the IC engines without abatement by their respective abatement devices. None of the engines shall be fired sooner than 28 days after the District receives the commissioning plan.

   (Basis: BACT, Offsets)

2. During the commissioning period, the owner/operator of the EEC shall demonstrate compliance with Condition 6 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:
   a. Firing hours for each engine
   b. Fuel flow rates to each engine
   c. Stack gas nitrogen oxide emission concentrations at P-1 through P-14
   d. Stack gas carbon monoxide emission concentrations at P-1 through P-14
   e. Stack gas oxygen concentrations at P-1 through P-14

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the engines. The owner/operator shall use District-approved methods to calculate heat input rates, NO_x mass emission rates, carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each calendar day. All records shall be retained on site for at least 2 years from the date of entry and made available to District staff upon request.
(Basis: BACT, Offsets)

3. The owner/operator shall install, calibrate, and make operational continuous emission monitors for NO_x, CO and O_2 for each engine prior to first firing of that engine. After first firing of an individual engine, the detection range of the continuous emission monitor for that engine shall be adjusted as necessary to accurately measure the resulting range of CO and NO_x emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.
(Basis: BACT, Offsets)

4. The owner/operator shall operate the facility such that the total number of firing hours of each Engine S-1 through S-14 without abatement of nitrogen oxide and CO emissions by its SCR System and Oxidation Catalyst System shall not exceed 300 hours per engine during the commissioning period. Such operation of S-1 through S-14 without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District Engineering Division and Enforcement and Compliance Division and the unused balance of the 300 firing hours per engine without abatement shall expire.
(Basis: BACT, Offsets)

5. The owner/operator shall use District approved calculation methods to estimate the total mass emissions of NO_x (as NO_2), CO, POC, PM_{10}, and SO_2 that are emitted by Engines S-1 through S-14 and S-15 during the commissioning and facility startup period. These emissions count towards the consecutive twelve-month emission limitations specified in Condition 14. Emission totals shall include emissions during the startup and shutdown of the engines.
(Basis: BACT, Offsets)

6. The owner/operator shall not operate the engines S-1 through S-14 in a manner such that the combined pollutant emissions from these sources will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the engines S-1 through S-14.

NO_x (as NO_2)	3058.4 pounds per calendar day
CO	4033.5 pounds per calendar day
POC (as CH_4)	975.1 pounds per calendar day
Total Particulate Matter	757.8 pounds per calendar day
PM_{10}	757.8 pounds per calendar day
$PM_{2.5}$	757.8 pounds per calendar day
SO_2	79.53 pounds per calendar day

(Basis: BACT, Offsets)

Conditions for the Engines S-1 through S-14 Post Commissioning Period

7. The owner/operator shall ensure that S-1 through S-14 IC Engines are fired on PUC natural gas exclusively. (Basis: BACT for PM_{10}, Cumulative Increase for SO_2)

8. The Owner/operator shall operate each engine such that the heat input rate for each engine S-1 through S-14 is less than or equal to 72.8 MMBtu/hr (HHV, 72.1 MMBtu/hr for Annual Average), averaged over an hour period, including startup/shutdown periods. The owner shall obtain heating value data for the natural gas on a weekly basis from the gas supplier. The weekly heating value data shall be used to calculate a monthly average for heating value that may be used to demonstrate compliance with these conditions. (Basis: BACT, Cumulative Increase)

9. The Owner/operator shall operate each engine such that the heat input rate for each engine S-1 through S-14 is less than or equal to 1730 MMBTU/day per calendar day, including startups/shutdowns. (Basis: Cumulative Increase)

10. The Owner/operator shall operate each engine such that the heat input rate for all engines S-1 through S-14 combined is less than or equal to 4,036,480 MMBTU/yr on a rolling 12-month average basis, including startups/shutdowns. (Basis: Offsets)

11. The owner/operator shall limit the total annual operating hours for engines S-1 through S-14 to 56,000 hours. (Basis: Offsets, Cumulative Increase)

12. The owner/operator shall properly operate and maintain the A-1 to A-14 Selective Catalytic Reduction (SCR) Systems, except as provided during the Commissioning Period, whenever fuel is combusted at the corresponding source S-1 through S-14, respectively, and the individual catalyst bed has reached minimum operating temperature specified by the abatement device manufacturer. The owner/operator shall not inject ammonia into the SCR units (A-1 through A-14) until the catalyst bed reaches the minimum operating temperature specified by the abatement device manufacturer (Basis: BACT for NO_x).

13. The owner/operator shall ensure that the cumulative combined emissions from S-1 through S-14 Engines and S-15 do not exceed the following limits during any consecutive twelve-month period, including emissions generated during engine startups and shutdowns:
    54.35 tons of NO_x (as NO_2) per rolling 12 month period;
    84.45 tons of CO per rolling 12 month period;
    76.11 tons of POC (as CH4) per rolling 12 month period;
    21.40 tons of PM_{10} per rolling 12 month period; and
    21.40 tons of $PM_{2.5}$ per rolling 12 month period; and
    6.63 tons of SO_2 per rolling 12 month period.
    (Basis: Offsets, Cumulative Increase)

14. The owner/operator shall comply with requirements (a) through (e) below under all operating scenarios, except during an engine start-up or shutdown. (Basis: BACT)

(a) The nitrogen oxide concentration at each point P-1 through P-14 shall not exceed 5 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for NO_x)
(b) The carbon monoxide concentration at each point P-1 through P-14 shall not exceed 13 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for CO)
(c) Total Particulate Matter, PM_{10}, and $PM_{2.5}$ emissions determined from the average of all engines tested shall not exceed 0.03 g/bhp-hr or 0.011 lb/MMBtu. Total Particulate Matter, PM_{10} and $PM_{2.5}$ emissions from each engine S-1 through S-14 shall not exceed 2.2 lb/hr. All engines subject to particulate source testing shall be tested within a six-week period from the completion of particulate testing on the first engine. The particulate test result for each engine shall be the average of three valid test runs. The particulate test results for all engines tested shall be averaged together and compared to the limit presented in this condition to determine compliance. (Basis: Voluntary Limit, Cumulative Increase)
(d) The POC concentration at each point P-1 through P-14 with the corresponding engine operating at 75% or more of full load shall not exceed 25 ppmv on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for POC)
(e) Ammonia (NH_3) emission concentrations at each point P-1 through P-14 shall not exceed 10 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 3-hour period. The owner/operator shall quantify, by continuous recording, the ammonia injection rate to A-1 through A-14 SCR Systems. The correlation between the engine heat input and the SCR System ammonia injection rates as determined in accordance with Condition 18 shall be used to calculate the corresponding ammonia emission concentration at emission points P-1 through P-14. The facility will notify the Engineering Division Permit Evaluation Manager in writing when any engine operates for 3 consecutive hours at an average calculated ammonia slip rate equal to or greater than 10 ppmvd corrected to 15% O_2 (in addition to any reporting required by District Regulation 1). The notification shall be provided to the District within one week of an engine operating at an average calculated slip rate equal to or greater than 10 ppmvd corrected to 15% O_2. If the parametric monitoring indicates a corresponding ammonia slip of 10 ppm corrected to 15% O_2 for 3 consecutive hours, then the District may require a District approved source test for ammonia slip to demonstrate ongoing compliance and to update the parametric monitoring correlation as necessary. (Basis: Regulation 2, Rule 5)

15. The owner/operator shall demonstrate compliance with Conditions 14 and 15 by using properly operated and maintained continuous monitors during all hours of operation including equipment startup and shutdown periods for all of the following parameters:
(a) Firing Hours and Fuel Flow Rates for each source
(b) Carbon Dioxide (CO_2) or Oxygen (O_2) concentrations, Nitrogen Oxides (NO_x) concentrations, and Carbon Monoxide (CO) concentrations at emission points P-1 through P-14
(c) Ammonia injection rate at A-1 through A-14 SCR Systems
(d) Corrected NO_x concentrations, NO_x mass emissions (as NO_2), corrected CO concentrations, and CO mass emissions at each emission point for every 1-hour period

(e) Total Heat Input Rate for every clock hour
(f) The cumulative total Heat Input (MMBTU) for each calendar day for each engine
(g) Calculate NO_x mass emissions (as NO_2) and CO mass emissions, for each calendar day for each engine, and for the previous consecutive twelve-month period using CEM data.
(h) Calculate the mass emissions of PM-10, POC, and SO_2 for each calendar day for each engine and for the previous twelve-month period using District approved emission factors.
The owner/operator shall record all of the parameters identified in (a) through (c) above every fifteen (15) minutes (excluding normal calibration periods) and shall summarize all of the above parameters in accordance with the relevant permit limits. The owner/operator shall use the parameters measured pursuant to (a) through (c) above and District approved calculation methods to calculate the parameters identified in (d) through (h) above for each engine:
(Basis: 1-520.1, 9-9-501, BACT (except for SO_2), Offsets, Cumulative Increase)

16. Within 136 days of the beginning of the commissioning period for each engine at EEC, the Owner/operator shall conduct a District-approved initial source test for Total Particulate Matter, and POC on the corresponding emission point P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. The Owner/operator shall conduct a District-approved initial source test for SO_2 on one of the fourteen emission points with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: 2-1-411).

17. Prior to the end of the commissioning period, the Owner/operator shall conduct a District and CEC CPM approved source test to establish emissions during startup and shutdown. The source test shall determine NO_x, CO, POC and PM_{10} emissions during cold startup and shutdown of the engines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. Twenty (20) working days before the execution of the source tests, the Owner/operator shall submit to the District and the CEC CPM a detailed source test plan designed to satisfy the requirements of this Condition, including specification of the number of tests. The Owner/operator shall notify the District and the CEC CPM at least seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District within 60 days of the date that source testing is completed at the facility.

18. The owner/operator shall conduct an initial District-approved source test to determine the SCR System ammonia injection rate and the corresponding NH_3 emission concentration at two of the fourteen emission points P-1 through P-14. The source test shall be conducted over the expected operating load range of the engines (including, but not limited to, 75% and 100% load) to establish the ammonia injection rates necessary to achieve NO_x emission limits while maintaining ammonia slip levels. A correlation between NO_x ppmv stack exit concentration, ammonia injection rate, heat input, and ammonia exit concentration shall be established for the two engines that were source tested. The test data shall be used as input for the calculation for the remaining engines. Ongoing compliance shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. (Basis: Regulation 2, Rule 5).

19. The owner/operator shall obtain approval for all source test procedures from the Technical Services Division prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as approved by the Technical Services Division. Twenty (20) working days before the execution of source testing, the Owner/operator shall submit to the District and the CEC CPM a detailed source test plan designed to satisfy the requirements of any of these Conditions, including specification of the number of tests. The Owner/operator shall notify the District at least seven (7) working days prior to the planned source test date. Source test results shall be submitted to the District and the CEC CPM within 60 days of completing the tests.
(Basis: BACT)

20. The owner/operator shall conduct a District approved source test no later than 365 days after than the initial Total Particulate Matter source test. The District approved source test shall determine the NH_3 emission concentration from two of the fourteen emission points to demonstrate ongoing compliance and to verify the parametric monitoring correlation. The District approved source test shall measure the Total Particulate Matter mass emission rate and POC emission concentration at emission points P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: Cumulative Increase, BACT)

21. After completion of the initial source test and the first annual source test, the owner/operator shall conduct a District approved source test on each engine every 8,760 hours of operation or every 3 years whichever comes first. The District approved source test shall determine the NH_3 emission concentration from two of the fourteen emission points to demonstrate ongoing compliance and to verify the parametric monitoring correlation. The District approved source test shall measure the Total Particulate Matter mass emission rate and POC emission concentration at emission points P-1 through P-14 with the corresponding source engine operating at least 80% of full load to determine compliance with these Permit Conditions. (Basis: Cumulative Increase, BACT)

22. The owner/operator shall not allow the maximum projected annual toxic air contaminant emissions from all emission points P-1 through P-14 combined to exceed the following limits:

    1,3-Butadiene 872 pounds per year
    Formaldehyde 11,200 pounds per year

    unless the following requirement is satisfied:

    The owner/operator shall perform a health risk assessment to determine the total facility risk using the emission rates determined by source testing and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. The owner/operator shall submit the risk analysis to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will not result in a significant cancer risk, the District and the CEC CPM may administratively adjust the carcinogenic compound emission limits listed above. (Basis: Regulation 2, Rule 5)

23. Within 136 days of start-up of the facility, the owner/operator shall conduct an initial District-approved source test on one of the fourteen emission points P-1 through P-14 with the corresponding engine operating at least 80% of full load to demonstrate compliance with Condition 22 and to demonstrate that the facility complies with Regulation 2, Rule 5. The initial District approved source test for toxic air contaminants shall quantify the emission rates from one engine of the following compounds: 1,3 Butadiene, Formaldehyde, Acetaldehyde, Benzene, Toluene, Xylene, and Polycyclic Aromatic Hydrocarbons. The toxic air contaminant source test results will be converted into emission factors in units of lb/MMBtu, and the annual firing rates for each of the fourteen engines will be used to calculate annual emissions of toxic air contaminants from the facility. The owner/operator shall use the results of the initial source test for toxic air contaminants to perform a health risk assessment to determine the total facility risk using District approved procedures and unit risk factors.
    (Basis: Regulation 2, Rule 5)

24. The owner/operator shall conduct an additional District approved source test within 3 years of the initial test on one of the fourteen emission points P-1 through P-14 with the corresponding engine operating at least 80% of full load to demonstrate compliance with Condition 22. The toxic air contaminant source test results will be converted into emission factors in units of lb/MMBtu, and the annual firing rates for each of the fourteen engines will be used to calculate annual emissions of toxic air contaminants from the facility.
    (Basis: Regulation 2, Rule 5)

Conditions for S-15 Emergency Standby Generator at all times

25. Operation of S-15 for reliability-related activities is limited to 50 hours per year. (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(2)(A)(3).)

26. The owner/operator shall operate engine S-15 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 hours 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, 17 C.C.R. § 93115(e)(2)(A)(3).)

27. The owner/operator shall operate engine S-15 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, 17 C.C.R. § (e)(4)(G)(1).)

28. 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. 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 of S-15 for reliability-related activities (maintenance and testing).
    b. Hours of operation of S-15 for emission testing to show compliance with emission limits.
    c. Hours of emergency operation of S-15.
    d. For each emergency, the nature of the emergency condition.
    e. Fuel usage for S-15.

    (Basis: Stationary Diesel Engine ATCM, 17 C.C.R. § 93115(e)(4)(I).)

29. At School and Near-School Operation: If S-15 is located on school grounds or within 500 feet of any school grounds, the owner/operator shall not operate it for non-emergency use, including maintenance and testing, during the following periods:
    a. Whenever a school-sponsored activity is taking place at the school (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, 17 C.C.R. § 93115(e)(2)(A)(1).)

Brian Lusher

From: Brian Lusher
Sent: Monday, July 16, 2007 9:28 AM
To: 'Chris Gallenstein (E-mail) ' (E-mail)
Subject: Eastshore Permit Particulate Concepts

Chris,

Please give us your comments on the following concepts:

1) Is a numerical g/bhp-hr, lb/hr, lb/MMBtu BACT limit for particulate mandatory. Or can the applicant accept a more reasonable limit and have BACT remain PUC quality natural gas and good combustion practice.

2) What do you think about a lb/hr limit for particulate only for all fourteen engines combined (equivalent to 0.03 g/bhp-h Compliance would be demonstrated by testing all fourteen engines periodically with a condition that the engines need tc tested as close together as possible.

3) What do you think about the units of the permit limit (g/bhp-hr, lb/hr, lb/MMBtu) for particulate.

If you have questions, then give me a call.

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Brian Lusher

From: Brian Lusher
Sent: Thursday, July 26, 2007 10:58 AM
To: 'Chris Gallenstein (E-mail) ' (E-mail); Brewster Birdsall (E-mail)
Subject: Proposed Particulate Limit

Gentleman,

District staff had a meeting with the applicant and Wartsilla yesterday. Wartsilla presented data showing that some of engines (16 and 20 cylinder models very simular to the Eastshore engines) would not be able to meet the proposed pe limit.

The District has requested as much of this data as the company can give us.

As for now we have no agreement on what a permit limit should be.

The numerical BACT argument does looks weak for this source category.

The diesel engine comparison is also not entirely fair since the certifications for diesel engines are based on ISO 8178 methods which are comparable to M5 filterable data with no back half. In fact if M5 with backhalf was used to measure PM from diesel engines the results would be 2 to 4 times higher based on a study by CARB.

I have contacted Nevada and the Barrick site was scheduled to be tested in July, with data available 60 days later.

Wartsilla is claiming that the Nevada data is lower than other engine sites and has less variablity. The Colorado data is much higher and this may be due to gas quality issues. I believe the Western 102 data is the most representative of a simular facility operating in CA. The company is also concerned about the precedence that our approach would set for single engine plants or facilities installing much less than 14 engines.

I will keep you posted on this issue...

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Brian Lusher

From: Brian Lusher
Sent: Wednesday, October 10, 2007 5:33 PM
To: 'Dr. Alvin Greenberg'
Subject: RE: response to Toth -2

Dr. G,

Attached are my response to Mr. Toth and my response to the form letter. Neither has been mailed out and both are currently under management review.

As far as TAC testing goes. Keep in mind that PAH testing is the real burden. It requires 3 x 3 hour runs, and there is usually time needed to set up between runs.

I sent you the formaldehyde data with some statistical analysis and that data showed the mean and the std deviation were on the same order of magnitude. One engine was high and would cause problems since it is so different than the other engines and not within one std dev of the mean.

You may want to consider testing some number of engines and using that data to estimate cancer risk and hazard indices. If the results were not near the ten in a million or hazard indices near 1 level, then no more testing. You also could consider having statistical screening combined with some risk criteria.

I will keep thinking about this issue and let you know if I can come up with anything better.

I will definitely enjoy your response to Mr. Toth's comments.

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

-----Original Message-----
From: Dr. Alvin Greenberg [mailto:agreenberg@risksci.com]
Sent: Wednesday, October 10, 2007 5:22 PM
To: 'Matthew Layton'; 'Keith Golden'; bbirdsall@aspeneg.com; Brian Lusher
Subject: response to Toth -2

I have previously sent you my draft response 1 addressing the EFs and Acrolein. Here now is response 2 addressing PM2.5 and cancer.
I look forward to your comments and suggestions on both responses. (I have also attached response 1 for your convenience.)
Thanks,
Alvin

Dr. Alvin Greenberg
Risk Science Associates

121 Paul Dr., Suite A
San Rafael, CA 94903
office 415-479-7560
cell 415-302-0438

October, 2007

Subject: **Preliminary Determination of Compliance**
Eastshore Energy Center
Application No. 15195

Dear :

The Bay Area Air Quality Management District (District) has received your comments regarding the District's Preliminary Determination of Compliance (PDOC) for the proposed project.

The District has considered your comments, along with other comments that were submitted, and has made a final determination that the proposed project meets the requirements of the District's Risk Management Rule (Reg. 2 Rule 5) and meets all other applicable District Regulations as well as applicable State and Federal regulatory requirements. The District will continue to participate in the California Energy Commission licensing process to ensure that the project will have no significant air quality impact to Hayward or the Region.

The public comments received on the Preliminary Determination of Compliance are addressed below.

Comment Category 1: Proposed Project located in a non-attainment area.

Commenters stated that the Region is not in attainment of the State and Federal Ambient Air Quality Standards and that it would not be appropriate to add new sources of air pollution.

Response to Comment Category 1

Currently, the Bay Area is designated as "attainment" for CO, NO2, SO2, and lead, which means that the air quality in the Bay Area meets federal and state standards for those pollutants. The Bay Area is designated as "non-attainment" for the state and federal ozone standards and for the state standards for fine particulate matter (PM10 and PM2.5). New, more stringent federal standards for fine particulate matter have recently been adopted, but EPA has not yet made a designation for the Bay Area for those standards.

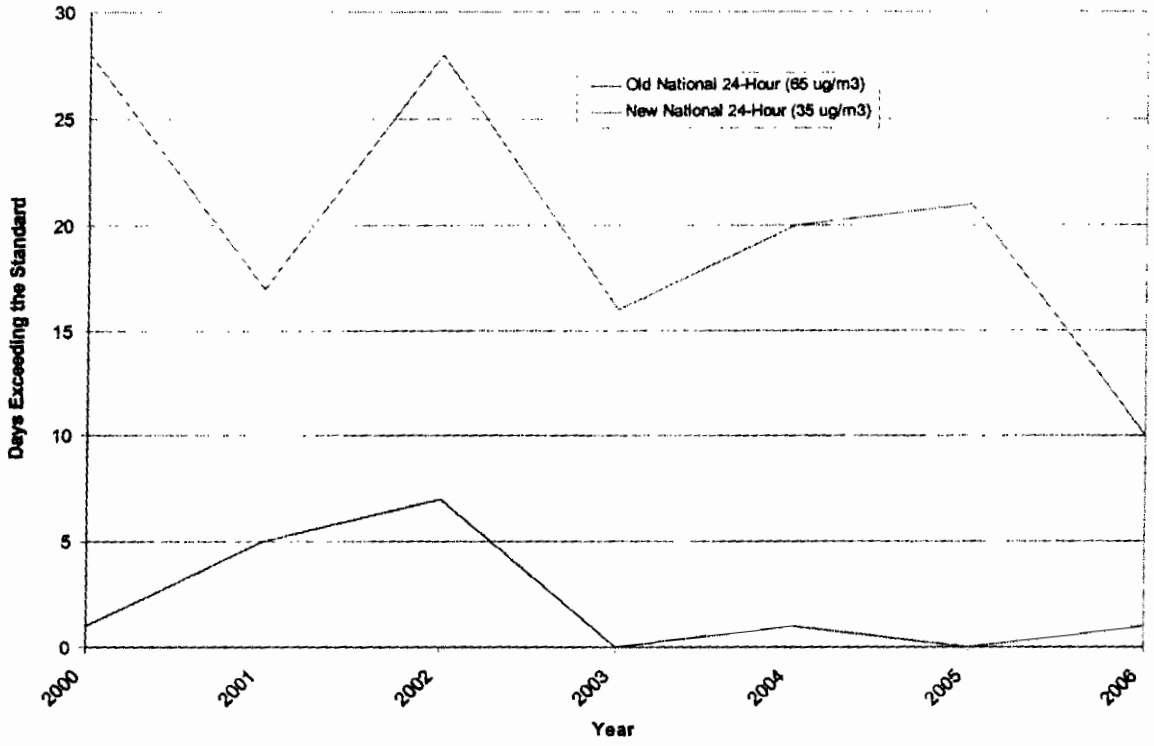
These air quality standards apply to the Bay Area as a whole. Thus, the fact that Hayward may be in an "attainment" area or a "non-attainment" area for a given pollutant does not mean that the air quality in Hayward is any better or worse than anywhere else in the Bay Area, and does not mean that the proposed project will have any greater or lesser impacts on air quality if it is operated in Hayward as opposed to any other location in the Bay Area.

The fact that the Bay Area is designated as "non-attainment" for certain pollutants does not mean that no new projects can be built. The District does not prohibit all new projects as a result of a "non-attainment" designation. Instead, the District requires new projects – including the proposed Eastshore Energy Center – to incorporate strict air pollution controls to ensure that emissions are minimized, and also requires new sources of emissions to be "offset" by shutting down older sources of emissions so that there is no net increase as a result of the new project. This process ensures that regional emissions will continually be reduced in order to bring the region into "attainment" for all regulated pollutants.

The District's regulatory system has a good track record in this regard. Air quality in the Bay Area has been improving over time as shown in Figures 1, 2 and 3. The region still faces challenges in meeting the air quality standards for ozone and fine particulate matter, and the District is continuing to develop strategies for the region to achieve compliance with these standards. The latest information is available on our website (www.baaqmd.gov) under the following topics:

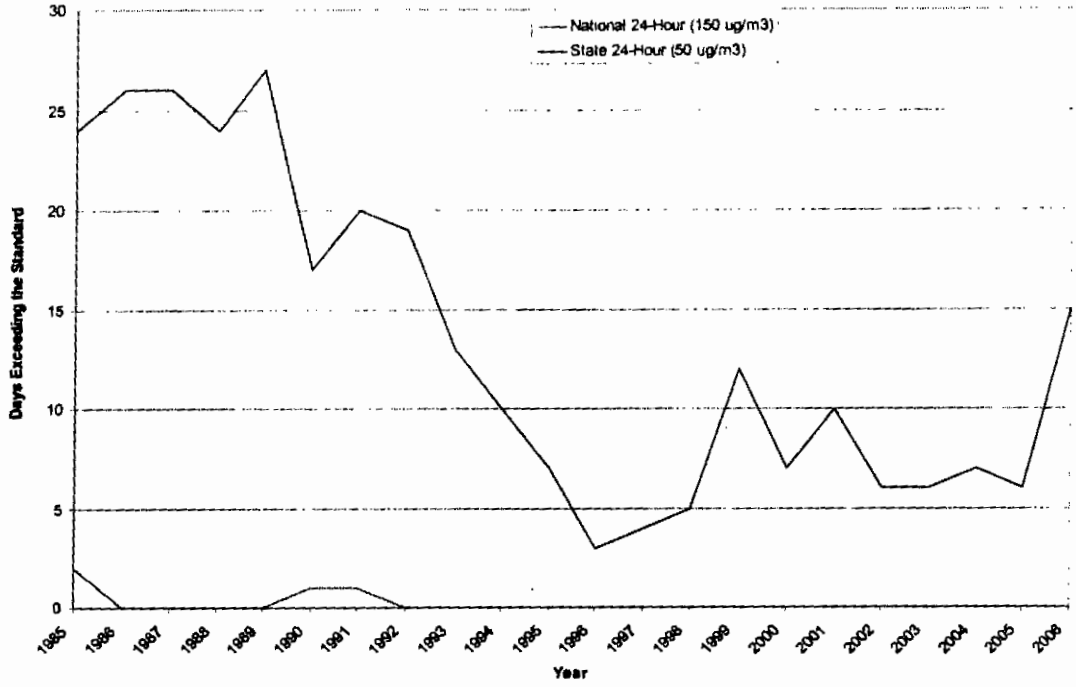
BAAQMD - Bay Area Ozone Strategy
BAAQMD - Particulate Matter

PM2.5 Particulate Matter Bay Area Historical Exceedances

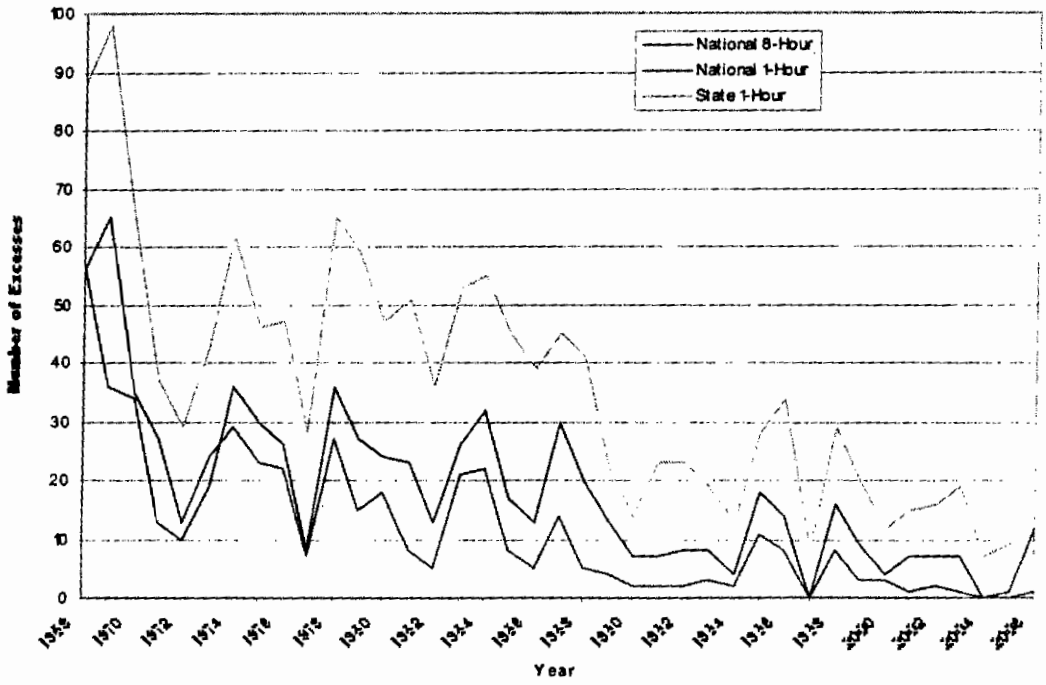


Notes:
On December 18, 2006, the USEPA lowered the national 24-hour PM2.5 standard to 35 micrograms per cubic meter.

PM10 Particulate Matter Bay Area Historical Exceedances



O3 Ozone Bay Area Historical Exceedances



Notes:
National 1-hour ozone standard was revoked on June 15, 2005.
On May 17, 2005, the California Air Resources Board implemented a new 8-hour ozone standard of 0.070 ppm, which was exceeded on 22 days in 2006 in the Bay Area.

Comment Category 2: Public Health Impacts due to proposed facility.

Commenters stated concerns over emissions of Toxic Air Contaminants from the proposed project and the Russell City Energy Center. Commenters were also concerned regarding proposed project impacts on asthma and health for nearby members of the community.

Response to Comment Category 2

The District takes very seriously the health concerns raised by the commenters. There are a number of health problems that can be caused or exacerbated by air pollution, and the District is committed to improving air quality and public health in all communities throughout the Bay Area.

As shown in the FDOC the District performed a Health Risk Screening Assessment for the project and the results were in compliance with the District Rule 2, Regulation 5 requirements. The results of the Health Risk Assessment were below the significance criteria for cancer risk, chronic health impacts, and acute non-cancer health impacts. The District review shows that the emissions from the proposed facility will not cause a significant impact on public health in the community. The District also performed a Heath Risk Screening Assessment for the Russell City Energy Center that shows that facility will not cause a significant impact on public health in the community.

Asthma and Health

With respect to asthma specifically, California Energy Commission staff examined the potential for asthma impacts in its Preliminary Staff Assessment and found that the proposed project would not cause a significant impact on asthma and public health in the community. The District reviewed this assessment and concurs in its conclusions. The Preliminary Staff Assessment is available at the Energy Commission website, and at the Hayward Public Library.

Comment Category 3: Cumulative Impact of proposed project, Russell City Energy Center and other existing sources of air pollution in the West Hayward area.

Commenters stated concerns regarding the cumulative impact of the proposed project, the Russell City Energy Center, and other existing air pollution sources in the surrounding community.

Response to Comment Category 3

The potential for cumulative impacts on air quality has been addressed through the CEC licensing process that is equivalent to the California Environmental Quality Act ("CEQA") environmental impact review process. Because the proposed project is a power plant that will be licensed by the CEC, the CEC has taken the lead for this project for purposes of conducting the environmental review. The CEC's staff has completed a detailed review of the potential impacts in its Preliminary Staff Assessment, and found that after mitigation measures are implemented there will be no significant cumulative impacts. The District supports the CEC's analysis and incorporates it by reference.

Comment Category 4: Proximity of the proposed project to nearby schools and residents.

Commenters expressed concern regarding the land use of the proposed site and its proximity to nearby schools and residents.

Response to Comment Category 4

Local land-use determinations and decisions about where to site power plants are made by the City of Hayward and the California Energy Commission, not by the District. The District's role is to evaluate the potential air quality impacts of a proposed project and determine whether the project will comply with air quality regulations. The District has done so and has determined that the proposed project will comply, as explained in the Determination of Compliance. In doing so, the District evaluated the potential for impacts on neighboring schools and residents.

Comment Category 5: Use of District Monitoring Network for Ambient Air Quality at Project Site.

Commenters stated a concern that the District does not currently have an ambient air monitoring station in the specific project area and the baseline ambient air quality data from the District air monitoring network may not be representative of air quality in the project area.

Response to Comment Category 5

The District's extensive air monitoring network provides a very good picture of ambient air quality conditions at the proposed project's location. The District currently operates 30 air monitoring stations throughout the 9 Bay Area counties, and meets or exceeds all monitoring requirements established by the California Air Resources Board and the US Environmental Protection Agency. The data produced by the District's air monitoring network and meteorological monitoring network is representative of the conditions in Hayward and the East Bay area.

The District does not place an air monitoring station in every single community throughout the Bay Area because to do so would be very costly and is not necessary to measure ambient air quality accurately. Monitoring stations have expensive capital costs and the equipment requires a specialist to operate and maintain the station. There is no need for additional stations beyond what the District already has in its extensive monitoring network in order obtain a representative picture of ambient air quality for a given area, and the costs of doing so would not be justified.

Comment Category 6: Use of Emission Reduction Credits to comply with District Rules and Regulations and to mitigate project impacts.

Commenters stated a concern that Emission Reduction Credits allow the facility to violate or bypass Air Quality Rules and Regulations, and that the use of Credits was not appropriate, nor an effective form of mitigation.

Response to Comment Category 6

The commenters are incorrect that the use of Emission Reduction Credits allows a facility to violate or bypass Air Quality rules and regulations.

The use of Emission Reduction Credits is the second step in a two-step process to ensure that air pollution is minimized and reduced in the Bay Area. The first step requires that all new projects meet strict regulations to minimize emissions. All new projects that will emit over 10 pounds per highest day of NOx, POC, CO, PM10, or SOx must use the Best Available Control Technology ("BACT") to reduce emissions to the maximum feasible extent. Then, once a project has minimized its emissions as much as feasible, the second step requires that any remaining emissions that cannot be minimized must be "offset" by the use of Emission Reduction Credits to ensure that there is no net emissions increase overall as a result of the new project. Thus, the use of Emission Reduction Credits does not circumvent air quality regulations, it is an integral part of the air quality regulations. In fact, this system is required by the California Clean Air Act.

The use of Emission Reduction Credits – also known as "Emissions Banking" – has worked to improve air quality in the Bay Area, in other parts of California, and on a national level. In California, ozone levels have been reduced in many areas in part because of Emissions Banking. On a national and international level, Emissions Banking has helped to reduce acid rain in the Northeast and in Canada.

Emissions Reduction Credits are generated by closing sources down or by reducing emissions from sources beyond what air quality regulations require. The District maintains a "bank" of Emissions Reductions Credits generated by such reductions, from which new projects must obtain Credits to offset their emissions. A facility wanting to bank its emissions reductions must submit a Banking Application to the District. The Application is evaluated by an engineer to determine the quantity of emissions reductions that may become Emission Reduction Credits. The total emissions reductions from the closure of a facility may be significantly higher than the quantity that may become Emissions Reduction Credits.

District regulations require the proposed project to obtain offsets for its NOx and POC emissions because the facility will emit greater than 35 tons per year of those pollutants. The proposed facility will be required to offset its NOx and POC emissions at a ratio of 1 to 1.15, meaning that for every ton emitted the facility will have to provide 1.15 tons of Emissions Reduction Credits. NOx and POC are both ozone precursors, and District regulations allow POC offsets to be used interchangeably for NOx. The proposed facility will be required to provide the Emissions Reduction Credits before the District issues the Authority to Construct for the project.

Additional information on Emissions Banking and Emission Reduction Credits may be found on the District website (www.baaqmd.gov) under the following topic: BAAQMD - Emissions Banking

Comment Category 7: Adequacy of Emissions Estimates for Wartsila Engines.

Commenters stated that Wartsila emissions information was used by the District to estimate emissions from the engines, and this was not appropriate since the company would benefit from the sale of these proposed engines. Commenters stated that adequate independent emissions testing had not been conducted for this specific Wartsila engine. Commenters stated that Wartsila emissions information was not compared to independently gathered emissions data. Commenters stated that emissions factors for Toxic Air Contaminants were not representative of the Wartsila engines proposed for use at the Eastshore Energy Center.

Response to Comment Category 7

The District based its estimates of emissions from the proposed project on reliable data from the testing of similar engines to the ones that will be used at the proposed project. The first section below outlines the data the District relied on for emissions of "criteria pollutants", which are pollutants that are not normally significant when emitted by a single facility, but which may become significant when emitted by a large number of sources and combine to impact ambient air quality over a large area. The second section outlines the data the District relied on for Toxic Air Contaminants ("TACs").

Criteria Pollutants

For criteria pollutants, the District relied primarily on independent testing conducted on similar engines at six other facilities, as explained in the FDOC. These tests were conducted by EPA-certified independent testing contractors to demonstrate that each engine could meet its permit limits. The data from these tests provide a good basis from which to estimate emissions from the proposed project.

The District considers all available information about emissions, and did review data supplied by Wartsila, the manufacturer of the engines. This was not the only information the District considered, as noted above. But even so, the District does not simply rely on the emissions estimates it develops for a proposed project, it incorporates them into the permits it issues as enforceable conditions. Here, the proposed project will be required to demonstrate that its emissions are no more than the estimated amounts, and will be subject to enforcement action if it exceeds the limits.

Toxic Air Contaminants

To estimate emissions of TACs from the proposed project, the District used published emission factors from the Califomia Air Resources Board, called CATEF factors. These emissions factors are based on source testing conducted in the early 1990s on two natural gas fired engines similar to the ones that will be used at the proposed project. The CATEF factors provide a conservative estimate of emissions from the proposed project for several reasons. First, emissions from newer engines are typically much lower than for the older models used in determining the CATEF factors. Second, the engines used in determining CATEF factors were not equipped with an oxidation catalyst, which reduces emissions of organic TACs. The engines at the proposed project will be equipped with an oxidation catalyst.

To confirm further that the CATEF factors provide a conservative estimate of emissions from this project, the District compared the CATEF factors with data from tests on existing Wartsila

engines for emissions of formaldehyde. Formaldehyde is one of the most important TACs from the proposed project because it is the second-highest cancer risk driver. Together with 1,3-Butadiene, these TACs account for over 90% of the total calculated cancer risk from the proposed facility. All 14 engines at the Nevada facility that uses Wartsila engines were tested for formaldehyde emissions, and in every case emissions were well below the CATEF factors. As shown below, the highest test result was less than half of the CATEF factor (adjusted for a 40% abatement efficiency) and the average result was an order of magnitude less than the CATEF factor (adjusted for a 40% abatement efficiency). These results further confirm that the CATEF factors provide conservative estimates of emissions from the proposed facility and are appropriate for use in evaluating TAC emissions and associated impacts.

Source	**Emission Factor lb/MMBtu**
CATEF	0.00462 No Oxidation Catalyst
Emission Factor for Health Risk Assessment	0.00462 x 0.6 = 0.00277
Nevada AVG	0.000277
Nevada MAX	0.0012

Notes: Oxidation Catalyst Reduction Efficiency = 40%
Nevada AVG = Average of all 14 Engines
Nevada MAX = Maximum Engine

Finally, the District will require the applicant to test an engine for all TACs of concern once the project is built, and to use the results to rerun the Health Risk Screening Assessment to demonstrate that the facility complies with the District's Risk Management Rule. This requirement will alleviate any potential concerns about whether the estimates the District used are sufficiently accurate.

In addition, each Wartsila engine will be equipped with a Continuous Emission Monitor for Carbon Monoxide. Carbon Monoxide and Organics are formed in the combustion process due to incomplete combustion. An engine with high carbon monoxide emissions would also have high organic emissions and a portion of the organic emissions are TAC. The Environmental Protection Agency is currently promulgating a regulation to reduce Hazardous Air Pollutants from large internal combustion engines. The EPA background information supporting this draft rule states that the agency has determined that Non Methane Hydrocarbons, carbon monoxide, and formaldehyde are good surrogates for all Hazardous Air Pollutant emissions from internal combustion engines. The continuous monitoring for carbon monoxide allows the District to determine if an engine is emitting high quantities of incomplete combustion products and whether the oxidation catalyst is working correctly.

Comment Category 8: Global Warming Impacts.

Commenters were concerned that the plant would emit green house gases that contribute to global warming.

Response to Comment Category 8

The proposed facility will burn fossil fuel and therefore will emit greenhouse gases that contribute to global climate change. The facility will burn natural gas, however, which is the cleanest burning and least carbon-intensive fossil fuel. In addition, a significant number of California's electric generating stations are over 30 years old, and a new facility is much more efficient than these older units. New facilities require less fuel per Megawatt of energy produced. The California Air Resources Board is developing an implementation strategy for Assembly Bill 32, which the governor signed into law last year. District staff will be working with the Air Resources Board in reducing emissions of green house gases in the Bay Area to meet the requirements of Assembly Bill 32. Additional information regarding greenhouse gas emissions from the proposed facility may be found in the California Energy Commissions Preliminary Staff Assessment.

Comment Category 9: Potential Environmental Justice Impacts.

Commenters raised issues relating to environmental justice due to the proposed project and the Russell City Energy Center.

Response to Comment Category 9

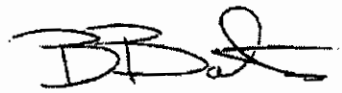
The District is committed to implementing its permitting programs in a manner that is fair and equitable to all Bay Area residents regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location in order to protect against the health effects of air pollution. The District has worked to fulfill this commitment in making its Determination of Compliance for the proposed project.

The District and the CEC have undertaken a detailed review of the potential public health impacts of the emissions associated with the proposed facility, and have found that after mitigation measures are implemented the project emissions will not have a significant impact on public health or air quality in the community. Since there will be no significant air-quality related impact, by definition there cannot be a significant impact on an environmental justice community.[1]"

If you have any additional questions, please contact Mr. Brian Lusher at blusher@baaqmd.gov or (415) 749-4623.

Thank you for your comments.

Very truly yours,



Brian F. Bateman
Director of Engineering
Engineering Division

BFB:BKL

[1] The commenters did not provide any specific information about any racial, ethnic, or economic characteristics about the area in which the proposed project would be located, which would be needed to determine whether the area is an environmental justice community. Because the District has determined that the proposed project would not have any significant adverse impacts, it necessarily follows that there can be no significant environmental justice impacts no matter what the exact characteristics of the area are. The District has therefore concluded that the proposed project does not implicate environmental justice concerns without adopting a position on whether the project is located in an environmental justice community.

October 4, 2007

Mr. Michael Toth
2511 Bradford Avenue
Hayward, CA, 94545

Subject: **Preliminary Determination of Compliance**
Eastshore Energy Center
Application No. 15195

Dear: Mr. Toth

The Bay Area Air Quality Management District (District) has received your comments regarding the District's Preliminary Determination of Compliance (PDOC) for the proposed project.

The District has considered your comments, along with other comments that were submitted, and has made a final determination that the proposed project meets the requirements of the District's Risk Management Rule (Reg. 2 Rule 5) and meets all other applicable District Regulations as well as applicable State and Federal regulatory requirements. The District is therefore issuing its Final Determination of Compliance (FDOC) and submitting it to the California Energy Commission (CEC) for use in its licensing process. The FDOC will be available on the CEC website. The District will continue to participate in that process to ensure that the project will have no significant air quality impact to Hayward or the Region.

In your email dated June 1, 2007 you stated numerous concerns regarding data quality issues and documentation of the CATEF emission factors used to estimate emissions from the project.

In order to estimate emissions from the project the District reviewed the available emissions data for this source category. The CATEF emission factors were the best and most representative emissions data available for this source category. The database states that they are for natural gas fired lean burn engines over 650 hp. The District requested the original test reports from a source test of a 1000 hp engine and a source test of a 5,500 hp engine that are the basis of the CATEF database and was not able to obtain this information.

The District also reviewed the Ratings for the CATEF emission factors. The Code 3 Rating indicates that the documentation in the original test report was not adequate to validate the test results. It is unknown exactly what was missing from the final test report that would cause a low rating of the data.

The District agrees the data set for certain compounds shows significant variation. This could be caused by one of the engines being tested being older than the other engine being tested. In addition, when testing for toxic air contaminants the measurements may be near the analytical detection limit and you may have a single test run below the detection limit and a run above the detection limit. The District does not have the original report to make a conclusion about some of the causes of the variation. The result of the source test is the average of three valid test runs. The maximum presented in the CATEF database is the highest test run from either engine tested.

The District considers the CATEF mean emission rate to be conservative since the engines tested were older than brand new engines. The engines tested were most likely built in the 1970's, 1980's, or 1990's, as the tests were conducted in the early 1990's, and the engines from this era had much higher emissions of criteria pollutants and toxic air contaminants. Carbon monoxide emissions and organic emissions from older engines are considerably higher than new engines equipped with Best Available Control Technology. Carbon Monoxide and organic emissions from older engines could be well over 100 ppm and often into the hundreds of ppm. The concentration limits for carbon monoxide and precursor organic compounds from the Wartsila engines are significantly lower. High toxic air contaminant emission rates typically correspond to high organic and carbon monoxide emission rates. In addition, the Wartsila engines are controlled by Toxics Best Available Control Technology for the source category. The oxidation catalyst on each engine will reduce the amount of organic based toxic air contaminants emitted from each engine.

The District attempted to obtain toxic air contaminant emissions data from similar facilities located in California and particularly the twin facility in Nevada. The only data available was for the twin facility in Reno, Nevada. The data was only for formaldehyde which is the second highest cancer risk driver based on the CATEF emission factor data and the health risk screening assessment results. The Nevada data shows that for formaldehyde the emission factor used by the District for each engine is conservative. The District used the CATEF formaldehyde factor and assumed an abatement efficiency of 45%. The resulting emission rate from each engine is 0.2 lb/hr of formaldehyde. The average from all fourteen Reno engines was 0.0198 lb/hr. The maximum average of three runs from one higher emitting engine was 0.0877 lb/hr. The data further suggests that Wartsila engines actually emit lower levels of toxic air contaminants than that predicted by the conservative CATEF emission factors.

In addition, each Wartsila engine will be equipped with a Continuous Emission Monitor for Carbon Monoxide. Carbon Monoxide and Organics are formed in the combustion process due to incomplete combustion. An engine with high carbon monoxide emissions would also have high organic emissions and a portion of the organic emissions are TAC. The Environmental Protection Agency is currently promulgating a regulation to reduce Hazardous Air Pollutants from large internal combustion engines. The EPA background information supporting this draft rule states that the agency has determined that Non Methane Hydrocarbons, carbon monoxide, and formaldehyde are good surrogates for all Hazardous Air Pollutant emissions from internal combustion engines. The continuous monitoring for carbon monoxide allows the District to determine if an engine is emitting high quantities of incomplete combustion products and whether the oxidation catalyst is working correctly.

The District and CEC will require toxics air contaminant testing if the proposed facility is licensed by the CEC. The results of the testing will be used to perform a new health risk screening assessment for the facility that must continue to comply with Regulation 2, Rule 5 requirements.

The District considers the health risk screening assessment prepared for the project to be representative of the potential air toxic related impacts due to this project. The results for cancer risk are significantly less than the 10 in a million significance threshold. Emissions of the risk drivers would need to increase by a factor of two to move the cancer risk towards the ten in a million significance threshold.

In CEC proceedings, questions regarding the PDOC, and in your comment email you mentioned the 2002 Pope study showing fine particulate matter causing potential cancer impacts due to relatively low concentrations of fine particulate matter. The health risk screening assessment does consider particulate matter compounds such as polycyclic aromatic hydrocarbons that have cancer potency values and reference exposure levels. At the present time there are no generic cancer potency values and reference exposure levels for fine particulate matter so there is no way to include it in the health risk assessment. The health risk assessment prepared for this project was conducted in accordance with all District requirements.

Thank you for your comments.

Sincerely,

Brian K. Lusher
Air Quality Engineer II

BKL:BKL

Brian Lusher

From: Brian Lusher
Sent: Wednesday, June 13, 2007 3:50 PM
To: 'Dr. Alvin Greenberg'
Subject: RE: Condition of Certification

Alvin,

Looks good.

Only one comment. Does propylene require an additional test or can the lab measure it with one of the other methods?

I have several years stack testing experience, but do not recall.

Brian

-----Original Message-----
From: Dr. Alvin Greenberg [mailto:agreenberg@risksci.com]
Sent: Wednesday, June 13, 2007 3:37 PM
To: Brian Lusher
Subject: RE: Condition of Certification

Brian,
Thanks so much for the quick turnaround. I have limited the testing of TACs to those included in the HRA plus the criteria pollutants. Take a quick look at this version.
-Alvin

Dr. Alvin Greenberg
Risk Science Associates
121 Paul Dr., Suite A
San Rafael, CA 94903
office 415-479-7560
cell 415-302-0438

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC HEALTH-1 The project owner shall, within one year of starting commercial operations, provide the results of a source test and human health risk assessment (HRA) to the Compliance Project Manager (CPM). The source test and human health risk assessment shall be conducted according to protocols reviewed and commented on by the Bay Area Air Quality Management District and reviewed and approved by the CPM, and shall be submitted to the CPM not less than 120 days prior to the one-year anniversary of starting commercial operations. The source test and HRA shall include the quantitative analysis and assessment of all criteria air pollutants and all toxic air contaminants assessed in the AFC's and staff's health risk assessments, including speciation of all PAHs emitted in the gaseous and particulate phases. The source test results and human health risk assessment shall confirm that the theoretical maximum cancer risk at the point of maximum impact is less

than 10 in one million.

Verification: At least 120 days prior to the one-year anniversary of starting commercial operations, the project owner shall provide a copy of the source test and human health risk assessment protocols to the BAAQMD for review and comment and to the CPM for review and approval. Not less than thirty (30) days after the source test has been completed or not later than one year after the date of starting commercial operations, whichever is sooner, the project owner shall provide the final source test results and the human health risk assessment to the BAAQMD for review and comment and to the CPM for approval.

From: Brian Lusher [mailto:blusher@baaqmd.gov]
Sent: Wednesday, June 13, 2007 3:05 PM
To: Dr. Alvin Greenberg
Subject: RE: Condition of Certification

Alvin,

Attached is an initial proposed source test matrix that will be the basis for my revised conditions. The District is looking at a more extensive initial test and then testing for the risk drivers on an ongoing basis.

The condition for certification should narrow down the list of toxics to be tested for otherwise (metals might need to be included or any of the 189 HAPs).

On the verification wording I would recommend that protocols need to be submitted within 120 days of the year anniversary to allow time for review, the testing, and the risk screen.

Otherwise looks good.

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Brian Lusher

From: Brian Lusher
Sent: Wednesday, June 13, 2007 3:05 PM
To: 'Dr. Alvin Greenberg'
Subject: RE: Condition of Certification

Alvin,

Attached is an initial proposed source test matrix that will be the basis for my revised conditions. The District is looking at a more extensive initial test and then testing for the risk drivers on an ongoing basis.

The condition for certification should narrow down the list of toxics to be tested for otherwise (metals might need to be included or any of the 189 HAPs).

On the verification wording I would recommend that protocols need to be submitted within 120 days of the year anniversary to allow time for review, the testing, and the risk screen.

Otherwise looks good.

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

-----Original Message-----
From: Dr. Alvin Greenberg [mailto:agreenberg@risksci.com]
Sent: Wednesday, June 13, 2007 2:46 PM
To: Brian Lusher
Subject: Condition of Certification
Importance: High

Brian,
Can you review this language and get back to me today with your input?
Thanks,
Alvin

Dr. Alvin Greenberg
Risk Science Associates
121 Paul Dr., Suite A
San Rafael, CA 94903
office 415-479-7560
cell 415-302-0438

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC HEALTH-1 The project owner shall, within one year of starting commercial operations, provide the results of a source test and human health risk assessment (HRA) to the Compliance Project Manager (CPM). The source test and human health risk assessment shall be conducted according to protocols reviewed and commented on by the Bay Area Air Quality Management District and reviewed and approved by the CPM. The source test and HRA shall include the quantitative analysis and assessment of all criteria air pollutants and toxic air contaminants, including speciation of all PAHs emitted in the gaseous and particulate phases. The source test results and human health risk assessment shall confirm that the theoretical maximum cancer risk at the point of maximum impact is less than 10 in one million.

Verification: At least 60 days prior to the one-year anniversary of starting commercial operations, the project owner shall provide a copy of the source test and human health risk assessment protocols to the BAAQMD for review and comment and to the CPM for review and approval. Not less than thirty (30) days after the source test has been completed or not later than one year after the date of starting commercial operations, whichever is sooner, the project owner shall provide the final source test results and the human health risk assessment to the BAAQMD for review and comment and to the CPM for approval.

Toxic Air Contaminant Test Matrix for Eastshore Energy Center (Initial Test)

Compound	Method	Cancer Risk at Worker
1,3 Butadiene	ARB 422	2.2 E-6
Formaldehyde	ARB 430	1.0 E-6
Acetaldehyde	ARB 430	5.3 E-8
Benzene	ARB 410A	2.2 E-7
Toluene		Not Identified as a Carcinogen
Xylene		Not Identified as a Carcinogen
Polycyclic Aromatic Hydrocarbons	ARB 429	1.0 E-8 (as Benzo(a)pyrene) 3.0 E-8 (Napthalene)
Sum Cancer Risk in Table		3.51 E-6
Total Cancer Risk All Compounds		3.54 E-6

Notes: Propylene included in CATEF list of compounds and based on the CATEF factor the facility emissions are 1.28 E 4 lb/yr compared to a Chronic Trigger Level of 1.2 E 5 lb/yr. Since the emissions estimate is significantly lower than the trigger level no additional testing for propylene will be required.

Brian Lusher

From: Brian Lusher
Sent: Thursday, October 18, 2007 3:03 PM
To: Matthew Layton (E-mail)
Subject: HCHO

Western 102
Source Test Result..

Eastshore Energy Center
Plant No. 18041
Application No. 15185
BAAQMD Rev 1, 6/4/07

Test Rasult from Barrick Goldstrike Mines-Western 102 Project AP4911-1364: Units 1-14

Source Test Dates: October 21-23, 2005, November 20-23, 2005
Testing Firm: Air Pollution Testing, Inc.

Unit S2.001					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0090	0.0089	0.0083	0.0087	0.0087	0.35	73.35	0.00012	0.00277
Fuel Use (scfh)					71908	77000			

Unit S2.002					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0054	0.0092	0.0095	0.0080	0.0081	0.35	73.29	0.00011	0.00277
Fuel Use (scfh)					71857	77000			

Unit S2.003					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0093	0.0010	0.0012	0.0038	0.0010	0.35	72.68	0.00001	0.00277
Fuel Use (scfh)					71250	77000			

Unit S2.004					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0190	0.0240	0.0280	0.0237	0.0240	0.35	72.72	0.00033	0.00277
Fuel Use (scfh)					71293	77000			

Unit S2.005					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0180	0.0220	0.0530	0.0303	0.0300	0.35	73.27	0.00041	0.00277
Fuel Use (scfh)					71831	77000			

Unit S2.006					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0230	0.0240	0.0055	0.0175	0.0170	0.35	73.57	0.00023	0.00277
Fuel Use (scfh)					72132	77000			

Unit S2.007					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0220	0.0140	0.0110	0.0157	0.0180	0.35	73.53	0.00022	0.00277
Fuel Use (scfh)					72089	77000			

Unit S2.008					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0490	0.0210	0.0140	0.0280	0.0280	0.35	73.35	0.00038	0.00277
Fuel Use (scfh)					71914	77000			

Unit S2.009					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0220	0.0220	0.0052	0.0164	0.0180	0.35	73.56	0.00022	0.00277
Fuel Use (scfh)					72118	77000			

Unit S2.010					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0450	0.0780	0.1400	0.0877	0.0870	0.35	72.28	0.00120	0.00277
Fuel Use (scfh)					70860	77000			

Unit S2.011					Test Report Average	Nevada Permit Limit	Average Firing Rate	Emission Factor	Eastshore Application
Pollutant	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0190	0.0180	0.0140	0.0170	0.0170	0.35	72.78	0.00023	0.00277
Fuel Use (scfh)					71352	77000			

Unit S2.012					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0049	0.0048	0.0027	0.0041	0.0041	0.35	73.22	0.00006	0.00277
Fuel Use (scfh)					71783	77000			

Unit S2.013					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0067	0.0057	0.0052	0.0059	0.0059	0.35	73.60	0.00008	0.00277
Fuel Use (scfh)					72157	77000			

Unit S2.014					Test Report	Nevada	Average	Emission	Eastshore
	Run 1	Run 2	Run 3	Average	Average	Permit Limit	Firing Rate	Factor	Application
Pollutant	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)
HCHO	0.0099	0.0120	0.0095	0.0105	0.0100	0.35	72.54	0.00014	0.00277
Fuel Use (scfh)					71115	77000			

Average All Units

Pollutant	Test Report Average (lb/hr)	Nevada Permit Limit (lb/hr)	Emission Factor (lb/MMBtu)	Eastshore Application (lb/MMBtu)
HCHO	0.02	0.35	0.00027	0.00277

Maximum All Units

Pollutant	Test Report Maximum (lb/hr)	Nevada Permit Limit (lb/hr)	Emission Factor (lb/MMBtu)	Eastshore Application (lb/MMBtu)
HCHO	0.09	0.35	0.0012	0.00277

Maximum Test Run

Pollutant	(lb/hr)	Nevada Permit Limit (lb/hr)
HCHO	0.14	0.35

Eastshore Energy Center
Plant No. 18041
Application No. 15185
BAAQMD Rev 0, 1/25/07

Engine HP: 11660
Max Firing Rate: 72.8 MMBtu

	PM-10 (lb/hr)	PM-10 (lb/MMBtu)	PM-10 (g/bhp-hr)
Vendor Guarantee	2.2	0.0302	0.086
Average of All 14 Tests at Western 102	0.33	0.0045	0.013
Two Highest Engines	0.8	0.0082	0.023
1 lb/hr	1	0.0137	0.039
0.8 lb/hr	0.8	0.0110	0.031
AP-42, Total PM-10	0.73	0.0100	
Tehama County Limit (No Source Test to Verify)	0.51		0.02
SJVAPCD Limit (No Source Test to Verify)	0.75		0.029
Western 102 located outside Reno (Identical Engine Model) Max Firing Rate 78.54 MMBtu/hr	2.59	0.0329	0.101

Unit S2.014	Nevada Permit Limi	Firing Rate	Emission Factor	Eastshore Application	Approximate Approximat	Concentration
Pollutant	(lb/hr)	(MMBtu/hr)	(lb/MMBtu)	(lb/MMBtu)	(g/bhp-hr)	(ppm)
PM/PM10	2.59	78.54	0.0330	0.0337	0.101	
NOx	1.49	78.54	0.0190	0.01913		5.2
CO	2.42	78.54	0.0308	0.03026		13.7
POC	2.42	78.54	0.0308	0.03326		24.0
HCHO	0.35	78.54	0.0045	0.0027		1.850
Fuel Use (scfh)	77000					

Eastshore Energy Center
Plant No. 18041
Application No. 15185
BAAQMD Rev 1, 10/1/07

Test Result from Barrick Goldstrike Mines-Western 102 Project AP4911-1364: Units 1-14

Source Test Dates: October 21-23, 2005, November 20-23, 2005
Testing Firm: Air Pollution Testing, Inc.

HCHO Test Results

	Run 1 (lb/hr)	Run 2 (lb/hr)	Run 3 (lb/hr)	Average (lb/hr)
Unit S2.001	0.0090	0.0089	0.0083	0.0087
Unit S2.002	0.0054	0.0092	0.0095	0.0080
Unit S2.003	0.0093	0.0010	0.0012	0.0038
Unit S2.004	0.0190	0.0240	0.0280	0.0237
Unit S2.005	0.0160	0.0220	0.0530	0.0303
Unit S2.006	0.0230	0.0240	0.0055	0.0175
Unit S2.007	0.0220	0.0140	0.0110	0.0157
Unit S2.008	0.0490	0.0210	0.0140	0.0280
Unit S2.009	0.0220	0.0220	0.0052	0.0164
Unit S2.010	0.0450	0.0780	0.1400	0.0877
Unit S2.011	0.0190	0.0180	0.0140	0.0170
Unit S2.012	0.0049	0.0048	0.0027	0.0041
Unit S2.013	0.0067	0.0057	0.0052	0.0059
Unit S2.014	0.0099	0.0120	0.0095	0.0105
Average All Engines				0.0198
Standard Deviation of The Averages				0.0213
Maximum of The Averages				0.0877
Minimum of the Averages				0.0038
Confidence Interval 95% of The Averages				0.0111
Standard Deviation of All Test Runs				0.0244
Maximum Single Test Run				0.1400
Minimum Single Test Run				0.0010
Confidence Interval 95% All Test Runs				0.0074
Average of All Test Runs				0.0198

Eastshore Maximum lb/hr = 0.00277 lb/MMBtu x 72.8 MMBtu/hr (max. firing rate) = 0.2 lb/hr

Brian Lusher

From: Brian Lusher
Sent: Wednesday, October 17, 2007 4:42 PM
To: Matthew Layton (E-mail); Brewster Birdsall (E-mail)
Subject: FDOC Word File

Matt and Brewster,

Here is a word version of the FDOC.

A15185_FDOC_101
72007.pdf

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Brian Lusher

From: Brian Lusher
Sent: Wednesday, October 17, 2007 5:03 PM
To: 'Matthew Layton'; Brewster Birdsall (E-mail)
Subject: RE: FDOC Word File

Matt,

See if this works.

Brian Lusher

-----Original Message-----
From: Matthew Layton [mailto:Mlayton@energy.state.ca.us]
Sent: Wednesday, October 17, 2007 5:00 PM
To: Brian Lusher
Subject: Re: FDOC Word File

Brian,

It is still a pdf, not a word file.

matt

>>> "Brian Lusher" <blusher@baaqmd.gov> 10/17/2007 4:41 PM >>>
Matt and Brewster,

Here is a word version of the FDOC.

<<A15185_FDOC_10172007.pdf>>

Regards,

Brian K Lusher
Air Quality Engineer II
Engineering Division
Bay Area Air Quality Management District

Phone (415) 749-4623
Fax (415) 749-5030

Brian Lusher

From: Brian Lusher
Sent: Monday, October 15, 2007 1:02 PM
To: 'mlayton@energy.state.ca.us'
Subject: FW: Community Meeting

FYI

-----Original Message-----
From: Barry Young
Sent: Monday, October 15, 2007 12:56 PM
To: Weyman Lee; Brian Lusher; Bob Nishimura
Subject: FW: Community Meeting

Weyman, Brian, and Bob,

Today, let me know if you are available to attend this public meeting next Wednesday evening.

Thanks,
--Barry

-----Original Message-----
From: Brian Bateman
Sent: Monday, October 15, 2007 12:52 PM
To: Barry Young
Subject: Community Meeting

Hi Barry:

Alameda County Supervisor Gail Steele has requested that District staff attend a public meeting concerning the Russell City and Eastshore power plants at Chabot College next Wed. evening (Oct. 24). CEC staff are also being invited. The primary purpose of the meeting is to let interested members of the public have an opportunity to provide comments.

This is a meeting we should have the appropriate technical staff attend (Wayman and Brian?). I'll provide additional information when available.

- Brian

Exhibit 705
ARB Fremont Chapel Way Maximin 1 hour average data

Fremont-Chapel Way

Nitrogen Dioxide - Maximum 1 Hour Average Data

2006

Parts Per Million (ppm)

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1	0.03	0.03	0.03	0.03	0.02	0.01	0.01	0.02	0.03	0.03	0.05	0.04
2	0.03	0.02	0.04	0.02	0.02	0.01	0.01	0.02	0.01	0.03	0.03	0.03
3	0.04	0.03	0.04	0.02	0.01	0.01	0.01	0.03	0.01	0.03	0.02	0.04
4	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.02	0.02	0.03	0.02	0.05
5	0.02	0.03	0.01	0.03	0.01	0.01	0.02	0.01	0.03	0.03	0.02	0.04
6	0.04	0.02	0.04	0.03	0.01	0.01	0.01	0.02	0.03	0.02	0.04	0.05
7	0.03	0.04	0.04	0.03	0.02	0.01	0.02	0.01	0.03	0.02	0.03	0.06
8	0.02	0.05	0.03	0.03	0.01	0.02	0.03	0.02	0.02	0.03	0.03	0.04
9	0.04	0.03	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.04	0.03	0.02
10	0.04	0.05	0.03	0.03	0.04	0.01	0.01	0.03	0.03	0.03	0.03	0.03
11	0.03	0.03	0.02	0.02	0.04	0.01	0.01	0.01	0.04	0.03	0.03	0.04
12	0.03	0.04	0.03	0.03	0.03	0.01	0.01	0.02	0.05	0.03	0.03	0.03
13	0.03	0.04	0.03	0.02	0.02	0.02	0.02	0.01	0.04	0.03	0.02	0.03
14	0.02	0.03	0.02	0.03	0.04	0.02	0.02	0.01	0.02	0.01	0.03	0.03
15	0.03	0.04	0.03	0.01	0.03	0.02	0.01	0.02	0.02	0.01	0.04	0.02
16	0.04	0.04	0.03	0.01	0.02	0.02	0.03	0.02	0.02	0.03	0.03	0.03
17	0.03	0.04	0.03	0.03	0.02	0.01	0.04	0.03	0.03	0.03	0.03	0.02
18	0.04	0.03	0.03	0.03	0.02	0.01	0.03	0.03	0.04	0.03	0.03	0.04
19	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.03	0.05	0.03	0.04
20	0.04	0.04	0.03	0.02	0.02	0.03	0.03	0.01	0.03	0.04	0.03	0.03
21	0.03	0.04	0.03	0.02	0.01	0.04	0.04	0.02	0.04	0.05	0.04	0.04
22	0.02	0.04	0.04	0.01	0.02	0.05	0.04	0.03	0.04	0.04	0.03	0.03
23	0.03	0.04	0.03	0.02	0.02	0.03	0.03	0.03	0.03		0.02	0.03
24	0.03	0.05	0.03	0.01	0.02	0.02	0.03	0.02	0.03	0.04	0.03	0.03
25	0.04	0.04	0.01	0.02	0.01	0.02	0.04	0.01	0.05	0.03	0.02	0.04
26	0.04	0.03	0.03	0.02	0.01	0.03	0.02	0.01	0.04	0.04	0.03	0.02
27	0.04	0.02	0.02	0.03	0.01	0.03	0.02	0.02	0.02	0.06	0.04	0.02
28	0.03	0.04	0.04	0.02	0.01	0.02	0.02	0.02	0.02	0.06	0.04	0.01
29	0.04		0.03	0.01	0.02	0.02	0.01	0.02	0.02	0.04	0.02	0.03
30	0.03		0.03	0.02	0.01	0.01	0.01	0.03	0.02	0.02	0.03	0.04
31	0.05		0.04		0.01		0.01	0.04		0.04		0.03
MAX:	**0.05**	**0.05**	**0.04**	**0.03**	**0.04**	**0.05**	**0.04**	**0.04**	**0.05**	**0.06**	**0.05**	**0.06**
MIN:	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**

Download Data: Quick or Select Format

http://www.arb.ca.gov/aqmis2/display.php?param=NO2&year=2006&report=SITE1YR&statistic=DMAX&site=2293&db=haqd

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE EASTSHORE ENERGY CENTER IN CITY OF HAYWARD BY TIERRA ENERGY

Docket No. 06-AFC-6

PROOF OF SERVICE (Revised 12/4/2007)

INSTRUCTIONS: All parties shall either (1) send an original signed document plus 12 copies or (2) mail one original signed copy AND e-mail the document to the address for the Docket as shown below, AND (3) all parties shall also send a printed or electronic copy of the document, which includes a proof of service declaration to each of the individuals on the proof of service list shown below:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 06-AFC-6
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DECLARATION OF SERVICE

I, Angela Hockaday, declare that on 12/7/07, I deposited copies of the attached Air Quality Testimony of Robert Sarvey, Declaration Exhibits and Exhibit List in the United States mail at Sacramento, CA, with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of the California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

ANGELA HOCKADAY