Prevention of Significant Deterioration Permit Application for the University of Massachusetts, Amherst Central Heating Plant

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1.0 INTRODUCTION

1.1 Introduction

The University of Massachusetts, Building Authority (UMBA) is submitting this application to the United States Environmental Protection Agency (U.S. EPA) for a Prevention of Significant Deterioration (PSD) permit modification that will reflect the Central Heating Plant (CHP) as being built. This application reflects the changes in the plant as being built from the previously approved PSD permit and Massachusetts Department of Environmental Protection (MA DEP) plan approval permit. U.S. EPA issued a Prevention of Significant Deterioration permit (No. 046-026-MA07) to UMBA on July 27, 2005 to install and operate the new central heating plant. An approval to construct (the "Air Plan Approval") from MA DEP was issued on February 20, 2004, and amended on August 9, 2005 (Approval No. 1B-02-043, Transmittal No. W029312).

UMBA has submitted a new Non-Major Comprehensive Plan Approval (NMCPA) application on February 12, 2008, pursuant to discussions with the MA DEP and in accordance with the Notice of Noncompliance received from the MA DEP on about December 13, 2007, to modify the previously approved Central Heating Plant (CHP) plan approval to reflect the plant as being built. UMBA has submitted a supplement to the application related to the modeling on March 28, 2008 to the MA DEP.

The CHP is currently under construction at the University of Massachusetts (UMass) campus in Amherst, Massachusetts. The CHP is located in an area that was used for athletic fields just west of the Mullins Center on Mullins Way. The existing steam plant, consisting of seven boilers fired with coal, natural gas, and/or fuel oil, as well as the coal handling and storage facilities elsewhere on campus, will be decommissioned upon successful startup and commissioning of the CHP.

This section provides an overview of the project and the plan approval application history; the remaining sections provide a detailed description of the proposed project, a review of applicable air quality regulations, and evaluation of alternative control technologies based on discussions with U.S. EPA and MA DEP and the results of the air quality impact assessment.

The new CHP will consist, when completed and operational, of a combustion turbine/generator (CTG), a heat recovery steam generator (HRSG) equipped with a duct burner, three package boilers, an emergency generator (black start generator), a low pressure steam turbine/generator (LPST/G) nominally rated at 4 megawatts (MW) and a high pressure steam turbine/generator (HPST/G) nominally rated at 2 MW. A major comprehensive plan approval application for construction of the new CHP was submitted to MA DEP in accordance with the requirements of 310 CMR 7.02 in November 2002 before initiating construction of the CHP, and an approval to construct (the "Air Plan Approval") was issued on February 20, 2004, and amended on August 9, 2005 (Approval No. 1B-02-043, Transmittal No. W029312). This previous approval was for a combustion turbine/generator (CTG), a heat recovery steam generator (HRSG) equipped with a duct burner, four package boilers, an emergency generator, and a diesel fire pump. U.S. EPA issued a Prevention of Significant Deterioration (PSD) permit (No. 046-026-MA07) to UMBA on July 27, 2005 to install and operate the new central heating plant. This permit was for a combustion turbine/generator (CTG), a heat recovery steam generator (HRSG) equipped with a duct burner, four package boilers, an emergency generator, and a diesel fire pump.

The MA DEP has also issued Plan Approval No. 1-B-07-018 dated May 10, 2007 for the CTG and HRSG Compliance Emission Monitoring System (CEMs), opacity monitor, temperature monitors, Selective Catalytic Reduction (SCR) and Carbon Monoxide (CO) catalyst control system, and ammonia storage and handling system; and Plan Approval 1-B-07-019 dated May 10, 2007 for the package boilers Compliance Emission Monitoring System, opacity monitor, temperature monitors, Selective Catalytic Reduction and Carbon Monoxide catalyst control system, and ammonia storage and handling system. Copies of the Approvals are included in Appendix D.

The proposed plant in the original application submittal was classified as a "major modification" of particulate matter with a mean diameter of 10 microns or less (PM_{10}) and, hence, is subject to the requirements of the Prevention of Significant Deterioration (PSD) regulations for PM_{10} only as set forth in 40 CFR Part 52.21. Accordingly UMBA filed an application for a PSD permit for the proposed plant with the responsible permitting authority, the U.S. EPA, Region 1 in January 2004 and a supplement to the application in November 2004 based on a review and request from U.S. EPA. The U.S. EPA requested that UMBA address total PM_{10}, including filterable and condensable particulate, in the control technology evaluation and air quality impact assessment. UMBA submitted this supplement to demonstrate that the proposed plant would incorporate control devices and techniques representative of Best Available Control Technology (BACT) for total PM_{10} and that the plant's impact will comply with applicable National Ambient Air Quality Standards (NAAQS) and PSD allowable increments. As previously mentioned, U.S. EPA issued a PSD permit (No. 046-026-MA07) to UMBA on July 27, 2005 to install and operate the new central heating plant.

This PSD application is being submitted to modify the existing permit to reflect the operations as being built at the facility. This application will demonstrate that the new plant will comply with all applicable emission standards and control technology requirements and that the plant's projected impacts will comply with applicable ambient air quality standards, and PSD allowable increments established by both MA DEP and U.S. EPA.

The plant is designed to satisfy the campus' base electrical load and steam supply requirements through the year 2025. The combustion installations, therefore, must be capable of responding immediately and of sustaining continuous operation to meet the frequent and highly variable electrical and steam demands on campus. Because of limitations on the availability of natural gas, the University of Massachusetts requires flexibility in fuel selection to meet the electrical and steam demands at the campus. Accordingly, the combustion turbine and package boilers will be fired with either natural gas or transportation grade fuel oil, while the duct burner will be fired exclusively with natural gas.

The CTG is a Solar Mars 100 series machine with a nominal rating of 10 megawatts (MW) and a heat input rating of approximately 120 million Btu per hour (MMBtu/hr) based on lower heating value (LHV). The heat input rating firing natural gas is approximately 137.9 MMBtu/hr without duct firing. The CTG exhaust will be discharged to a HRSG with a rated steam output of 100,000 pounds per hour (lb/hr) equipped with a duct burner rated at 91.8 MMBtu/hr. The duct burner was initially permitted at 77.4 MMBtu/hr in Approval No. 1B-02-043, but was modified during the final design phase of the project. Because of the limited availability of natural gas, the CTG will have the capability of firing either natural gas or transportation grade fuel oil; the duct burner will be fired exclusively with natural gas.

The three package boilers installed are Rentech Boilers. Two of these package boilers are low pressure boilers. The low pressure boilers are each rated at 156.1 MMBtu/hr firing oil at an ambient temperature of 80 degrees Fahrenheit or 162.1 MMBtu/hr firing natural gas at an ambient air temperature of 80 degrees Fahrenheit and 125,000 lbs/hr of superheated steam. The third boiler is a high pressure boiler rated at 173.4 MMBtu/hr firing oil at an ambient temperature of 80 degrees Fahrenheit or 179.7 MMBtu/hr firing natural gas at an ambient air temperature of 80 degrees Fahrenheit and 125,000 lbs/hr of superheated steam. The original plan approval was for four boilers each rated at 170 MMBtu/hr and 175,000 lb/hr of superheated steam.

The emergency generator (black start generator) is rated at 9.13 MMBtu/hr. The emergency generator initially proposed was rated at 7.7 MMBtu/hr. The fire pump proposed in the initial application is not being installed.

This application is divided into five sections and five appendices. Section 2 describes the project. Section 3 summarizes the applicable regulations. Section 4 summarizes the Best Available Control Technology analysis that was conducted as part of the original permit application. Section 5 summarizes the Air Quality Impact Assessment. Appendix A contains previously submitted BACT analyses.

Appendix B contains Combustion Turbine and Boiler Performance Data and supporting calculations. Appendix C contains supporting documentation for the Air Quality Modeling results. A copy of the PSD permit (No. 046-026-MA07) and a copy of MA DEP Plan Approval No. 1B-02-043 are included in Appendix D. As discussed above, PSD permit (No. 046-026-MA07) and MA DEP Plan Approval 1B-02-043 provided approval for the installation of the new CTG/HRSG and package boilers for the new Central Heating Plant. Applicable MA DEP approvals to the new CHP have been included in Appendix D. Appendix E contains plans and schematic drawings. Manufacturer brochures and operating and maintenance manuals have previously been provided.

2.0 DESCRIPTION OF PROJECT

The University of Massachusetts Building Authority previously proposed to construct and operate a new CHP to replace the existing steam plant at the Amherst campus of the University of Massachusetts. This application is providing updated information on the construction and operation of the new CHP. This section provides a description of the project, addressing the combustion installations and associated air pollution control systems. It also provides performance and emissions data for the combustion turbine, HRSG, package boilers, and ancillary facilities. This information has been updated to reflect the final design of the facility.

2.1 Project Components

The proposed new CHP consists of a combustion turbine, a HRSG with a duct burner, three package boilers, a low pressure steam turbine/generator, a high pressure steam turbine/generator and an emergency generator (black start generator). The new CHP will also include a low pressure steam turbine/generator (LPST/G) nominally rated at 4 megawatts (MW) and a high pressure steam turbine/generator (HPST/G) nominally rated at 2 MW. The facility is not planning to install the fourth boiler and the fire pump as permitted in the existing plan approval for the new CHP. The plant will be designed to satisfy the campus' base electrical load and steam supply requirements through the year 2025. The new CHP will be located at the site of existing athletic fields just west of the Mullins Center on Mullins Way. Upon start-up of the CHP, the seven boilers at the existing steam plant will be decommissioned, as well as the coal handling and storage facilities on campus. The University will relocate the 4 MW LPST/G from the old heating plant to the new Central Heating Plant after the new plant is completed. A new 2 MW HPST/G will be installed under a separate contract in the summer of 2009. A site layout for the CHP, showing the location of major structures and equipment is presented in Appendix E.

2.1.1 CTG/HRSG

The CTG is a Solar Mars 100 series machine with a nominal rating of 10 MW and a heat input rating of approximately 137.9 MMBtu/hr. The CTG exhaust will be discharged to a HRSG with a rated steam output of 100,000 lb/hr equipped with a duct burner rated at 91.8 MMBtu/hr. The duct burner (DB) was initially permitted at 77.4 MMBtu/hr in MA DEP Approval No. 1B-02-043 and U.S. EPA PSD Permit No. 046-026-MA07, but was modified during the final design phase of the project. Because of the limited availability of natural gas, the CTG will have the capability of firing either natural gas or transportation grade fuel oil; the duct burner will be fired exclusively with natural gas.

The CTG will utilize a dry low-NO_x (DLN) combustor to control the formation of oxides of nitrogen (NO_x). To further reduce NO_x emissions, the CTG will be equipped with a dedicated selective catalytic reduction (SCR) system for control of NO_x emissions. The CTG will also be equipped with an oxidation catalyst system to control carbon monoxide (CO) emissions, while the design of the combustion installations, implementation of good operating practices, and the use of natural gas or transportation grade fuel oil will serve to control emissions of particulate matter (PM), sulfur dioxide (SO_2), and volatile organic compounds (VOC). The exhaust gases from the CTG/HRSG will be discharged to the atmosphere via a dedicated 125-foot stack. In the event that the HRSG has to be brought off line, the combustion turbine exhaust will then be discharged via a 125-foot stack.

Performance data for the combustion turbine/HRSG/DB under the alternative fuel firing configurations and various meteorological conditions are provided in Table 2-1.

The SCR system for the CTG/HRSG will be designed to reduce NO_x emissions by at least 90 percent under either fuel firing configuration. Based on these performance criteria, the outlet NO_x concentration will be no more than 2.5 parts per million by volume (ppmvd) when firing natural gas and 6.0 ppmvd when firing transportation grade fuel oil, both corrected to 15 percent oxygen (O_2). The oxidation catalyst system for the CTG/HRSG is designed to reduce the outlet CO concentration to no more than 5.0 ppmvd when firing natural gas and 5.0 ppmvd when firing diesel fuel, both corrected to 15 percent O_2. The SCR system is designed to limit ammonia (NH_3) emissions to 2.0 ppmvd at 15 percent O_2. Information on the SCR and CO catalyst systems have been provided previously to the MA DEP and approved in Plan Approval No. 1B-07-018.

The CTG/HRSG will exhaust through a dedicated stack that will be monitored by continuous emissions monitors for emissions of NO_x, CO, and ammonia. Opacity and O_2 will also be continuously monitored. In addition, a temperature monitoring system will continuously monitor and record the inlet temperatures to the SCR and CO catalysts for the CTG/HRSG. Data from each monitor will be collected and stored by a central Data Acquisition and Handling System (DAHS), which will be operated on a PC.

The total PM_{10} emissions from the combustion turbine/HRSG include both "filterable" and "condensable" particulate matter. Filterable particulate is that portion of the total particulate that exists in the stack in either solid or liquid state and is measured on the filter or "front-half" of the U.S. EPA Method 5 sampling train. Condensable particulate, on the other hand, is that portion of the total particulate that exists as a gas in the stack, subsequently condensing in cooler ambient air to form particulate matter. As a gas in the stack, condensable particulate passes through the Method 5 filter and is subsequently measured by analyzing the impingers or "back-half" of the sampling train.

The filterable PM_{10} emissions from combustion turbines result from the carryover of noncombustible trace constituents in the fuel, the introduction of particles with the combustion air, or the formation of particles consisting of unburned carbon. Filterable particulate emissions are extremely low when firing natural gas and only marginally higher when firing transportation fuel oil due to the fuel's low ash content. Condensable particulate, on the other hand, primarily result from the formation of ammonium salts downstream of the combustion turbine in the HRSG. The ammonia introduced in the SCR systems reacts with the SO_2 and NO_x in the combustion gases to form ammonium sulfates and nitrates. Furthermore, the CO catalyst promotes the oxidation of these constituents in the combustion gases contributing to the formation of ammonium salts.

Federal and state permitting authorities have only in recent years required the application of SCR and oxidation catalyst systems to industrial or institutional cogeneration units around the country. Consequently, there is limited data available on total PM_{10} emissions, and in particular condensable PM_{10} emissions, from dual-fuel cogeneration units equipped with both SCR and CO catalyst. Given the limited availability of emissions data, the total PM_{10} emissions from the proposed combustion turbine/HRSG are based on the emission guarantees provided by the equipment vendors of 0.030 lb/MMBtu when firing natural gas and 0.050 lb/MMBtu when firing distillate fuel oil. The total PM_{10} emissions from the combustion turbine/HRSG at maximum load under the alternative firing configurations are provided in Table 2-1. The $PM_{2.5}$ emission rate is conservatively assumed to be PM_{10} emission rate.

2.1.2 Package Boilers

Two of package boilers will each have a maximum continuous rating of 125,000 lbs/hr of superheated steam at 466 degrees Fahrenheit and 200 pounds per square inch gauge (psig). Based on this steaming rate, these two boilers will each have a maximum heat input rate of approximately 162.1 MMBtu/hr firing natural gas and 156.1 MMBtu/hr firing fuel oil at ambient temperature of 80 degree Fahrenheit. Based on this steaming rate, the boilers will each have a maximum heat input rate of approximately 164.0 MMBtu/hr firing natural gas and 158.5 MMBtu/hr firing fuel oil at ambient temperature of 40 degrees Fahrenheit. The third boiler will have a maximum continuous rating of 125,000 lbs/hr of superheated steam at 740 degrees Fahrenheit and 625 pounds per square inch gauge (psig). Based on this steaming rate, the boiler will have a maximum heat input rate of approximately 179.7 MMBtu/hr firing natural gas and 173.4 MMBtu/hr firing fuel oil at ambient temperature of 80 degree Fahrenheit. Based on this steaming rating, the boiler will have a maximum heat input rate of approximately 182.0 MMBtu/hr on gas firing and 175.7 MMBtu/hr on oil firing at ambient temperature of 40 degrees Fahrenheit. The boilers will be operated close to the ambient temperature of 80 degrees Fahrenheit.

The PSD permit application was for four boilers with each boiler having a maximum continuous rating of 131,250 lbs/hr of superheated steam at 460 degrees Fahrenheit and 175 pounds per square inch gauge (psig), with a maximum heat input rating of 170.1 MMBtu/hr on natural gas and 162.2 MMBtu/hr on oil.

The University will be installing a low pressure steam turbine/generator, and a high pressure steam turbine/generator that will use steam from the boilers. The LPST/G will be nominally rated at 4 megawatts and the HPST/G will be nominally rated at 2 megawatts.

Again, because of the limited availability of natural gas, the boilers will be designed to burn either natural gas or transportation grade fuel oil. The exhaust gases from each of the boilers will be discharged via a 125-foot stack. Performance data for the two low pressure and one high pressure boilers under the alternative fuel firing configurations are provided in Table 2-2A and 2-2B, respectively.

The package boilers will utilize low-NO_x burners (LNB) to control the production of NO_x. To further reduce NO_x emissions, each boiler will be equipped with an SCR system designed to limit the outlet NO_x concentrations to no more than 5.0 ppmvd when firing natural gas and 9.0 ppmvd when firing fuel oil, both corrected to 3 percent O_2. The SCR System is designed to limit NH_3 emissions to 2.0 ppmvd or less corrected to 3 percent O_2. To control CO emissions, each boiler will also be equipped with an oxidation catalyst system designed to limit the outlet CO concentrations to no more than 20 ppmvd firing natural gas and 25 ppmvd firing fuel oil, both corrected to 3 percent O_2.

Similar to the combustion turbine/HRSG, the total PM_{10} emissions from the three boilers also include filterable and condensable particulate matter as measured using the U.S. EPA Method 5 sampling train. Again the filterable particulate from boilers result from the carryover of noncombustible trace constituents in both the fuel and combustion air, while condensable particulate primarily results from the formation of ammonia salts in the boilers. Similar the cogeneration unit, the ammonia introduced in the SCR system reacts with SO_2 and NO_x in the combustion gases to form ammonium sulfates and nitrates. The CO catalyst further promotes the oxidation of SO_2 and NO_x enhancing the formation of the ammonium salts.

The MA DEP has only in recent years required the application of SCR and CO catalyst systems to industrial or institutional boilers in the Commonwealth. Consequently, there is little or no data available on the total PM_{10} emissions from dual-fuel boilers equipped with both SCR and CO catalyst. Accordingly, the total PM_{10} emissions from the proposed boilers are based on emission guarantees provided by equipment vendors of 0.020 lb/MMBtu firing natural gas and 0.040 lb/MMBtu firing distillate fuel oil. The total PM_{10} emissions at maximum load are provided in Tables 2-2A and 2-2B.

2.1.3 Emergency Generator (Black Start Generator)

An emergency generator (black start generator) is installed to supply electrical power for the plant in the event of a power outage at the CHP. The prime mover generator will be a reciprocating engine fired with either diesel fuel or natural gas. The emergency generator (black start generator) will have a maximum heat input of 9.13 MMBtu/hr and a maximum power output of 900 kilowatts (KW). The previous permit approval was for an emergency generator with a maximum heat input of 7.7 MMBtu/hr and a maximum power output of 750 KW. To allow for routine testing and maintenance and the possible loss of power at the plant, it has been assumed that the black start generator will operate no more than 300 hours during any consecutive 12-month period.

To minimize emissions, the emergency generator (black start generator) will be fired with either natural gas or low-sulfur diesel fuel. Furthermore, emergency generator operations will be limited to no more than 300 hours over any consecutive 12-month period. Performance data for the emergency generator under the alternative fuel firing configurations are summarized in Table 2-3. Note that the estimated emissions for these units are based upon manufacturers' data or emission factors cited in U.S. EPA AP-42. Detailed information on the emergency generator is presented in Appendix B.

2.1.4 Low Pressure Steam Turbine/Generator

The LPST/G receives steam from the 200 psig steam header and exhausts the steam at 20 psig to the low pressure steam header. The LPST/G will generate approximately 4 MW of power. This unit exists at the existing central heating plant and will be relocated to the new central heating plant in summer 2008.

2.1.5 High Pressure Steam Turbine/Generator

The HPST/G receives 600 psig steam from the HSRG and/or the high pressure boiler and exhausts the steam at 200 psig. This equipment will be installed in 2009.

2.1.6 No. 2 Fuel Oil and Chemical Storage Tanks

The CHP will include storage tanks for fuel oil and various chemicals required for air pollution control, boiler feedwater treatment, and process wastewater treatment. A revised list of storage tanks and the basic design data for the fuel oil and chemical storage tanks at the site is provided in Appendix B.

2.2 Potential Emissions

The new combustion turbine, HRSG, and package boilers will be equipped with the following air pollution control technologies:

- Combustion Turbine and HRSG:

Nitrogen Oxides. Dry low-NOx combustor and SCR system designed to limit NOx emissions to 2.5 ppmvd firing natural gas and 6.0 ppmvd firing fuel oil, both corrected to 15 percent O_2. The SCR system will also be designed to limit NH_3 emissions to 2.0 ppmvd corrected to 15 percent O_2 under either fuel firing configuration.

Carbon Monoxide. An oxidation catalyst system designed to limit CO emissions to 5.0 ppmvd firing natural gas and 5.0 ppmvd firing fuel oil, both corrected to 15 percent O_2. The CO limit in Plan approval 1B-02-043 is for 2.0 ppmvd corrected to 15 percent O_2 firing natural gas. The vendor's guarantee is 5.0 ppmvd corrected to 15 percent O_2 firing natural gas.

- Three Package Boilers

Nitrogen Oxides. Low-NO_x burners and SCR system designed to limit NO_x emissions to 5.0 ppmvd firing natural gas and 9.0 ppmvd firing fuel oil, both corrected to 3 percent O_2. The SCR system will also be designed to limit NH_3 emissions to 2.0 ppmvd corrected to 3 percent O_2 under either fuel firing configuration.

Carbon Monoxide. An oxidation catalyst system designed to limit CO emissions to 20 ppmvd firing natural gas and 25 ppmvd firing fuel oil, both corrected to 3 percent O_2.

Particulate, sulfur dioxide (SO_2), and VOC emissions will be controlled by the design of the combustion installations, implementation of good operating practices, and the use of natural gas or transportation grade fuel oil (less than 0.05 percent sulfur).

The particulate emission limit when firing fuel oil for the CTG/HRSG is 0.04 lb/MMBtu in the previously approved permits. However, the vendor guarantee for particulate matter is 0.05 lb/MMBtu. Emissions are calculated for the CTG/HRSG based on this value (0.05lb/MMBtu). The particulate emissions when firing fuel oil for the boilers are based on a vendor guarantee of 0.04 lb/MMBtu. Particulate emissions for PM_{10} and $PM_{2.5}$ are assumed to be equivalent since vendor guarantees and data are not available for $PM_{2.5}$.

Tables 2-1, and 2-2A and 2-2B summarize the performance data for the combustion turbine/HRSG and the high pressure and low pressure package boilers under both fuel firing configurations, respectively. Performance and emission data for the combustion turbine, HRSG, and package boilers are detailed in Appendix B.

Table 2-1: Performance Data for the Combustion Turbine Generator/HRSG

Load	100%			
Fuel Type	**Natural Gas**		**Fuel Oil**	
Ambient Temperature (°F)	60	60	60	60
Relative Humidity (%)	60	60	60	60
Duct Burner (Off/On)	Off	On	Off	On
Output (kW)	10250	10250	9582	9582
Gas Consumption (lb/hr)	5355	8773	n/a	3344
Oil Consumption (lb/hr)	n/a	n/a	5684	5684
Heat Input (MMBtu/hr)	122.30	200.30	110.66	187.06
Exhaust Temperature (°F)	381	316	382	314
Exhaust Flow (acfm)	115,228	107,271	112,723	104,940
PM_{10} (lb/hr)	3.67	6.01	3.32	5.61

[a] The duct burner is fired exclusively with natural gas at a maximum fire rate of 4018 lb/hr when the combustion turbine is firing natural gas and 3957 lb/hr when the turbine is firing fuel oil.

Table 2-2A: Performance Data for the High Pressure Package Boiler

Load	100%	
Fuel Type	**Natural Gas**	**Fuel Oil**
Ambient Temperature (°F)	80	80
Steam Flow (lb/hr)	125,000	125,000
Fuel Consumption (lb/hr)	7,956	8,907
Heat Input (MMBtu/hr)	179.72	173.41
Exhaust Flow (acfm)	51,996	52,998
Exhaust Temperature (°F)	326	321
PM_{10} (lb/hr)	1.80	6.94

[a] Exhaust gas concentrations reported in terms of parts per million by volume on a dry basis (ppmvd) corrected to 3 percent O_2.

Table 2-2B: Performance Data for the Low Pressure Package Boilers (Per Unit)

Load	**100%**	
Fuel Type	**Natural Gas**	**Fuel Oil**
Ambient Temperature (°F)	80	80
Steam Flow (lb/hr)	125,000	125,000
Fuel Consumption (lb/hr)	7174	8017
Heat Input (MMBtu/hr)	162.1	156.1
Exhaust Flow (acfm)	46076	46076
Exhaust Temperature (°F)	308	305
PM_{10} (lb/hr)	1.62	6.24

[a] Exhaust gas concentrations reported in terms of parts per million by volume on a dry basis (ppmvd) corrected to 3 percent O_2.

To minimize emissions, the emergency generator (black start generator) will be fired with either natural gas or low-sulfur diesel fuel. Furthermore, emergency generator operations will be limited to no more than 300 hours over any consecutive 12-month period. Performance data for the emergency generator under the alternative fuel firing configurations are summarized in Table 2-5. The black start generator was installed on August 29, 2007. If an emergency engine was installed after March 23, 2006 regulation 310 CMR 7.26 (42) applies. Note that the estimated emissions for this unit is based upon manufacturers' data or emission factors cited in U.S. EPA AP-42. Detailed information on the emergency generator is presented in Appendix B. A document with the 2006 Model Year Certificate of Conformity for 40 CFR Part 89 Certification: U.S EPA Tier 2 for the black start generator is included in Appendix B. Also included is the manufacturer information on the Caterpillar Diesel Generator Set. Note that the NOx+HC (g/KW-hr) is 6.4 and is in compliance with 40 CFR Part 89. CO and PM maximum limits (g/KW-hr) are 3.5 and 0.2, respectively and are consistent with 40 CFR 89.

Table 2-3: Performance Data for the Emergency Generator (Black Start Generator)[a]

Unit	Emergency Generator	
Fuel Type	**Natural Gas**	**Fuel Oil**
Heat Input (MMBtu/hr)	9.13	9.13
PM_{10} (lb/MMBtu)	0.044	0.044
PM_{10} (lb/hr)	0.40	0.40

[a] Based on manufacturer's data emission factors.

The net change in potential emissions associated with the proposed project is based upon the future potential emissions from the proposed sources minus the actual emissions from existing sources being retired as part of the action. To determine the net change in emissions, it was assumed that:

- the combustion turbine is operating at maximum load firing fuel oil for 2,160 hours per year (90 days) and the remainder of the year firing natural gas;
- the package boilers are operating at maximum load firing either fuel oil or natural gas for a combination of 8,760 hours per year (See Appendix B for additional detail);
- the duct burner is operating at maximum load firing natural gas for 8,760 hours per year based on the combustion turbine operation; and
- the emergency generator (black start generator) is operating at maximum load firing diesel fuel oil for 300 hours per year.

Potential emissions for the combustion turbine are based on 90 days of firing fuel oil and the remainder of the year operating on natural gas and the duct burner operating at full load firing natural gas for the entire year. Potential emissions for the boilers are based on the high pressure boiler, operating on fuel oil October 1 through April 30th, and on natural gas the remainder of the year; one low pressure boiler operating on fuel oil year round, and one low pressure boiler operating half on natural gas and the other half on fuel oil for the entire year. This does not mean the high pressure boiler will not operate using fuel oil during the remainder of the year. The fuel oil usage for the boilers for May 1- September 30th may be used on any of the boilers. According to Vanderweil Engineers (the Engineer of Record for the new CHP) the most likely operating scenario will use the low pressure boilers firing fuel oil during May 1- September 30th.

Pursuant to discussions with MA DEP the actual emissions from the plan approval 1B-02-043 were used in the analysis, the actual emissions from the existing boilers are based upon the average emissions over calendar years 2000 and 2001. Table 2-4 documents the net change in PM_{10} emissions associated with the CHP.

Table 2-4: Net Change in Potential Emissions Associated with Proposed Project

Pollutant	Proposed CHP Potential Emissions (tpy)				Existing Plant Actual Emissions (tpy)[b]	Net Change in Emissions (tpy)
	Combustion Turbine/HRSG[a]	Package Boilers[a]	Generator [a]	Total		
PM_{10}	31.8	65.7	0.1	97.6	4.14	93.46

[a] Based on potential emissions from the combustion turbine and package boilers operating at maximum load firing fuel oil for 8,760 hours per year; the duct burner operating at maximum load firing natural gas for 8,760 hours per year; and the emergency generator operating at maximum load firing diesel fuel for 300 hours per year.

[b] Based on actual emissions from the existing boilers averaged over calendar years 2000 and 2001.

3.0 REGULATORY APPLICABILITY EVALUATION

3.1 Introduction

This section summarizes the regulatory evaluation that was performed as part of the original comprehensive plan application for the CHP to the MA DEP and the PSD application to U.S. EPA. Please refer to those documents for additional details. The regulatory applicability has been updated below to reflect recent changes in regulations.

The U.S. EPA and MA DEP have promulgated regulations that establish ambient air quality standards and emission limitations that may be applicable to the CHP. These regulations impose design constraints on new sources of air pollution and provide the basis for evaluating the potential impacts of such sources on ambient air quality. The potentially applicable regulations include: (1) National and State Ambient Air Quality Standards; (2) MA DEP Plan Approval Requirements; (3) Nonattainment New Source Review; (4) Prevention of Significant Deterioration Review; (5) New Source Performance Standards; and (6) National Emission Standards for Hazardous Air Pollutants. These regulatory programs are discussed in detail below in the context of the CHP.

3.2 National and State Ambient Air Quality Standards

The U.S. EPA promulgated National Ambient Air Quality Standards (NAAQS) for six air contaminants known as criteria pollutants, for the protection of public health and welfare. These criteria pollutants are particulate matter with a mean diameter of less than 10 microns (PM_{10}), particulate matter with a mean diameter of less than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_x), carbon monoxide (CO), ozone (O_3), and lead (Pb). The U.S. EPA established both primary standards intended to protect human health, and secondary standards intended to protect public welfare from adverse effects associated with air pollution, such as damage to property or vegetation. The MA DEP essentially adopted the Federal limits in developing the Massachusetts Ambient Air Quality Standards (MAAQS). The NAAQS and MAAQS, including short-term and long-term standards, are presented in Table 3-1.

On July 18, 1997, the U.S. EPA promulgated regulations revising the NAAQS for particulate matter and O3. The regulations essentially established new standards for particulate matter with a mean diameter of 2.5 microns or less ($PM_{2.5}$), and replaced the current 1-hour O3 standard with an 8-hour standard of 0.08 part per million (ppm). The District of Columbia Circuit Court of Appeals, however, remanded the rulemaking back to the U.S. EPA for reconsideration on May 14, 1999. The U.S. EPA subsequently appealed the Court of Appeals decision to the U.S. Supreme Court. On February 27, 2001, the U.S. Supreme Court issued a decision that upheld the U.S. EPA's original action establishing the $PM_{2.5}$ and O_3 standards. The U.S. EPA is continuing a nationwide ambient air quality monitoring program and is preparing regulatory guidance for implementing the new $PM_{2.5}$ and O_3 standards. Regarding particulate matter, MA DEP is beginning to require facilities to demonstrate compliance with $PM_{2.5}$ standards as well as PM_{10} standards. Regarding particulate matter, the U.S. EPA's current guidance relies on the demonstrations of compliance with the current PM_{10} standards.

Table 3-1 National and State Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS and MAAQS (ug/m3)		Significant Impact Levels (ug/m3)
		Primary	Secondary	
NO_x	Annual[1]	100	Same	1
SO_2	Annual[1]	80	---	1
	24-hour[2]	365	---	5
	3- hour [3]	---	1,300	25
PM_{10}	Annual[3]	50	---	1
	24-hour[4]	150	---	5
$PM_{2.5}$	Annual	15		0.3
	24-hour	35		2.0
CO	8-hour [2]	10,000	Same	500
	1-hour [2]	40,000	Same	2000
O_3	1-hour [4]	235	Same	---
Pb	3-month [1]	1.5	---	---

(1) Not to be exceeded
(2) Not to be exceeded more than once per year.
(3) Not to be exceeded by the arithmetic average of the annual averages from three successive years.
(4) Not to be exceeded more than an average of one day per year over three years.
Source: 40 CFR Part 50 and 310 CMR 6.00

One of the basic goals of Federal and State air quality regulations is to ensure that ambient air quality, including the impacts of both existing and new sources, complies with the NAAQS and MAAQS. To this end the U.S. EPA has classified all regions of the country as "attainment", "nonattainment," or "unclassifiable" area with respect to the ambient air quality standards. The Towns of Amherst and Hadley are located in a region currently classified as either an attainment or unclassifiable are for PM_{10}, SO_2, NO_2, CO, and Pb. The region is also currently classified as a "serious" nonattainment area for O_3.

To identify those new sources with the potential to violate or contribute to a violation of an ambient air quality standard, the U.S. EPA and MA DEP have adopted significant impact levels (SILs) for PM_{10}, $PM_{2.5}$, NO_2, SO_2, and CO. If the impacts of a new source are found to be below the SILs, no further analysis is required to assess compliance with ambient air quality standards. If the impacts are found to exceed the SILs, on the other hand, a more detailed dispersion modeling analysis is required to assess compliance with ambient air quality standards. This analysis must consider the impacts associated with not only the new source, but also existing sources in the region. Additional information and discussion on this is provided in Section 5 of this application.

3.2 Massachusetts Air Regulations

310 CMR 7.02 – Plan Approval Requirements

Construction of the CTG/HRSG was approved pursuant to 310 CMR 7.02 Comprehensive Plan Application, which applies to fuel utilization facilities with a maximum energy input capacity equal to or greater than 40 MMBtu/hr firing natural gas, or 30 MMBtu/hr firing distillate fuel oil. See attached Air Plan Approval No. 1B-02-043 in Appendix B of this application package. In accordance with the provisions of that Air Plan Approval, additional non-major comprehensive plan applications were required to be submitted for the CEMS, opacity monitoring systems, SCR control systems, ammonia handling & storage systems, and CO catalyst control systems for the CTG/HRSG and for the package boilers. Those applications were submitted and approval received under Plan Approvals Nos. 1B-07-018 and 1B-070019.

In accordance with the plan approval requirements, this non-major comprehensive plan approval is being submitted for the modifications to the equipment permitted under Plan Approval 1B-02-043. Also in accordance with the Notice of Noncompliance (NON-WE-07-7022) this application is being submitted for the changes in the equipment permitted under Plan Approval 1B-02-043.

Massachusetts regulations require the application of Best Available Control Technology (BACT) for each regulated pollutant. A BACT analysis was conducted for Air Plan Approval No. 1B-02-043. In addition, the portion of the analysis pertaining to add-on controls and monitoring equipment was included in the applications approved (Plan Approvals Nos. 1B-07-018 and 1B-070019). The BACT analysis is in Section 4 of this application.

The initial application (Plan Approval 1B-02-043) included the following regulatory review for the application for 310 CMR 7.02.

According to 310 CMR 7.02(1)(b), no person shall construct a new facility or modify an existing facility unless the plans, specifications, and operating and maintenance procedures have been approved by the MA DEP. Depending on the increase in the potential emissions or maximum heat input to a fossil fuel utilization facility, the owner or operator of a subject facility is required to file one of the following:

Limited Plan Application (LPA). An LPA is required if the construction or modification would result in an increase in potential emissions of 1.0 ton or more, but less than 5.0 tons, of any air contaminant over any consecutive 12-month period. For fossil fuel utilization facilities, an LPA is required if the maximum heat input in 10 MMBtu/hr or more, but less than 40 MMBtu/hr, for units burning natural gas and 10 MMBtu/hr or more, but less than 30 MMBtu/hr, for units burning distillate fuel oil (310 CMR 7.02 (4)(a) and (b)).

Comprehensive Plan Application (CPA). A CPA is required if the construction of modification would result in an increase in potential emissions of 5.0 tons or more of any regulated pollutant over any consecutive 12-month period. For fossil fuel utilization facilities, an CPA is required if the maximum heat input is 40 MMBtu/hr or more for units burning natural gas and 30 MMBtu/hr or more for units burning distillate fuel oil (310 CMR7.02(5)(a) and (b)).

In determining the applicability of the MA DEP plan approval requirement, the owner or operator may not take credit for any contemporaneous emission reductions when estimating the potential emissions from a new of modify facility (310 CMR 7.02(4)(b) and (5)(b)). It should also be noted that emergency engines are exempt from the plan approval requirements if (1) the engine has an energy input capacity of less than 3 MMBtu/hr (310 CMR 7.02); or (2) the engine has an energy input capacity ranging from 3 to 10 MMBtu/hr and operates less than 300 hours over any consecutive 12-month period (310 CMR 7.03).

To obtain approval of proposed construction subject to 310 CMR 7.02 (4) or (5), the owner or operator of a facility must submit the appropriate plan approval application to the MA DEP (310 CMR 7.02(4)(d) or (5)(d)). At minimum, an applicant must satisfy the following conditions (1) the application for the construction or modification must be submitted on forms furnished by the MA DEP; (2) the application must be submitted in duplicate and signed by a responsible official; (3) the application must be accompanied by sufficient information to document the facility's potential emissions and any other information required by the MA DEP; and (4) the applicant must make an affirmative demonstration that owned or operated by the applicant in the Commonwealth are in compliance with applicable provisions of 310 CMR 7.00, et. seq.

In approving the plan approval application, the MA DEP must determine that facility emissions would not result in a violation of the ambient air quality standards under 310 CMR 6.00, that the emissions would comply with the emission limitations and any other provisions of 310 CMR 7.00, and that emissions would represent the application of Best Available Control Technology (BACT) is defined in the regulations "an emission limitation based on the maximum degree of reduction of any regulated air contaminant emitted from or which results from any regulated facility which the Department, on a case-by-case basis taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques for control of each such contaminant" (310 CMR 7.00, Definitions).

The original CHP application was classified as a major modification for PM_{10}, UMBA filed an application for a major comprehensive plan approval with the MA DEP. Pursuant to discussions with the MA DEP is required to file a non-major comprehensive plan approval application for modification to the facility. The application must demonstrate that the combustion turbine and package boilers will incorporate air pollution control technologies representative of BACT and that the resulting emission will not cause or contribute to a violation of applicable ambient air quality standards and PSD allowable increments.

Note that, based on the design capacity and restricted operation of the emergency generator, this source is specifically exempt from the plan approval requirements of the MA DEP.

310 CMR 7.00 Appendix A: Nonattainment New Source Review

MA DEP must determine if a new or modified facility is subject to NNSR under 310 CMR 7.00, Appendix A. According to these provisions, the owner or operator of a major source located in a nonattainment area must obtain a major comprehensive plan approval from the MA DEP before initiating construction of the facility. In determining the applicability of NNSR, the owner or operator can take credit for contemporaneous emission reductions in determining the net change in potential emissions. In a serious nonattainment area for ozone (O_3), a major stationary source is defined as any facility that has potential emissions of 25 tpy or more of either NO_x or VOC, which are precursors to the formation of O_3.

The existing steam plant is classified as a major stationary source of NO_x and is located in a serious nonattainment area for ozone. A modification to an existing major source is subject to NNSR if the net increase in the potential NO_x or VOC emissions is equal to or greater than 25 tpy. The net change in potential emissions is based upon the future potential emissions from the proposed sources minus the actual emissions from existing sources being retired as part of the action and contemporaneous emission changes occurring over the five years prior to operation of the new source. To determine the net change in emissions resulting from the proposed action, it is assumed that the combustion turbine and package boilers are operating at full load and the duct burner is operating at full load firing natural gas. Potential emissions for the combustion turbine are based on 90 days of firing fuel oil and the remainder of the year operating on natural gas and the duct burner operating at full load firing natural gas for the entire year. Potential emissions for the boilers are based on the high pressure boiler, operating on fuel oil October 1 through April

30, and on natural gas the remainder of the year; one low pressure boiler operating on fuel oil year round, and one low pressure boiler operating half on natural gas and the other half on fuel oil for the entire year. This does not mean the high pressure boiler will not operate using fuel oil during the remainder of the year. Table 3-2 compares the net change in the potential NO_x and VOC emissions associated with the new CHP. As shown, the net increase in potential NO_x and VOC emissions would both be less than 25 tpy. The new CHP is therefore not subject to the requirements of NNSR.

Table 3-2: NNSR Applicability Determination

Pollutant	Proposed CHP Potential Emissions (tpy)[a]	Existing Plant Actual Emissions (tpy)[b]	Net Change in Emissions (tpy)	Significant Emission Rates (tpy)[c]
NOx	44.5	174.31	-129.81	25
VOC	10.6	22.96	-12.36	25

[a] Based on potential emissions from the CTG and three new package boilers as described above operating at maximum load and the duct burner operating at maximum load firing natural gas in any 12-month rolling period.
[b] Based on actual emissions from the existing boilers averaged over calendar years 2001 and 2002.
[c] Significant emission rates triggering NNSR.

3.3 Federal Air Regulations

Prevention of Significant Deterioration (PSD)

The facility is located in an attainment area for the remaining criteria pollutants and is therefore potentially subject to PSD for these pollutants. To be classified as a major source of PSD, the source must meet one of the following sets of criteria:

- Be listed in one of the 28 named source categories set forth in Section 169 of the Clean Air Act and have controlled emissions exceeding 100 tpy of any pollutant regulated by the U.S. EPA under the Clean Air Act or

- For those sources not in a named category, have potential controlled emissions exceeding 250 tpy of any U.S. EPA-regulated pollutant.

MA DEP must also determine if a new or modified facility is subject to the requirement of the PSD regulations under 40 CFR Part 52.21. According to these provisions, the owner or operator of a major source or major modification of an existing major source must obtain a major comprehensive plan approval from the MA DEP before initiating construction of the facility. In determining the applicability of PSD requirements, the owner or operator can take credit for contemporaneous emission reductions in determining the net change in potential emission, in area included in a list of specific categories that emits or has the potential to emit 100 tpy or more of any regulated pollutant or, of not included in the list of source categories, 250 tpy or more of regulated pollutant. The PSD requirements apply not only to those pollutants that are emitted in excess of the major source thresholds, but also to any other regulated pollutants that are emitted in excess the corresponding significant emission rates established in the regulations.

The existing steam plant is classified as a major source and is located in attainment or unclassified areas for PM_{10}, SO_2, NO_2, and CO. A modification to an existing major source is subject to PSD review if the net change in the potential emissions of any regulated pollutant is equal to or greater than the corresponding significant emission rates. The net change in potential emissions is based upon the future potential emissions from the proposed sources minus the actual emissions from existing sources being retired as part of the action and contemporaneous emission changes occurring over the five years prior to operation of the new source. Again, to determine the net change in emissions resulting from the proposed action, it is assumed that the combustion turbine and package boilers are operating at full load and the duct burner is operating at full load firing natural gas. Potential emissions for the combustion turbine are based on 90 days of firing fuel oil and the remainder of the year operating on natural gas and the duct burner operating at full load firing natural gas for the entire year. Potential emissions for the boilers are based on the high pressure boiler, operating on fuel oil October 1 through April 30, and on natural gas the remainder of the year; one low pressure boiler operating on fuel oil year round, and one low pressure boiler operating half on natural gas and the other half on fuel oil for the entire year. This does not mean the high pressure boiler will not operate using fuel oil during the remainder of the year. Table 3-3 documents the net change in PM_{10}, SO_2, NO_x and CO emissions associated with the CHP. As shown, the CHP will be considered a major modification for PM_{10} and thus is subject to PSD review only for that pollutant.

Table 3-3: PSD Applicability Determination

Pollutant	Proposed CHP Potential Emissions (tpy)[a]	Existing Plant Actual Emissions (tpy)[b]	Net Change in Emissions (tpy)	Significant Emission Rates (tpy)[c]
PM_{10}	97.6	4.14	+93.46	15
SO_2	85.9	388.94	-303.07	40
NO_2	44.5	174.31	-129.81	40
CO	66.5	44.11	+22.39	100

[a] Based on potential emissions from the CTG and three new package boilers operating at maximum load oil and the duct burner operating at maximum load firing natural gas in any 12-month rolling period.
[b] Based on actual emissions from the existing boilers averaged over calendar years 2001 and 2002.
[c] Significant emission rates triggering NNSR.

New Source Performance Standards (NSPS)

The U.S. EPA has promulgated performance standards for new stationary sources pursuant to Section 111 (b) of the Clean Air Act (40 CFR Part 60). These new source performance standards (NSPS) establish emission limitations and monitoring, recordkeeping, and reporting requirements for certain categories of industrial and commercial facilities.

The initial application described that the combustion turbine would be subject to the NSPS for stationary combustion turbine (40 CFR 60, Subpart GG), while the duct burner serving the HRSG are subject to the standards for small industrial boilers (40 CFR 60, Subpart Dc). The new boilers are subject to the standards for large industrial boilers (40 CFR Subpart Db).

Since the initial application 40 CFR 60 Subpart KKKK – Stationary Combustion Turbines has been promulgated.

40 CFR 60 Subpart KKKK – Stationary Combustion Turbines

Because the project commenced construction, modification, or reconstruction after February 18, 2005, per §60.4305 the turbine is subject to this subpart. The combustion turbine will be subject to the NSPS for stationary combustion turbines which limits NO_x emissions, and sulfur content in fuel. The unit will meet the NO_x limit through the use of dry low NO_x combustion and SCR add-on control equipment, and will meet the sulfur content limit through the use of clean fuels.

Per §60.4305 (b), the turbine is specifically exempt from 40 CFR 60 Subpart GG, and the HRSG is specifically exempt from 40 CFR 60 Subpart Dc.

The package boilers are still subject to the standards for large industrial boilers (40 CFR Subpart Db). Because the new package boilers each have a maximum rated capacity of more than 100 MMBtu/hr, they will be subject to the particulate and NO_x standards under 40 CFR Subpart Db. These NSPS limit particulate emissions from affected units firing oil alone or in combination with other fuels to 0.1 pounds per million Btu and NO_x emissions from affected units firing natural gas or distillate oil to 0.2 lb/MMBtu. Note that, because the package boilers will burn a very low sulfur oil (less than 0.05 percent by weight), they will not be subject to the SO_2 standards under subpart Db. Compliance with BACT will ensure that the particulate and NO_x emissions from the new package boilers will be well below the applicable NSPS.

National Emissions Standards for Hazardous Air Pollutants (NESHAP)

Pursuant to Section 112(b) of the Clean Air Act, the U.S. EPA has promulgated the National Emission Standards for Hazardous Air Pollutants (NESHAP) under 40 CFR Parts 61 and 63. These regulations have been incorporated by reference into the Department's Air Pollution Control Regulations. The existing coal-fired boilers at the campus constitute a major source of HAP because they have the potential to emit more than 10 tons of hydrogen chloride annually. Therefore, the CTG/HRSG at the new CHP is subject to NESHAP for stationary combustion turbines (40 CFR 63 Subpart YYYY) and for industrial, commercial, and institutional boilers (Subpart DDDDD) until such time the facility is no longer a major source of HAPs. Therefore, the package boilers at the new CHP are subject to NESHAP for industrial, commercial, and institutional boilers (Subpart DDDDD). Since the initial plan approval application both Subpart YYYY and Subpart DDDDD have been promulgated. However, since Subpart DDDDD was promulgated it has been remanded. U.S EPA has determined that the Courts' invalidation of the MACT standard means that permitting agencies must now utilize the case by case provisions of Section 112(j) of the Clean Air Act to set standards for boilers. U.S. EPA is expected to release a guidance memorandum in 2008 explaining the procedures for implementing Section 112(j) decisions on the vacated MACT category.

Subpart YYYY regulates emissions of formaldehyde as a surrogate chemical for overall emissions of hazardous air pollutants (HAP). The CTG will be required to limit the concentration of formaldehyde to 91 parts per billion by volume on a dry basis (ppbvd) or less, corrected to 15 percent O_2. Compliance must be verified with an initial performance test within 180 days of startup and with subsequent annual tests thereafter. Because an oxidation catalyst will be used with the CTG, the 4-hour rolling average temperature at the catalyst inlet will also have to be maintained within the range suggested by the catalyst manufacturer.

Subpart DDDDD established emission limits for industrial, commercial and institutional boilers and process heaters. The duct burner for the CTG/HRSG is classified as a new large liquid fuel affected source because it will burn liquid and gaseous fuels with a heat input greater than 10 MMBtu/hr, and because construction began after January 13, 2003. Under Table 1 of Subpart DDDDD, the duct burner would have needed to meet the following emission limits: for particulate matter (PM), 0.03 lb per MMBtu heat input; for hydrogen chloride (HCl), 0.0005 lb/MMBtu heat input; and for carbon monoxide (CO), 400 ppmvd corrected to 3 percent O_2, calculated as a 30-day rolling average. Subpart DDDDD has been remanded. This means that permitting agencies (MA DEP) must now utilize the case by case provisions of Section 112(j) of the Clean Air Act to set standards for boilers.

The August 9, 2005 Air Plan Approval establishes particulate matter emission limits for the CTG/HRSG of 0.010 lb/MMBtu firing either natural gas or diesel fuel, as measured by 40 CFR 60 Appendix A, Method 5. The Air Plan Approval dated August 9, 2005 has separate limits for PM_{10} of 0.040 lb/MMBtu firing diesel fuel and 0.030 lb/MMBtu firing natural gas, as measured by 40 CFR 51, Appendix M, Test Method 201 or 201A and Test Method 202. This application revises the particulate emission rate for the PM_{10} when firing diesel fuel to 0.05 lb/MMBtu for the CTG/HRSG. The natural gas emission rate of 0.03 lb/MMBtu remains the same.

The August 9, 2005 Air Plan Approval establishes CO emission limits for the CTG/HRSG of 2.0 ppmvd corrected to 15 percent O_2 when firing natural gas and 6.0 ppmvd corrected to 15 percent O_2 when firing fuel oil. This application revised the CO emission limit for the CTG/HRSG to 5.0 ppmvd correct to 15 percent O_2 when firing natural gas based on vendor guarantee.

Because the duct burner will fire only natural gas, it is not subject to the performance testing or operating limits requirements of Subpart DDDDD, pursuant to 40 CFR 63.7506(a). UMass would need to submit a Notice of Compliance Status report, as required under 40 CFR 63.9, stating that only natural gas is burned. UMass would also need to maintain records demonstrating that only natural gas is burned, and include a statement to that effect in each semi-annual report as required under 40 CFR 63.7550. However, Subpart DDDDD has been remanded. This means that permitting agencies (MA DEP) must now utilize the case by case provisions of Section 112(j) of the Clean Air Act to set standards for boilers.

Additionally, therefore, the boilers at the new CHP are subject to NESHAP for industrial, commercial, and institutional boilers (Subpart DDDDD). Subpart DDDDD established emission limits for industrial, commercial and institutional boilers and process heaters. The three new package boilers are classified as new large liquid fuel affected sources because they burn liquid and gaseous fuels with a heat input greater than 10 MMBtu/hr, and construction began after January 13, 2003. Under Table 1 of Subpart DDDDD, the package boilers would need to meet the following emission limits: for particulate matter (PM), 0.03 lb per MMBtu heat input; for hydrogen chloride (HCl), 0.0005 lb/MMBtu heat input; and for carbon monoxide (CO), 400 ppmvd corrected to 3 percent O_2, calculated as a 30-day rolling average. However, Subpart DDDDD has been remanded. This means that permitting agencies (MA DEP) must now utilize the case by case provisions of Section 112(j) of the Clean Air Act to set standards for boilers.

The August 9, 2005 Air Plan Approval establishes particulate matter emission limits for each boiler of 0.011 lb/MMBtu firing diesel fuel and 0.010 lb/MMBtu firing natural gas, as measured by 40 CFR 60 Appendix A, Method 5. The Air Plan Approval dated August 9, 2005 has separate limits for PM_{10} for each boiler of 0.040 lb/MMBtu firing diesel fuel and 0.020 lb/MMBtu firing natural gas, as measured by 40 CFR 51, Appendix M, Test Method 201 or 201A and Test Method 202. An additional PM_{10} limit of 0.030 lb/MMBtu applies when firing diesel fuel, as measured by 40 CFR 51, Appendix M, Test Method 201 or 201A.

The revised Air Plan Approval establishes CO emission limits of 25.0 ppmvd corrected to 3 percent O2 when firing diesel fuel and 20.0 ppmvd corrected to 3 percent O_2 when firing natural gas.

Because the boilers will fire only diesel fuel and natural gas, they are not subject to the performance testing or operating limits requirements of Subpart DDDDD, pursuant to 40 CFR 63.7506(a). UMass would need to submit a Notice of Compliance Status report, as required under 40 CFR 63.9, stating that only diesel fuel and natural gas are burned. UMass would also need to maintain records demonstrating that only diesel fuel and natural gas are burned, and include a statement to that effect in each semi-annual report as required under 40 CFR 63.7550. However, Subpart DDDDD has been remanded. This means that permitting agencies (MA DEP) must now utilize the case by case provisions of Section 112(j) of the Clean Air Act to set standards for boilers.

Accidental Release Program

Section 112(r) of the Clean Air Act Amendments of 1990 established a program for Accidental Release Prevention, which requires affected facilities to take preventive action to avoid accidental releases of toxic or flammable chemicals. Facilities are required to prevent, detect, and respond to accidental releases through the preparation and implementation of risk management plans and hazard assessments. U.S. EPA has promulgated regulations under 40 CFR 68 that identify the list of regulated substances and threshold quantities.

Because SCR will be employed to control NO_x emissions from the combustion turbine and package boilers, ammonia will necessarily be stored on site. The SCR systems will use aqueous ammonia at concentrations of less than 20 percent and, hence, will not be subject to the Accidental Release Program under 40 CFR Part 112(r). However, these regulations include a "general duty clause" that essentially mandates that all facilities be designed to prevent the release of any hazardous material and to minimize the offsite consequences of any accidental release. The proposed ammonia storage tanks will be designed in a manner to minimize the potential for an ammonia release and to ensure that any accidental release would not cause an adverse impact on public health. An off-site consequences analysis was performed to determine the potential effects of an accidental release from the ammonia storage tanks. This analysis was conducted for the original Major Comprehensive Plan Approval application and provided to MA DEP. This analysis demonstrates that an accidental ammonia release would not cause adverse effects on public health in the vicinity of the plant. Therefore, the UMass CHP is not subject to the specific RMP requirements under 40 CFR 68.

4.0 BACT ANALYSIS

As part of the original comprehensive plan approval application and the original PSD permit application for the CHP, an analysis was conducted to determine that emissions from the new facility would represent the application of Best Available Control Technology (BACT).

Pursuant with discussions with MA DEP, a new BACT analysis was not conducted for PM_{10} for the NMCPA application. Pursuant to discussions with U.S. EPA a copy of the text the previously submitted BACT analysis conducted in 2004 for the PSD application submittal is included in Appendix A and an updated discussion provided below.

The results of the MA BACT analysis are summarized in Air Plan Approval 1B-02-043, included in Appendix A of this application package. Pursuant to discussions with John Kirzec at the MA DEP, the previous MA BACT analysis as provided in the application dated August 2002 for Air Plan Approval 1B-02-043 is provided below. According to the John Kirzec the existing MA BACT should still be applicable to the facility. The MA BACT analysis text updated to reflect the facility as built regarding equipment specification and information was submitted in the February 2008 submittal to the MA DEP and a copy is included in Appendix A.

This section demonstrates that the control devices and techniques for PM_{10} emissions from the combustion turbine/HRSG and the package boilers satisfy the BACT requirements of the PSD regulations under 40 CFR 52.21. This evaluation includes a review of previous BACT determinations made by Federal and state agencies for similar types of combustion installations around the country. It also includes an evaluation of the technical and economic feasibility of alternative technologies available for the control of PM_{10} emissions from such installations.

4.1 Technical Approach

Major new sources and modifications to existing major sources are required to apply BACT pursuant to the PSD regulations in 40 CFR 52.21(j)(2). According to the PSD regulations, BACT means *"an emissions limitation based on the maximum degree of reduction for each air pollutant subject to regulation which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case by case basis, taking into account energy, environmental and economic impacts, and other costs determines is achievable through application of production processes or available methods, systems and techniques for control of each air pollutant."*

Consistent with U.S. EPA guidance, a "top down" approach was used in the determination of BACT for the combustion turbine/HRSG and the package boilers in the original PSD permit application. Using this top-down approach, alternative control technologies were identified for PM_{10} emitted from the combustion turbine and the package boilers. Those alternatives found to be technically unfeasible were eliminated from further consideration, while the remaining technologies were ranked by their performance levels. The technically feasible alternatives were then evaluated on the bases of the associated economic, energy, and environmental impacts. If an alternative technology, starting with the most stringent, was eliminated based on any of these criteria, the next most stringent technology was evaluated until the identification of BACT in the original PSD application.

In determining BACT, the evaluation may consider the combination of: 1) change in raw material; 2) process modifications; and 3) add-on controls. Of these options, only add-on controls are available to further control PM_{10} emissions from the cogeneration and boiler units fired with either natural gas or transportation grade fuel oil. The original BACT evaluation, therefore, addressed only add-on controls for the control of PM_{10} emissions from both the combustion turbine/HRSG and the boilers at the CHP. This analysis is provided in Appendix A.

4.2 Fuel Availability

The University of Massachusetts is located in a relatively remote, low population density area of Western Massachusetts. Because of the low population density and lack of large industrial complexes, natural gas supplies have not yet been extended to this area to support continuous availability for both residential customers and large industrial/institutional end users. To provide firm gas supplies to the University in the quantities necessary to operate the new combustion equipment, it would require upgrades to pipeline capacity of both the local distribution company, Berkshire Gas, and the gas transportation company, Tennessee Gas. The extent of these upgrades would involve significant secondary environmental impacts, such as wetland disturbances, water crossings, roadway excavations, and disruptions of forested and agricultural lands. Although these upgrades would not be under the control of the University of Massachusetts, the substantial cost of providing the upgrades would likely have to be borne, in part or in whole, by the University.

An analysis of the cost-effectiveness of upgrading the pipeline system was done in 2003 for three scenarios which showed for the simplest upgrade that would allow some of the equipment to operate on a continuous basis for part of the year a cost of approximately $2.1 million dollars, to the upgrade that the new equipment to operate most of the year a cost of approximately $14.7 million dollars. Natural gas will be burned to the extent allowable by the capability of the existing fuel distribution system. Should natural gas become available in larger quantities in the future, the University of Massachusetts would then re-negotiate its contracts to allow for more natural gas utilization.

4.3 Particulate Matter

Particulate matter (PM_{10}) emissions from fuel utilization facilities are generally a result of incomplete combustion or non-combustible components in the fuel (i.e., ash). Particulate matter emissions from natural gas combustion are generally very low due to the negligible non-combustible component and high efficiency of combustion. Particulate emissions during fuel oil firing are somewhat higher due to the higher sulfur and ash contents of the fuel. There are no technically feasible or commercially available add-on controls for particulate emissions from combustion turbines or boilers fired with either natural gas or distillate fuel oil. Therefore, the most stringent level of control of particulates from the proposed combustion equipment is based on good operating practices resulting in the emission levels presented in Table 4-1. These levels are consistent with recent determinations of BACT for similar sources in the Northeast.

Table 4-1: New Proposed PM_{10} Emission Limits

Unit	PM_{10} Limits Natural Gas Firing (lb/MMBtu)	PM_{10} Limits Fuel Oil Firing (lb/MMBtu)
Combustion Turbine/HRSG	0.03	0.05
Boilers	0.02	0.04

4.4 BACT Determinations

Consistent with U.S. EPA guidance, in the original PSD application, we reviewed available databases to identify previous BACT determinations made by Federal and state agencies for similar types of combustion installations around the country. These databases included:

- Emission limits established in recently issued pre-construction permits for similar combustion installations around the country as compiled by the U.S. EPA in its "RACT/BACT/LAER Clearinghouse" (RBLC).
- Emission limits established in recently issued pre-construction permits for similar combustion installations in California as compiled by the California Air Resources Board in its "BACT Clearinghouse."

The summary of the recent BACT determinations in the original application for either simple-cycle of combined-cycle combustion turbines fired with natural gas and/or distillate fuel oil is provided in Table 3-1 in Appendix A. The summary of recent BACT determinations in the original application for industrial boilers fired with natural gas and/or distillate fuel oil is provided in Table 3-2 in Appendix A. The results of information in these of tables are discussed on pages 3-2 and 3-3 in Appendix A.

Tables 4-2 and 4-3 summarize some BACT determinations from the RBLC that have been added since 2003. These tables do not contain an exhaustive list of all recent determinations, but rather a summary of some recent determinations. Table 4-2 provides a summary of recent BACT determinations made by Federal and state agencies for either simple cycle or combined-cycle combustion turbines fired with natural gas and/or distillate fuel oil. As shown in this table, only two of the combustion turbines listed in the database are fired with both natural gas and distillate fuel oil. Of these two, only one combustion turbine is equipped with SCR, but not a CO catalyst. The PM_{10} emission limits for this unit are 0.019 lb/MMBtu when firing natural gas and 0.0358 when firing distillate fuel oil. If this unit were equipped with a CO catalyst, the PM_{10} emissions limits would be expected to be higher due to the increase formation of ammonium salts with CO catalysts. This review, therefore, generally supports the proposed PM_{10} emissions limits of 0.030 lb/MMBtu when firing natural gas and 0.050 when firing oil. The detailed RBLC Clearing house databases for combustion turbines are provided in Appendix A.

Table 4-3 provides a summary of recent BACT determinations made by Federal and state agencies for industrial boilers fired with natural gas and/or distillate fuel oil. As shown in this table, only three units are fired with natural gas and distillate fuel oil, none of which are equipped with SCR or a CO catalyst. Only one natural gas fired boiler is equipped with and SCR unit and CO catalyst (Liberty Generating Company). The limit is listed in the database as lb/hr and determined on a case-by case basis. The standard limit listed in the database under this facility is 0.008lb/MMBtu. Compliance is based on the state limit for this facility. The database does not identify whether the facility is required to conduct performance tests on the boiler to demonstrate compliance with the PM_{10} emission limit. Therefore, it is not possible to ascertain whether the PM_{10} emissions from this gas fired boiler ultimately complied with the specified PM_{10} emission limit. The remaining BACT determinations generally support the proposed PM_{10} emission limits of 0.02 lb/MMBtu when firing natural gas and 0.040 when firing fuel oil.

It should be noted that the MA DEP has made numerous BACT determinations for PM_{10} emissions from similar types of combustion installations in the Commonwealth. The MA DEP, however, has historically regulated filterable particulate emissions only, rather than total particulate emissions (i.e., both filterable and condensable particulates). These BACT determinations, therefore, do not establish a precedence for the total PM_{10} emission limits that will be established by U.S. EPA Region 1 in its BACT determination for the CHP.

Table 4-2: BACT Determinations for Combustion Turbine and Cogeneration Units

Facility	Location	Source	Heat Input (MMBtu/hr)	Fuel Type	Controls	Particulate Limit (lb/MMBtu)		Source
						Natural Gas	Fuel Oil	
CW Burdick Generating Station	NE	Combustion Turbines (2)	8000 gal/hr/ 1 MM SCF (40 MW ea)	FO/NG	WI/DLN	NA	NA	RBLC
TECO-Polk Power Station	FL	Combined -Cycle	1765	FO	WI	NA	0.009	RBLC
Forsyth Energy Plant	NC	Combined-Cycle with HRSG/DB	1844.3	NG/FO	DLN/WI/SCR	0.019	0.0358 & 0.248 w/DB FO & 0.021 w/DB NG	RBLC
MICHOUD Electric Generating Plant	LA	Combined-Cycle (2)/HRSGS/DB	1595	NG	NA	NA	NA	RBLC
Genova Arkansas, LLC	AR	Combined Cycle/DB	170 MW	NG	DLN/SCR	0.02 (DB)	NA	RBLC
Liberty Generating Station	NJ	Combined Cycle/DB	2964/3202	NG	SCR/OC	0.015 / 0.017 (DB)	NA	RBLC
Amella Energy Center	TX	Turbines with DB	1030 (total)	NG	SCR	NA	NA	RBLC

Table 4-2: BACT Determinations for Combustion Turbine and Cogeneration Units (continued)

Facility	Location	Source	Heat Input (MMBtu/hr)	Fuel Type	Controls	Particulate Limit (lb/MMBtu)		Source
						Natural Gas	Fuel Oil	
CPV Warren	VA	Combined Cycle/DB (2)	1717	NG	DLN/SCR/OC	0.013 (draft)	NA	RBLC
Caithness Blythe II, LLC	CA	Combustion Turbine	170 MW	NG	SCR	NA	NA	RBLC
FL Municipal Power Authority	FL	Combined Cycle/HRSG/DB	170 MW	NG	NA	NA	NA	RBLC
Calpine Corp-Rocky Mountain Energy Center	CO	Combustion Turbine	300 MW	NG	NA	NA	NA	RBLC
AES Red Oak, LLC	NJ	Combustion Turbine	2180	NG	SCR/OC	0.0135	NA	RBLC
Sierra Pacific Power Company	NV	Combined Cycle/HRSG/DB	306 MW	NG	NA	0.011 lb/MMBtu (3-hr rolling)	NA	RBLC
Berrien Energy, LLC	MI	Combined Cycle/DB (3)	1584	NG	DLN/OC/SCR	NA	NA	RBLC

DB means Duct Burner; HRSG, Heat Recovery Steam Generator
NG means natural gas; and FO, distillate fuel oil.
WI means water injection; DLN, Dry Low-NO_x; LNB, SCR, selective catalytic reduction; and OC, oxidation catalyst.
RBLC means the U.S. EPA RACT/BACT/LAER Clearinghouse

Table 4-3: BACT Determinations for Industrial Boilers Fired with Natural Gas and Distillate Fuel Oil

Facility	Location	Source	Heat Input (MMBtu/hr)	Fuel Type	Controls	Particulate Limit (lb/MMBtu)		Source
						Natural Gas	Fuel Oil	
Temple Inland	GA	Boiler	192.0	FO/NG Back-up	None	NA	0.05	RBLC
Miller Brewing Company	OH	Boiler	238	FO/NG/Coal	Baghouse	NA	NA	RBLC
Plum Point Associates, LLC	AR	Auxiliary Boiler	175	FO	LNB/FGR	NA	NA	RBLC
VCU East Plant	VA	Three Boilers	150	NG/FO	LNB/FGR	NA	NA	RBLC
TECO-Polk Power Station	FL	Auxiliary Boiler	120	FO	LNB	NA	NA	RBLC
Sandy Creek energy	TX	Auxiliary Boiler	175	NG	None	NA	NA	RBLC
Forsyth Energy Plant	NC	Auxiliary Boiler	110.2	NG	LNB	NA	NA	RBLC
Weston Plant	WI	Auxiliary Boiler	229.8	NG	LNB	0.0075	NA	NA
E.I. Dupont DE NEMOURS	MS	Boilers (2)	231	NG	LNB/FGR	NA	NA	RBLC
Longview Power, LLC	WV	Auxiliary Boiler	225	NG	LNB	0.0022	NA	RBLC

Table 4-3: BACT Determinations for Industrial Boilers Fired with Natural Gas and Distillate Fuel Oil (continued)

Facility	Location	Source	Heat Input (MMBtu/hr)	Fuel Type	Controls	Particulate Limit (lb/MMBtu)		Source
						Natural Gas	Fuel Oil	
Genova Arkansas, LLC	AR	Auxiliary Boiler	33	NG	LNB or FGR	0.012	NA	RBLC
AES Huntington Beach	CA	Boiler	225	NG	LNB/FGR/SCR	N/A	N/A	RBLC
Williams Refining &Marketing, LLC	TN	Boiler	180	NG	NA	0.0075	NA	RBLC
Williams Refining &Marketing, LLC	TN	Stabilization Reboiler	54	NG	NA	0.005	NA	RBLC
Liberty Generating Station	NJ	Auxiliary Boiler	200	NG	OC/SCR	NA	NA	RBLC
Amella Energy Center	TX	Auxiliary Boiler	155	NG	NA	NA	NA	RBLC
Sierra Pacific Power Co.	NV	Auxiliary Boiler	159	NG	NA	0.004 (3-hr rolling)	NA	RBLC
Lawton Energy Cogen Facility	OK	Auxiliary Boiler	NA	NG	DLN	NA	NA	RBLC

NG means natural gas; and FO, distillate fuel oil.
WI means water injection; DLN, Dry Low-NO_x; LNB, Low NO_x Burner; FGR, Flue Gas Recirculation; SCR, selective catalytic reduction; and OC, oxidation catalyst.
RBLC means the U.S. EPA RACT/BACT/LAER Clearinghouse

4.5 BACT Evaluation

The emissions of PM_{10} from the combustion turbine/HRSG and package boilers result from inert material contained in the fuels, particles introduced with the combustion air, particulates consisting of unburned carbon, and ammonia salts formed by the reaction of ammonia with SO_2 and NO_x. The bulk of the total PM_{10} is attributable to the ammonium salts formed downstream of the SCR and oxidation catalyst systems. Regardless of the formation mechanism, all of the particulate emitted from combustion turbine/HRSG and the boilers are expected to be less than 1.0 microns in diameter.

4.5.1 Regulatory Precedence

In the preamble to the New Source Performance Standards (NSPS) for Stationary Gas Turbines (40 CFR 60 Subpart GG), the U.S. EPA recognized that "particulate emissions from stationary gas turbines are minimal." Furthermore, the U.S. EPA found that particulate control devices are not typically installed on combustion turbines and that the cost of installing a particulate control device is prohibitive. The U.S. EPA, therefore, decided not to promulgate performance standards for particulate matter from stationary gas turbines. Since the initial application 40 CFR 60 Subpart KKKK – Stationary Combustion Turbines has been promulgated and because the project commenced construction, modification, or reconstruction after February 18, 2005, per §60.4305 the turbine is subject to this subpart. Per §60.4305 (b), the turbine is specifically exempt from 40 CFR 60 Subpart GG, and the HRSG is specifically exempt from 40 CFR 60 Subpart Dc.

Similarly, the U.S. EPA concluded that particulate control devices were neither practical nor cost-effective for boilers fired with natural gas or distillate fuel oil in the establishing of the NSPS for Industrial/ Commercial/ Institutional Steam Generating Units (40 CFR 60 Subpart Db). The U.S. EPA, therefore, did not promulgate performance standards for particulate matter from such boilers fired with either natural gas or distillate fuel oil. The new boilers at CHP are subject to 40 CFR 60 Subpart Db.

These NSPS limit particulate emissions from affected units firing oil alone or in combination with other fuels to 0.1 pounds per million Btu. The proposed limits are less than 0.1 pounds per million Btu.

4.5.2 Alternative Control Technologies

The most stringent particulate control method demonstrated on combustion turbines and institutional boilers is the use of fuels with low ash contents (such as natural gas or low sulfur transportation diesel). In the RBLC and CARB BACT Clearinghouse, the predominant control methods listed for combustion turbines or industrial boilers are the use of proper combustion controls and the firing of low-ash fuels. There were no listings for combustion turbines or boilers firing these fuels that were equipped with add-on controls, such as electrostatic precipitators or baghouses for units firing only natural gas or fuel oil. These types are of add-on control devices are not considered practical or cost effective due to the low grain loading in the combustion gases (ranging from less than 0.01 lb/MMBtu to 0.05 lb/MMBtu), the extremely small size of the filterable particulate (almost entirely less than 1.0 micron), and the high proportion of condensable particulate (typically 60 to 80 percent of total particulate).

4.5.3 Conclusions

The proposal control techniques for PM_{10} emissions from the combustion turbine/HRSG and the boilers are the use of proper combustion controls and firing of clean fuels. Specifically, PM_{10} emissions will be controlled by means of the following devices and techniques:

- the use of clean fuels will minimize particulate attributable to the carryover of inert material in the fuel;
- the installation of high-performance combustors or burners will minimize the formation of unburned carbon in the combustion unit;
- the installation of high-efficiency filters will remove particles from the combustion air before being introduced into the combustion unit; and
- the maintenance of low ammonia slip will minimize the formation of ammonium salts downstream of the SCR and oxidation catalyst systems.

Based on the original review of previous control technology determinations and evaluation of alternative control devices and techniques, the proposed control measures are considered representative of BACT for total PM_{10} emissions from the combustion turbine/HRSG and the boilers installed at the new CHP. The proposed PM_{10} emissions limits for the combustion turbine/HRSG and the boilers are summarized in Table 4-1.

5.0 AIR QUALITY IMPACT ASSESSMENT

This section describes the dispersion modeling approach and predicted impacts of the CHP emission sources on air quality. The dispersion modeling analysis was conducted in accordance with procedures documented in the air quality modeling protocol letter submitted to MA DEP and U.S. EPA, Region I, on November 20, 2007 (Appendix D). The modeling approach was revised based on a technical memo dated January 22, 2008 concerning the configuration of stacks and screens, U.S. EPA comments provided in a meeting with U.S EPA Region I on February 7, 2008, a technical memo dated February 28, 2008 to address stack merging, and follow-up discussions with U.S. EPA Region I. (The protocol letter and both technical memos are included in Appendix C.)

The modeling results show compliance with applicable ambient standards and increments. For the CHP alone, maximum predicted 24-hour average concentrations of PM_{10} are greater than the corresponding Significant Impact Level (SIL). Modeling analysis for 24-hour average PM_{10} was therefore required, to assess the impact of the CHP in combination with other major sources in the surrounding area.

Results of this "interactive" modeling analysis demonstrate compliance with the 24-hour average NAAQS and PSD allowable increment for PM_{10}.

5.1 Technical Approach

The objective of the air quality modeling analysis is to demonstrate that the predicted impacts of the proposed project will comply with the applicable NAAQS and PSD allowable increments for PM_{10}. Currently, the Towns of Hadley and Amherst are located in a region classified as attainment (or unclassified) for PM_{10}. To identify those new sources with the potential to violate or contribute to a violation of ambient air quality standards, the U.S. EPA has adopted significant impact levels (SILs) for pollutants subject to PSD requirements. If the impacts of a new source are found to be below the SILs, no further analysis is required to assess compliance with ambient air quality criteria. If the impacts are found to exceed the SILs, on the other hand, a more detailed dispersion modeling analysis is required to assess compliance with ambient air quality standards. This analysis must consider the impacts associated not only with the new source, but also with existing sources in the region. The applicable standard, increment and SIL for 24-hour average PM_{10} are summarized in Table 5-1. For a modeling demonstration, the "design value" for assessing compliance with the NAAQS for PM_{10} is the highest sixth-highest predicted concentration over the five-year modeling period (40 CFR Part 51 Appendix W, Section 7.2.1.1).

5.1.1 Source Parameters

As previously stated, the combustion turbine generator unit and the package boilers will have the capability of firing both natural gas and transportation grade fuel oil. Because the emissions of PM_{10} are greater when firing fuel oil than when firing natural gas, the modeling analysis considered primarily the fuel oil firing configuration for the combustion installations. Table 5-2 provides the emission rates and the stack parameters for the combustion turbine generator firing oil or natural gas, plus the HRSG with the duct burner firing natural gas only, under various operating loads and meteorological conditions. The stack parameters for the package boilers under various operating loads are provided in Table 5-3. The three boiler stacks were modeled as a single merged stack; the emissions and the stack parameters are listed for the individual boilers and for the merged stack. Note that, because the emergency generator (black start generator) would operate only if the combustion turbine were out of service, this source was not included in the air quality modeling analysis.

Table 5-1: National Ambient Air Quality Standards, PSD Increments and Significant Impact Levels for Modeled Pollutants

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)	Class II PSD Increment ($\mu g/m^3$)	Class II PSD Significant Impact Levels ($\mu g/m^3$)
PM_{10}	24-hour	150[1]	30[2]	5

[1] Not to be exceeded more than once per year on average over 3 years.
[2] Not to be exceeded more than once per year.

Table 5-2: Emissions and Stack Parameters for Combustion Turbine

Modeling Inputs	**100% Load Natural Gas**						**100% Load Diesel Oil**					
Ambient Temperature, F	0	0	60	60	100	100	0	0	60	60	100	100
Duct Burner	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Stack Exhaust temperature, K	474	434	467	431	463	428	473	434	468	430	463	427
Stack exit velocity, m/s	23.53	21.70	20.71	19.28	18.11	16.94	23.54	21.77	20.26	18.86	17.38	16.21
Pollutant, g/s												
PM_{10}	0.52	0.87	0.46	0.76	0.41	0.66	0.83	1.39	0.70	1.18	0.60	0.99
	75% Load Natural Gas						**75% Load Diesel Oil**					
Ambient Temperature, F	0	0	60	60	100	100	0	0	60	60	100	100
Duct Burner	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Stack Exhaust temperature, K	478	432	470	428	464	426	477	431	470	428	464	425
Stack exit velocity, m/s	22.48	20.52	18.92	17.45	16.34	15.15	22.33	20.43	18.44	17.00	15.72	14.57
Pollutant, g/s												
PM_{10}	0.44	0.78	0.38	0.66	0.34	0.57	0.70	1.25	0.58	1.03	0.51	0.88
	50% Load Natural Gas						**65% Load Diesel Oil**					
Ambient Temperature, F	0	0	60	60	100	100	0	0	60	60	100	100
Duct Burner	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Exhaust temperature, K	473	429	465	426	460	424	476	431	468	426	464	424
Stack exit velocity, m/s	20.12	18.56	16.66	15.40	14.42	13.41	21.52	19.66	17.58	16.23	15.09	13.91
Pollutant, g/s												
PM_{10}	0.38	0.68	0.33	0.56	0.29	0.49	0.66	1.19	0.55	0.97	0.48	0.84

Table 5-3: Emissions and Stack Parameters for Package Boilers

	Boiler 200		Boiler 300		Boiler 400		Merged Stacks	
	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil
Ambient Temperature, F	80	80	80	80	80	80	80	80
	100% Load							
Stack Exhaust temperature, K	436	434	426	425	426	425	430	428
Stack exit velocity, m/s	16.61	16.93	14.72	14.97	14.72	14.97	15.35	15.63
Pollutant, g/s								
PM_{10}	0.45	0.87	0.41	0.79	0.41	0.79	1.27	2.45
	75% Load							
Stack Exhaust temperature, K	419	417	410	409	410	409	413	412
Stack exit velocity, m/s	11.87	12.10	10.56	10.68	10.56	10.68	11.00	11.15
Pollutant, g/s								
PM_{10}	0.34	0.65	0.30	0.59	0.30	0.59	0.94	1.82
	50% Load							
Stack Exhaust temperature, K	404	402	397	397	397	397	400	399
Stack exit velocity, m/s	7.71	7.88	6.87	6.99	6.87	6.99	7.15	7.29
Pollutant, g/s								
PM_{10}	0.22	0.43	0.20	0.39	0.20	0.39	0.63	1.21

5.1.2 GEP Stack Height

The top of the CHP turbine stack and the top of the boiler stacks are 125 feet above ground elevation. The Good Engineering Practice (GEP) Guidelines indicate that nearby building obstacles taller than 50 feet may produce wake effects that influence dispersion from these stacks. The Turbine and Boiler Building has a barreled roof, with a peak height of 56 feet where it meets the base of the stacks, and an eave height of 25 feet. The stacks are bracketed on the north and south by a pair of perforated screens with an estimated effective open area in excess of 50%. The top of the screens is 118 feet above ground level. The east and west sides of the stacks are open. Drawings and photographs of the CHP building, stacks and screens are provided in Appendix C.

To account for the potential influence of wake effects from the Turbine and Boiler Building and the stack enclosure (screens), building obstacle inputs for AERMOD were developed using U.S. EPA's Building Profile Input Program (BPIP-PRM, version 04274). The stack enclosure was specified as two curved (solid) walls; the BPIP software includes no provisions for a porous structure such as a perforated screen. Recognizing that perforated screens will produce less wake effect than a solid wall, however, the screens were modeled at a reduced (lower) height of 112 feet 4 inches, rather than at the actual height of 118 feet. The compliance modeling results reported here are based on this effective (reduced) screen height. Dr. Ronald Petersen of CPP Wind Engineering, a nationally recognized expert in the study of building wake effects on dispersion, has provided an assessment of the "effective height" for the screens, based on his wind-tunnel experience with obstacles that partially obstruct air flow around building structures. Dr. Petersen's analysis indicates that the effective height of the screens is less than 100 feet. A copy of Dr. Petersen's analysis with supporting documentation is included in Appendix C.

5.1.3 Model Selection

The AERMOD model, version 07026, was used in this application. The U.S. EPA *Guideline on Air Quality Models* (40 CFR 51, Appendix W) recommends AERMOD for applications involving combustion sources and industrial facilities located in flat or moderate terrain.

5.1.4 Meteorological Data

Dispersion models use meteorological data, including wind speed and wind direction, to simulate the transport and dispersion of air contaminants in the atmosphere. According to the U.S. EPA *Guideline on Air Quality Models*, modeling analyses should use either one year of on-site observations or five years of nearby, representative observations compiled by the National Weather Service.

No on-site meteorological measurements are available at the project site; representative observations from the nearest NWS station were therefore used in the modeling analysis. The nearest first-order weather station is located at Westover Air Force Base (AFB) in Chicopee Falls, Massachusetts (FAA Identifier CEF, WBAN No. 14703). This station is located approximately 13 miles south of the site. The most recent data record from Westover AFB has many missing hours; whereas, a nearly complete five-year data record is available for 1991 through 1995. These data, therefore, were used in the air quality modeling analysis. The nearest upper air soundings collected during the same period are available from Albany, New York (FAA Identifier ALB, WBAN No. 14735). These soundings were used in conjunction with the surface observations from Westover AFB to develop the meteorological inputs used in the modeling analysis.

AERMET (version 04300) was used to process the surface and upper air data to produce the input files required by AERMOD. AERMET requires inputs for roughness length, albedo, and daytime Bowen ratio, which are determined based on land surface characteristics in the vicinity of the anemometer site (at Westover AFB). Land use characteristics were determined using the U.S. EPA processor program AERSURFACE (version 08009). Land use data at 30-m resolution were obtained from the USGS 1992 National Land Cover Data archive (NLCD 92), as recommended in the AERSURFACE Users Guide (U.S. EPA, 2007).

The default monthly seasonal classifications were used, with snow cover specified for winter months; the "airport" flag was specified for the area around the meteorological surface station. For the Bowen ratio calculations, months during 1991-95 were classified as "wet", "normal", or "dry", following the criteria specified in the AERSURFACE Users Guide. Monthly precipitation records were obtained from the Massachusetts Department of Conservation and Recreation for Westover AFB ("Granby"), and precipitation statistics were calculated for the 57-year period from 1951 through 2007 to determine the 30th percentile and 70th percentile monthly precipitation values.

Documentation of meteorological data processing is documented on the data CD with modeling files that accompanies this application. Files are provided that document the conversion of original surface data from the International Surface Weather Observation (ISWO) format to a format (SAMSON) accepted by AERMET, and the derivation of parameters such as relative humidity. AERMET Stage 1 and Stage 2 processing served to identify data gaps; a second set of data for CEF obtained from NCDC (in different format) was used to fill data gaps. The final (Stage 3) AERMET processing incorporates the surface parameters derived based on land use information using AERSURFACE. Equivalent processing steps were followed to prepare the upper air input files. Upper air data gaps were filled using archived NOAA data from the North American Regional Reanalysis (NARR) program.

5.1.5 Model Receptors

The two stacks (one for the combustion turbine and one for the package boilers) are adjacent to each other. A polar grid to 20 kilometers was defined to determine the Significant Impact Area. Modeling receptors were located every 10 degrees at the following distances from the midpoint between the two stacks:

- 100-meter intervals from 100 to 2,000 meters;
- 250-meter intervals from 2,000 to 5,000 meters;
- 1000-meter intervals from 5,000 to 10,000 meters; and
- 2500-meter intervals from 10,000 to 20,000 meters.

To characterize near-field impacts (inside 100 m), receptors were also placed at 10 m spacing around the perimeter of the CHP building, with partial rings of receptors at 50 m and 75 m. In addition, 21 receptors were placed at sensitive locations in the immediate vicinity of the site. The Earth Tech program RECMAKE_POLAR.4, equivalent to AERMAP (v06341) was used to process the receptor elevations and associated hill heights. USGS seamless digital terrain data with a resolution of 9 meters were used in RECMAKE_POLAR.4. (AERMAP was not used; this software is not compatible with seamless digital terrain files.)

5.1.6 Background Air Quality

The CHP is located in Hampshire County, which is currently designated as an attainment area for all modeled pollutants. If the projected impacts of the CHP are greater than the SILs, background contributions from major sources affecting the Significant Impact Area, along with the contribution of other smaller sources estimated from monitored background must be added to the projected impacts of the new plant to determine compliance with the standards. As described below, modeling results for CHP indicate that predicted impacts exceed the SILs for 24-hour average PM_{10}.

The major sources of PM_{10} located within 25 km of the proposed site were identified by John Kirzec of the MA DEP Western Region. These sources include the following combustion installations: Smith College, Mount Tom, Solutia, MMWEC, MASSPOWER, and Stony Brook. Emission rates for several sources were adjusted upward to account for condensable particulates, since the allowable emission rates were set based only on the filterable fraction. (These adjustments were described in detail in the modeling report for the 2004 PSD application.) Of these sources, MMWEC, MASSPOWER and Stony Brook are subject to the PSD regulations for PM_{10} and were included in the assessment of PSD allowable increment consumption. Table 5-4 summarizes the stack parameters for the existing PM_{10} sources.

To estimate the contribution of other sources in the region, ambient background concentrations of 24-hour average PM_{10} were conservatively estimated based on peak concentrations measured at a representative MA DEP monitoring station over the last three years. Table 5-5 summarizes the estimated background concentrations. It should be noted that the minor source baseline for PM_{10} has not been triggered in either the Towns of Amherst or Hadley, Massachusetts.

5.2 Air Quality Modeling Results

Three combustion-turbine operating cases (0°F on oil, with duct burner) and three package-boiler operating cases were combined in four operating scenarios: 100% load (all units), 75 % load (all units), "high/low" (turbine at 100% load; boilers at 50%) and "low load" (65% load for turbine, 50% load for boilers). Impacts were evaluated separately for the turbine and the boilers, and for both combined. Each scenario was run for five successive one-year periods, 1991 through 1995. The maximum predicted impacts for the combustion turbine and for the boilers were generally associated with the 100% load condition. (For the boilers, however, the peak 1-hour impact for CO and the peak 3-hour impact for SO_2 were predicted at 75% load.) Annual average impacts for NO_2 were predicted for an annual emission scenario, with the turbine operating at 100% load (emission rates scaled to reflect 6600 hours per year on gas, 2160 hours per year on oil), with boilers operating as follows Boilers 200 and 300 on oil, Boiler 400 half on oil, half on gas during winter months (October through April); and Boiler 200 on gas, Boiler 300 on oil, Boiler 400 half on oil, half on gas during summer months (May through September). For all other pollutants, annual average impacts were calculated based on peak short-term emission rates.

5.2.1 Predicted Impacts of CHP

The results of the air quality modeling analysis for the CHP are presented in Table 5-6. The maximum 24-hour PM_{10} concentration of PM_{10} is greater than the SIL. Two isopleth plots illustrate the maximum predicted 24-hour PM_{10} concentrations for the worst year, 1991. The spatial pattern of maximum predicted impacts for the full receptor grid is shown in Figure 5-1; a detailed plot for the area within 1 km of the stacks is provided in Figure 5-2. The predicted PM_{10} concentrations exceed the SILs in a small area within 1500 m east of the CHP, and in two areas with elevated terrain, one area located approximately 5.0 to 12.5 km north of the site and a smaller area approximately 10 km south of the site. Because the maximum CHP impact exceeds the SIL, a more detailed "interactive" modeling analysis is required to assess compliance with NAAQS and PSD allowable increments for PM_{10}, within those areas where the CHP impacts are above the SIL. This analysis must consider the impacts of the new source, in combination with other permitted sources in the region. The full receptor grid was used for the NAAQS and PSD increment compliance analyses.

Table 5-4: Existing PM_{10} Sources in the Region

Source	Heat Input (MMBtu/hr)	UTM Coordinates (m)		Stack Height (m)	Stack Diameter (m)	Temperature (K)	Exit Velocity (m/s)	Allowable PM_{10} Emissions (g/s)	Adjusted PM_{10} Emissions (g/s)
		Easting	Northing						
Smith College	289.2	694526	4687220	48.77	1.32	422.2	25.65	4.02	4.39
Mt. Tom	1,480	697444	4683710	112.77	3.05	422.2	28.12	14.92	24.62
MMWEC	952	704186	4670050	45.72	4.72	394.4	6.17	14.39	14.39
	952	704186	4670050	36.57	4.34	672.2	12.43	9.60	9.60
Solutia	249	704650	4670230	59.74	2.13	422.2	9.66	0.85	1.60
MASSPOWER	1,250	705536	4674730	64.92	4.80	394.4	15.68	15.44	15.44
Stony Brook Phase II	2,377	705514	4674860	45.9	5.49	363	21.2	4.79	4.79

Table 5-5: Estimated Background Concentration of PM_{10}

Pollutant	Station ID	Location	Averaging Period	Peak Measured Concentration[a] (µg/m³) 2004	2005	2006	Background Concentration[a] (µg/m³)
PM_{10}	25-013-2009	Springfield	24-hour				51
			Highest	80	61	51	
			Second-high	48	53	49	
			Third-high	45	47	46	

[a] The background concentration for PM_{10} is based on the 4th highest 24-hour concentration over 3 years at the selected monitoring station.

Table 5-6: AERMOD Predicted Maximum Impacts for CHP

Pollutant	Averaging Period	Maximum Predicted Impact (µg/m³)	Direction and Distance (m, deg)	Class II PSD Significant Impact Level (µg/m³)
PM_{10}	24-hour	8.65	8000, 360	5

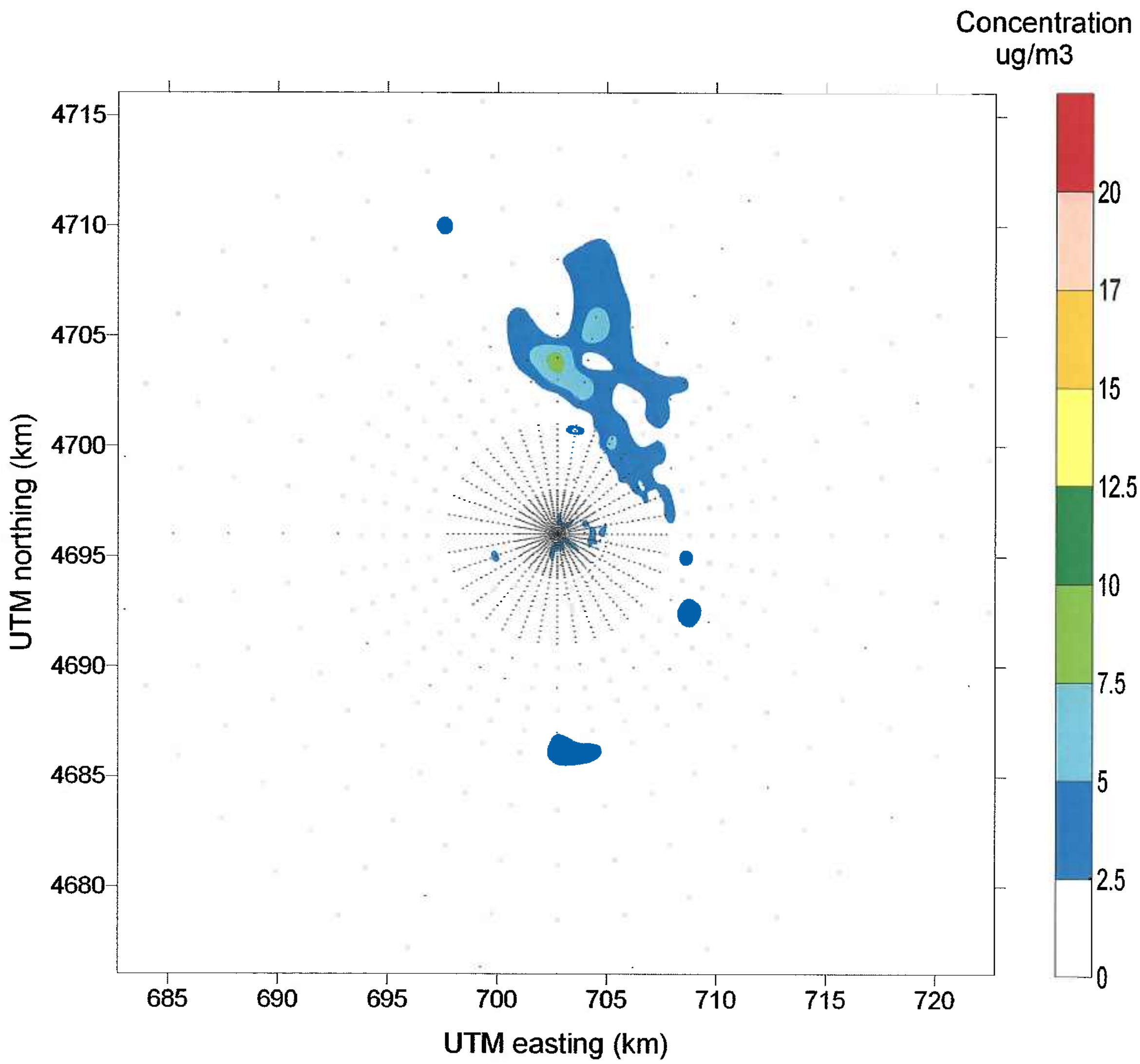

Figure 5-1: Maximum predicted 24-hour average PM_{10} impacts from CHP (1991) for full receptor grid

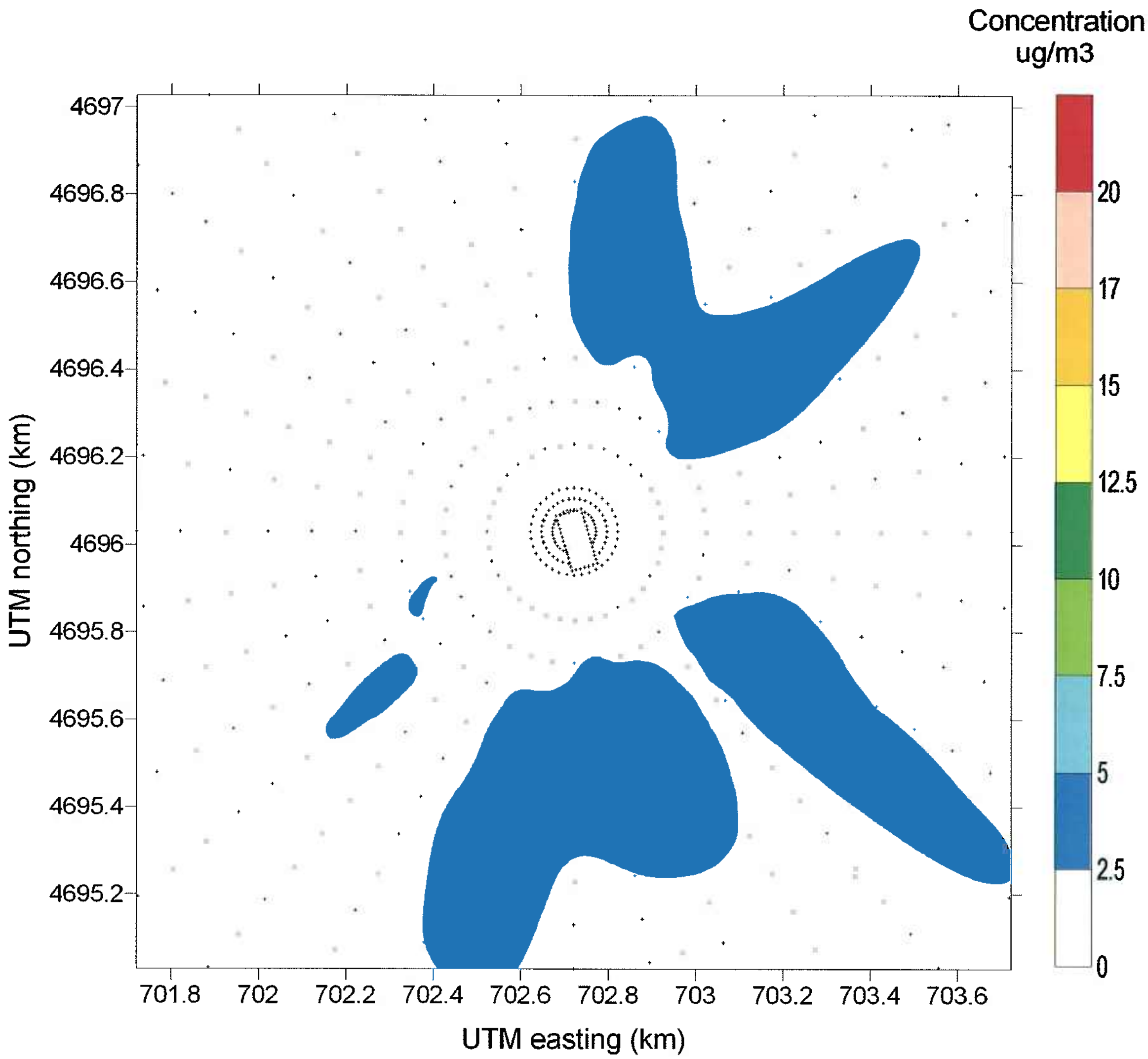

Figure 5-2: Maximum predicted 24-hour average PM_{10} impacts within 1 km of CHP (1991)

5.2.2 NAAQS Compliance Analysis

The AERMOD model was used to predict the maximum 24-hour PM_{10} concentrations attributable to the proposed CHP, other existing major sources, and for the five-year period of 1991 through 1995. The highest sixth-highest predicted concentration for the five-year modeling period, plus background, is compared with the NAAQS in Table 5-8. The sixth highest 24-hour prediction over the five-year period is the third highest prediction for the year 1991. The spatial pattern of predicted third-highest 24-hour impacts for 1991 for PM_{10} is shown in Figure 5-3. As shown in Table 5-7, the predicted design concentration for 24-hour PM_{10} is well below the NAAQS. The peak event and location for the combined impact of the CHP and other sources is not the peak event for the CHP alone, or for the other sources alone.

Table 5-7: NAAQS Compliance Analysis for 24-hour Average PM_{10}

NAAQS compliance 24-hour average PM-10 6th highest over 5 years	Concentration ($\mu g/m^3$)	Date/Time year/month/day	Location UTM-E (m)	Location UTM-N (m)	Location elevation (m)
Combined impact	10.07	1991/10/08	702721.4	4704030.0	141.7
Background	51.0				
Total concentration	61.1				
NAAQS	150				
6th highest – CHP	5.42	1995/10/03	699901.8	4695004.0	155.1
6th highest – other	9.62	1994/08/26	709558.6	4677235.0	170.3
CHP contribution to overall 6th highest	4.30				

5.2.3 PSD Increment Consumption Analysis

AERMOD was also applied to assess compliance with the Class II PSD increment for 24-hour average PM_{10}. The highest, second-high 24-hour concentration associated with the proposed plant and other PSD sources is compared with the applicable Class II allowable increment in Table 5-8. As shown in Table 5-10, the predicted peak 24-hour PM_{10} impact is below the corresponding PSD allowable increment. The H2H predicted impact from all sources combined is 9.84 $\mu g/m^3$, less than one-third of the PSD increment. This peak prediction is dominated by other sources; the CHP contribution to this event is only 0.04 $\mu g/m^3$, and the location is more than 6 km away from the location of the peak impact from CHP alone.

Table 5-8: PSD Compliance Analysis for 24-hour PM_{10}

PSD Increment Analysis **H2H 24-hour average PM_{10}**	**Concentration** ($\mu g/m^3$)	**Date/Time** year/month/day	**UTM-E** (m)	**Location** **UTM-N** (m)	**elevation** (m)
H2H - combined	9.84	19911208	706139.8	4686632.5	199.8
PSD increment	30.00				
H2H - CHP alone	6.18	19920519	699901.8	4695004.0	155.1
H2H - other sources	9.80	19911208	706139.8	4686632.5	199.8
CHP contribution to H2H	0.04				

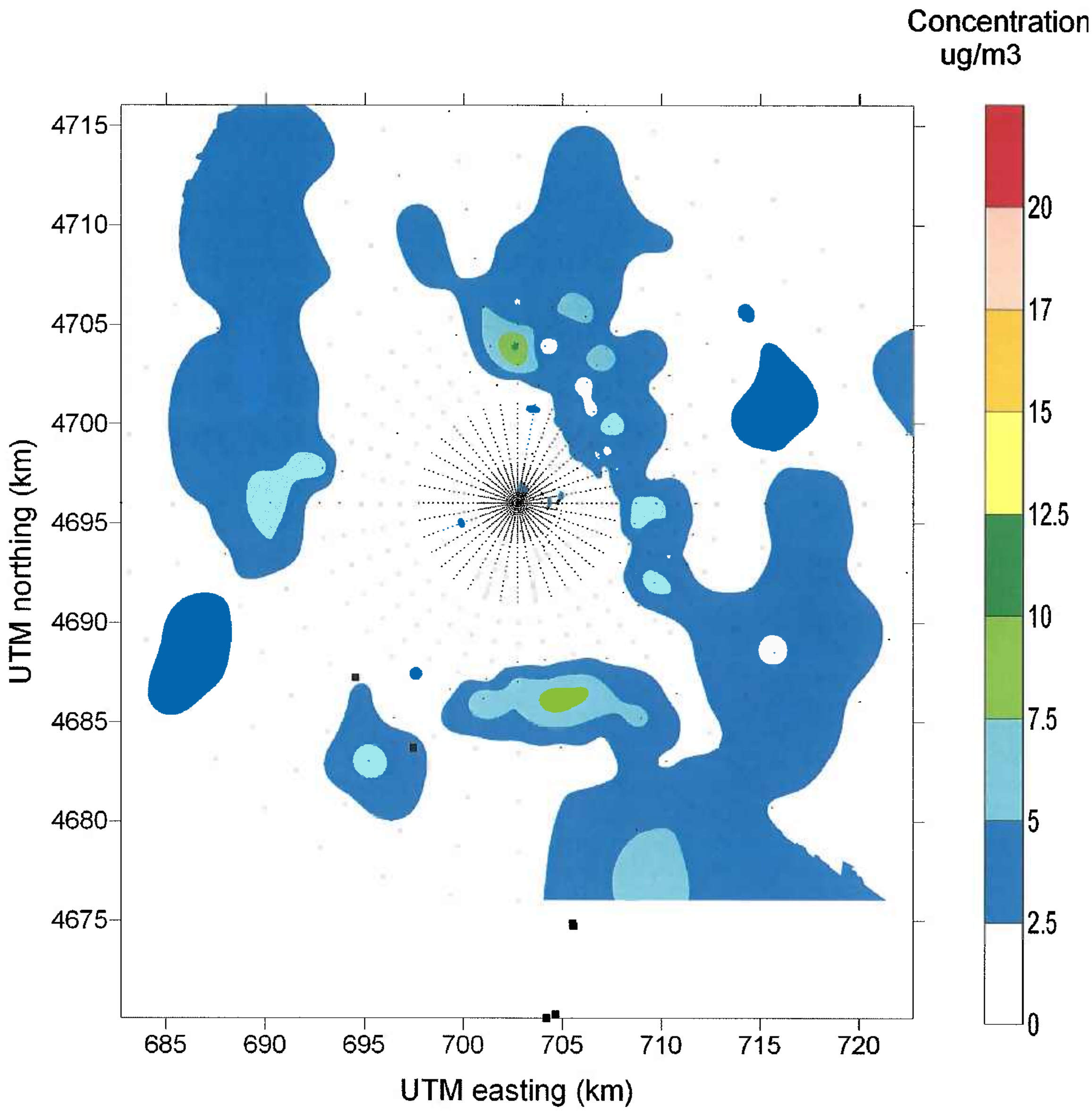

Figure 5-3: Predicted 6th Highest 24-hour Average PM_{10} Impact over 5 Years from CHP plus Other Major Sources (Maximum Predicted Impacts for 1995)

5.2.4 Conclusions

In conclusion, the modeling analysis indicates that the proposed CHP will neither cause nor contribute to a predicted violation the NAAQS for 24-hour average PM_{10}. By definition, therefore, the proposed plant will not have an adverse effect on public health or welfare in the area. Furthermore, the plant will neither cause nor contribute to a predicted exceedance of the PSD Class II allowable increment for 24-hour average PM_{10}, and thus will not cause or contribute to a significant deterioration of existing air quality.

5.3 Class I Area Analysis

The proposed CHP is considered a major modification for PM_{10} and thus is subject to PSD review only for that pollutant. The PSD regulations include the requirement to assess the plant's potential impacts on air quality and visibility in Class 1 Areas. In this instance, the closest Class 1 Area is the Lye Brook Wilderness Area in Vermont, which is approximately 86 kilometers north-northwest of the Amherst Campus.

The potential emissions of the proposed units were compared with the actual emissions from existing units in determining the applicability of the PSD regulations. Based upon this comparison, the replacement of the existing steam plant with the CHP would result in a significant net increase of PM_{10}. On the other hand, the project would result in dramatic reductions in the potential emissions of both SO_2 and NO_x. It should be noted that, because the existing and proposed units are intended to provide steam for electrical generation and space heating on campus, the replacement of the existing plant with the CHP in actuality would result in a reduction in the actual emissions of all pollutants including PM_{10}, SO_2, and NO_x.

The major concern at Class I areas is the degradation of visibility resulting from long-range transport of pollution from distant major sources. Visibility is degraded by visible light scattered into and out of the line of sight and by light absorbed along the line of sight. Light extinction is the sum of light scattering and absorption and is usually quantified using the light extinction coefficient (b_{ext}). For the far field, like the impacts of the CHP at Lye Brook, the light absorption is due to elemental carbon or soot. The light scattering is due to the fine particulate smaller than 2.5 microns (fine primary particulate emitted directly from the plant and secondary particulate formed from SO_2 and NO_x) and from coarse particulate larger than 2.5 microns, but less than 10 microns, emitted directly from the plant.

Particle scattering coefficients for the components of atmospheric particulate are provided in the *Federal Land Managers' Air Quality Related Values Workgroup Phase I Report,* December 2000. These coefficients are multiplied by the mass concentration of each particulate species. For the fine particulate, ammonium sulfate and ammonium nitrate have a dry scattering coefficient of 3, organic aerosols a coefficient of 4, and soil (or fine primary plant particulate) a coefficient of unity. Sulfates and nitrates are further multiplied by a relative humidity factor that is equal to or greater than one and can be as large as 18. All coarse particulate have a coefficient of 0.6. This means that reducing concentrations of sulfates and nitrates would be far more efficient in improving visibility than reducing concentrations of primary particulate. Therefore, even if the project were to cause a slight increase in particulate emissions, the reduction in SO_2 and NO_x emissions (and the preferential scattering of light by sulfates and nitrates) would result in an improvement in visibility in the Lye Brook Wilderness Area.

Based upon these considerations, the University of Massachusetts Building Authority requested assistance from the U.S. Forest Service (USFS) in establishing the need to assess the impacts of the proposed project on air quality and visibility in the Lye Brook Wilderness Area. In the USFS's response of June 12, 2002, the agency determined that *"there will be no adverse impacts, and possibly a net benefit, to the Lye Brook Wilderness connected to the proposed modifications to the University of Massachusetts Central Heating Plant)".* Accordingly, the USFS stated that no air quality or visibility analysis would be required for the Lye Brook Wilderness Area.

5.4 Additional Impact Analyses

The PSD regulations require additional impact analyses to consider the project's potential effects on soils and vegetation and the potential impact of secondary growth. Because the project is classified as a major modification for PM10, these analyses only address project effects for PM10.

5.4.1 Secondary Growth

The proposed CHP is intended to produce steam used for electrical generation and space heating, which was produced by the existing steam plant. The project, therefore, is not expected to induce secondary growth beyond what is otherwise anticipated at the campus. The work force for construction is temporary and not sufficiently large to induce secondary growth, and no growth in operating staff is anticipated. Thus, no secondary growth related to the work force is expected for either construction or operation of the CHP.

5.4.2 Soils and Vegetation

The PSD regulations require analysis of air quality impacts on sensitive vegetation types, with significant commercial or recreational value, or sensitive types of soil. This analysis was performed by comparing the predicted impacts with screening levels presented in the U.S. EPA document, "*A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils and Animals*" (U.S. EPA 1980). It should be noted that the screening levels represent the minimum concentrations in either plant tissue or soils at which adverse growth effects or tissue injury were reported in the literature. Accordingly, the screening levels typically represent the lowest concentrations having an adverse effect on the most sensitive vegetation. If the impacts of the proposed plant are shown to be below these screening levels, therefore, it should not have an adverse impact on the vegetation grown in the region, including produce and tobacco.

The designated vegetation screening levels for criteria pollutants are equivalent to or exceed NAAQS and/or PSD increments. Therefore, compliance with the NAAQS and PSD increments would ensure compliance with sensitive vegetation screening levels. In particular, the U.S. EPA found that the information used in developing the NAAQS for total suspended particulate (TSP) would suffice for the evaluation of impacts on sensitive vegetation and soils. However, the U.S. EPA also found that trace metals in TSP may have greater impacts on vegetation and soils than the total amount of particulate matter. Therefore, this evaluation focuses on the deposition of trace metals potentially emitted from the proposed plant on soils and the subsequent uptake by plants. Note that no credit was taken for the reduction in particulate and trace metal emissions resulting from the decommissioning of the existing steam plant.

The deposition of trace metals on soils was evaluated using the screening techniques presented in U.S. EPA's document, "*A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals.*" This evaluation provides screening level estimates of deposited trace element concentrations based on a three-centimeter soil depth, an assumed 30-year life for the facility, and maximum annual concentrations of trace elements. The soil concentrations are calculated as follows:

$$DC = 21.5 * (N/d) * X_g$$

where: DC is the soil concentration (parts per million wet),
N is the expected lifetime of the source (assume 30 years),
d is the depth of the soil through which the deposited material is found (assume 3 centimeters), and
X_g is the maximum annual concentration of the trace elements attributable to the project ($\mu g/m^3$).

Using this procedure, the calculated soil concentrations were compared to acceptable soil screening levels provided by U.S. EPA. Soil concentrations are also used to calculate plant tissue concentrations assuming default plant to soil ratios provided by the screening methodology. Plant tissue concentrations were then compared to acceptable tissue screening concentrations and dietary screening concentrations for animals.

The predicted soil concentrations due to plant emissions are compared with the soil screening levels in Table 5-9. These results indicate that projected trace element soil concentrations are well below the screening levels for all metals.

Table 5-9: Trace Element Soil Concentrations Compared to Screening Levels

Pollutant	Maximum Deposition Concentration (ppmw)	Screening Level (ppmw)
Arsenic	0.008	3.0
Cadmium	0.006	2.5
Chromium	0.006	8.4
Lead	0.013	1,000
Manganese	0.015	2.5
Mercury	0.006	455
Nickel	0.011	500
Selenium	0.037	13

The predicted soil concentrations due to plant emissions are then compared with average endogeneous levels in Table 5-10. These results also demonstrate that the projected trace element soil concentrations are below the average endogenous screening levels.

Table 5-10: Trace Element Soil Concentrations Compared to Average Endogenous Concentrations

Pollutant	Maximum Deposition Concentration (ppmw)	Endogeneous Concentration (ppmw)
Arsenic	0.008	6.00
Cadmium	0.006	0.06
Chromium	0.006	100.00
Lead	0.013	10.00
Manganese	0.015	850.00
Mercury	0.006	2.00
Nickel	0.011	40.00
Selenium	0.037	0.50

Finally, plant tissue concentrations resulting from plant uptake from the soil are compared with plant tissue screening levels and animal dietary screening levels in Table 5-11. As can be seen in this table, plant tissue concentrations fall below both the tissue and animal dietary screening levels.

Table 5-11: Plant Tissue Concentrations Compared to Plant Tissue and Dietary Animal Screening Levels

Pollutant	Maximum Deposition Concentration (ppmw)	Plant:Soil Ratio	Tissue Concentration (ppmw)	Screening Level-Tissue (ppmw)	Screening Level-Dietary (ppmw)
Arsenic	0.008	0.14	0.0011	0.25	3
Cadmium	0.006	10.7	0.063	3	15
Chromium	0.006	0.02	0.0001	1	NA
Lead	0.013	0.45	0.0059	126	115
Manganese	0.015	0.066	0.0010	400	2,500
Mercury	0.006	0.50	0.0030	NA	NA
Nickel	0.011	0.045	0.0005	60	1,000
Selenium	0.037	1.00	0.037	100	15

In conclusion, this screening analysis demonstrates that the proposed plant will not have an adverse impact on vegetation or soils in the region. In particular, because the screening levels are based upon the lowest concentrations having an adverse effect on the most sensitive vegetation, the plant will not adversely affect agricultural crops in the area, including produce and tobacco. Again, no credit was taken for the reduction in emissions resulting from the decommissioning of the existing steam plant.

Appendix A

PSD Permit BACT Analysis

NMCPA Revised BACT Analysis

RBLC Database

3.0 CONTROL TECHNOLOGY EVALUATION

This section demonstrates that the proposed control devices and techniques for PM_{10} emissions from the combustion turbine/HRSG and package boilers satisfy the BACT requirements of the PSD regulations under 40 CFR 52.21. This evaluation includes a review of previous BACT determinations made by Federal and state agencies for similar types of combustion installations around the country. It also includes an evaluation of the technical and economic feasibility of alternative technologies available for the control of PM_{10} emissions from such installations.

3.1 Technical Approach

Major new sources and major modifications to existing major sources are required to apply BACT pursuant to the PSD regulations in 40 CFR 52.21(j)(2). According to the PSD regulations, BACT means *"an emissions limitation based on the maximum degree of reduction for each air pollutant subject to regulation which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case by case basis, taking into account energy, environmental and economic impacts, and other costs determines is achievable through application of production processes or available methods, systems and techniques for control of each air pollutant."*

Consistent with U.S. EPA guidance, a "top-down" approach was used in the determination of BACT for the combustion turbine/HRSG and package boilers. Using this top-down approach, alternative control technologies were identified for PM_{10} emitted from the combustion turbine and package boilers. Those alternatives found to be technically unfeasible were eliminated from further consideration, while the remaining technologies were ranked by their performance levels. The technically feasible alternatives were then evaluated on the bases of the associated economic, energy, and environmental impacts. If an alternative technology, starting with the most stringent, was eliminated based on any of these criteria, the next most stringent technology was evaluated until the identification of BACT.

In determining BACT, the evaluation may consider the combination of: (1) change in the raw material; (2) process modifications; and (3) add-on controls. Of these options, only add-on controls are available to further control PM_{10} emissions from cogeneration and boiler units fired with either natural gas or transportation grade fuel oil. The BACT evaluation, therefore, addresses only add-on controls for the control of PM_{10} emissions from both the combustion turbine/HRSG and package boilers at the proposed CHP.

3.2 BACT Determinations

Consistent with U.S. EPA guidance, we first reviewed available databases to identify previous BACT determinations made by Federal and state agencies for similar types of combustion installations around the country. These databases include:

- Emission limits established in recently issued pre-construction permits for similar combustion installations around the country as compiled by the U.S. EPA in its "RACT/BACT/LAER Clearinghouse" (RBLC).
- Emission limits established in recently issued pre-construction permits for similar combustion installations in California as compiled by the California Air Resources Board in its "BACT Clearinghouse."

It should be noted that the MADEP has made numerous BACT determinations for PM_{10} emissions from similar types of combustion installations in the Commonwealth. The MADEP, however, has historically regulated filterable particulate emissions only, rather than total particulate emissions (i.e., both filterable and condensable particulates). These BACT determination, therefore, do not establish a precedence for the total PM_{10} emission limits that will ultimately be established by the U.S. EPA Region 1 in its BACT determination for the proposed CHP.

Table 3-1 provides a summary of recent BACT determinations made by Federal and state agencies for either simple-cycle or combined-cycle combustion turbines fired with natural gas and/or distillate fuel oil. As shown in this table, only three of the combustion turbines listed in the databases are fired with both natural gas and distillate fuel oil. Of these, only one combustion turbine is equipped with SCR, but not a CO catalyst. The PM_{10} emission limits for this unit are 0.017 lb/MMBtu when firing natural gas and 0.0357 when firing distillate fuel oil. If this unit were equipped with a CO catalyst, the PM_{10} emission limits would be expected to be higher due to the increased formation of ammonium salts with CO catalysts. This review, therefore, generally supports the proposed PM_{10} emission limits of 0.030 lb/MMBtu when firing natural gas and 0.050 when firing fuel oil. The detailed RBLC and CARB BACT Clearinghouse databases for combustion turbines are provided in Appendix A.

Table 3-2 provides a summary of recent BACT determinations made by Federal and state agencies for industrial boilers fired with natural gas and/or distillate fuel oil. As shown in this table, only one natural gas-fired boiler is equipped with an SCR and CO catalyst system (i.e., the Liberty Generating Company). The PM_{10} emission limit for this auxiliary boiler is 0.008 lb/MMBtu when firing natural gas. The owner, however, was not required to conduct performance tests on the boiler to demonstrate compliance with the PM_{10} emission limit, but rather only to monitor the composition of the fuels fired in unit. Therefore, it is not possible to ascertain whether the actual

Table 3-1: BACT Determinations for Combustion Turbine and Cogeneration Units

Facility	Location	Source	Heat Input (MMBtu/hr)[a]	Fuel Type[b]	Controls[c]	Particulate Limit (lb/MMBtu)[a]		Source[d]
						Natural Gas	Fuel Oil	
University of Cincinnati	Ohio	Two 14.5-MW CC Combustion Turbines	N.A.	NG/FO	DLN/OC	0.0073 w/ DB 0.0084 w/o DB	0.013 w/ DB 0.012 w/o DB	RBLC
Mustang Power, LLC	Oklahoma	Four 45-MW LM6000 CC Combustion Turbines	185 DB	NG	DLN/SCR/OC	0.0117	N.A.	RBLC
Tesora Alaska Company	Alaska	Solar Centaur Combustion Turbine	50.9 CT 36.5 DB	NG/FO	None	0.0140 CT Only 0.0140 DB Only	0.0372 CT Only 0.0140 DB Only	RBLC
La Paloma Generating Co.	California	Four 262-MW GT-24 CC Combustion Turbines	N.A.	NG	DLN/SCR/OC	0.010	N.A.	BC
Sutter Power Plant	California	Two 501F Gas Turbines	1900 CT 170 DB	NG	DLN/SCR/OC	0.006	N.A.	BC
NCPA	California	One 25.24-MW GE Frame 5 Combustion Turbine	325 CT	NG	WI	0.013	N.A.	BC
Mobil E&P U.S., Inc.	California	Three Solar Centaur Combustion Turbine	61.5 CT 38.7 DB	NG	WI/SCR	0.016	N.A.	BC
Exxon Co. USA	California	One GE PG5361 Combustion Turbine	463 CT 345 DB	NG	SI/SCR	8.6	N.A.	BC
Mojave Generating Co.	California	One 45-MW CW 251 B0-10 SC Combustion Turbine	N.A.	NG/FO	WI/SCR	0.017	0.0357	BC
SCPI N. Midway	California	One 4-MW Alllison 501KB Combustion Turbine	46.7 CT	NG	None	0.015	N.A.	BC
Chevron-Gaviota	California	Six 4-MW Allison 501KB CC Combustion Turbines	47.2 CT 55.3 DB	NG	None	0.008	N.A.	BC
SCPI	California	One GE LM2500-PE	N.A.	NG	None	0.015	N.A.	BC
Frito-Lay Cogeneration	California	One Allison Combustion Turbines	53 CT 40 DB	NG	None	0.009	N.A.	BC

[a] CT means combustion turbine; and DB, duct burner.
[b] NG means natural gas; and FO, distillate fuel oil.
[c] WI means water injection; SCR, selective catalytic reduction; and OC, oxidation catalyst.
[c] RBLC means the U.S. EPA RACT/BACT/LAER Clearinghouse; and BC, CARB BACT Clearinghouse.

Table 3-2: BACT Determinations for Industrial Boilers Fired with Natural Gas and Distillate Fuel Oil

Facility	Location	Source	Heat Input (MMBtu/hr)[a]	Fuel Type[b]	Controls[c]	Particulate Limit (lb/MMBtu)[a]		Source[d]
						Natural Gas	Fuel Oil	
VCU East Plant	Virginia	Three Boilers	150	NG/FO	LNB/FGR	0.010	0.011	RBLC
VCU East Plant	Virginia	Three Boilers	150	NG/FO	LNB/FGR	0.008	0.010	RBLC
Williams Refining & Marketing	Tennessee	Two Steam Boilers	95 No. 9 180 No. 10	NG	None	0.0075 No. 9 0.0075 No. 10	N.A.	RBLC
Liberty Generating Co.	New Jersey	Auxiliary Boiler	200	NG	SCR/OC	0.008	N.A.	RBLC
AES Red Oak LLC	New Jersey	Auxiliary Boiler	120	NG/FO	None	0.0066	0.040	RBLC
Tenaska Arkansas Part.	Arkansas	Auxiliary Boiler	122	NG	FGR	0.0050	N.A.	RBLC
Redbud Energy LP	Oklahoma	Auxiliary Boiler	20	NG	LNB	0.0074	N.A.	RBLC
Bridgestone Firestone	N. Carolina	Two Boilers	121	NG	None	0.24	N.A.	RBLC
Lawrenceburg Energy	Indiana	Auxiliary Boiler	124.6	NG	LNB	0.0070	N.A.	RBLC
Pope & Talbot, Inc.	Oregon	Two Power Boilers	229	NG	None	0.0025	N.A.	RBLC
Minnesota Corn	Minnesota	Steam Boiler	237.4	NG	None	0.0084	N.A.	RBLC
Broad River Energy	S. Carolina	Three Power Boilers	230	NG	LNB/FGR	0.0050	N.A.	RBLC
Alabama Power Co.	Alabama	Auxiliary Boiler	220	NG	LNB/FGR	0.0080	N.A.	RBLC
Roche Vitamins	New Jersey	Two Boilers	84.484.4 No. 1 134/231 No. 2 152/242 No. 3 118/204 No. 4	NG/FO	None	0.0140 No. 1 0.0050 No. 2 0.0050 No. 3 0.0864 No. 4	0.0500 No. 1 0.0498 No. 2 0.0513 No. 3 0.0514 No. 4	RBLC
LSP Cottage Grove	Minnesota	Auxiliary Boiler	114 NG 104 FO	NG/FO	None	0.0050	0.061	RBLC
Archer Daniels Midland	N. Dakota	Auxiliary Boiler	189	NG/FO	None	0.014	0.014	RBLC
Proctor & Gamble	Missouri	Two Boilers	125 NG 50 FO	NG/FO	LNB/FGR	0.0070	0.050	RBLC
Alabama Power Co.	Alabama	Auxiliary Boiler	190	NG/FO	LNB	0.010	0.020	RBLC
Cargill, Inc.	Iowa	Boilers	230 No. 4 182 No. 5 182 No. 6	NG	LNB	0.010	N.A.	
Milagro	New Mexico	Boiler	112	NG/FO	LNB/FGR	0.0050	0.0050	RBLC
LS Power Corp.	Wisconsin	Auxiliary Boilers	112	NG/FO	LNB	0.0050	0.050	RBLC
Courtaulds Fibers	Alabama	Boilers	148	NG	LNB/FGR	0.005	N.A.	RBLC
Plum Point Associates	Arizona	Auxiliary Boiler	175	FO	LNB/FGR	0.0071	N.A>	RBLC

Table 3-2: BACT Determinations for Industrial Boilers Fired with Natural Gas and Distillate Fuel Oil (Continued)

Facility	Location	Source	Heat Input (MMBtu/hr)[a]	Fuel Type[b]	Controls[c]	Particulate Limit (lb/MMBtu)[a]		Source[d]
						Natural Gas	Fuel Oil	
Tampa Electric	Florida	Auxiliary Boiler	120	FO	LNB	N.A.	0.10	RBLC
Pine Bluff Energy	Arkansas	Steam Boiler	362	NG/FO	LNB/FGR	0.005	0.030	RBLC
Piney Point Phosphates	Florida	Boiler	190	FO	LNB	N.A.	0.014	RBLC
Mead Containerboard	Alabama	Boiler	223	FO	None	N.A.	0.10	RBLC
Navy Public Work Ctr.	Virginia	Three Boilers	205.8	FO	LNB/FGR	N.A.	0.005	RBLC

[a] CT means combustion turbine; and DB, duct burner.
[b] NG means natural gas; and FO, distillate fuel oil.
[c] WI means water injection; SCR, selective catalytic reduction; and OC, oxidation catalyst.
[c] RBLC means the U.S. EPA RACT/BACT/LAER Clearinghouse; and BC, CARB BACT Clearinghouse.

PM_{10} emissions from this gas-fired boiler ultimately complied with the specified PM_{10} emission limit. The remaining BACT determinations generally support the proposed PM_{10} emission limits of 0.020 lb/MMBtu when firing natural gas and 0.050 when firing fuel oil. The detailed RBLC and CARB BACT Clearinghouse data for industrial boilers are provided in Appendix A.

3.3 BACT Evaluation

The emissions of PM_{10} from the combustion turbine/HRSG and package boilers result from inert material contained in the fuels, particles introduced with the combustion air, particles consisting of unburned carbon, and ammonia salts formed by the reaction of ammonia with SO_2 and NO_x. The bulk of the total PM_{10} is attributable to the ammonium salts formed downstream of the SCR and oxidation catalyst systems. Regardless of the formation mechanism, all of the particulate emitted from combustion turbine/HRSG and package boilers are expected to be less than 1.0 microns in diameter.

3.3.1 Regulatory Precedence

In the preamble to the New Source Performance Standard (NSPS) for Stationary Gas Turbines (40 CFR 60 Subpart GG), the U.S. EPA recognized that "particulate emissions from stationary gas turbines are minimal." Furthermore, the U.S. EPA found that particulate control devices are not typically installed on combustion turbines and that the cost of installing a particulate control device is prohibitive. The U.S. EPA, therefore, decided not to promulgate performance standards for particulate matter from stationary gas turbines. Similarly, the U.S. EPA concluded that particulate control devices were neither practical nor cost-effective for boilers fired with natural gas or distillate fuel oil in the establishing the NSPS for Industrial/Commercial/Institutional Steam Generating Units (40 CFR 60 Subpart Db). The U.S. EPA, therefore, did not promulgate performance standards for particulate matter from such boilers fired with either natural gas or distillate fuel oil.

3.3.2 Alternative Control Technologies

The most stringent particulate control method demonstrated on combustion turbines and institutional boilers is the use of fuels with low ash contents (such as natural gas or low sulfur transportation diesel). In the RBLC and CARB BACT Clearinghouse, the predominant control methods listed for combustion turbines or industrial boilers are the use of proper combustion controls and the firing of low-ash fuels. There were no listings for combustion turbines or boilers firing these fuels that were equipped with add-on controls, such as electrostatic precipitators or baghouses. These add-on control devices are not considered practical or cost-effective due to the low grain loading in the combustion gases (ranging from less than 0.01 to 0.05 lb/MMBtu), the extremely small size of the filterable particulate (almost entirely less than

1.0 micron), and the high proportion of condensable particulate (typically 60 to 80 percent of total particulate).

3.3.3 Conclusions

The proposed control techniques for PM_{10} emissions from the combustion turbine/HRSG and package boilers are the use of proper combustion controls and firing of clean fuels. Specifically, PM_{10} emissions will be controlled by means of the following devices and techniques:

- the use of clean fuels will minimize particulate attributable to the carryover of inert material in the fuel;
- the installation of high-performance combustors or burners will minimize the formation of unburned carbon in the combustion unit;
- the installation of high-efficiency filters will remove particles from the combustion air before being introduced into the combustion unit; and
- the maintenance of low ammonia slip (less than 2 ppm) will minimize the formation of ammonium salts downstream of the SCR and oxidation catalyst systems .

Based on our review of previous control technology determinations and evaluation of alternative control devices and techniques, the proposed control measures are considered representative of BACT for total PM_{10} emissions from the combustion turbine/HRSG and package boilers to be installed at the CHP. The proposed PM_{10} emission limits for the combustion turbine/HRSG and package boilers are summarized in Table 3-3.

Table 3-3: Proposed PM_{10} Emission Limits

Installation	PM_{10} Limits Natural Gas Firing (lb/MMBtu)	PM_{10} Limits Fuel Oil Firing (lb/MMBtu)
Combustion Turbine/HRSG	0.030	0.050
Package Boilers	0.020	0.050

4.0 BACT ANALYSIS

As part of the original comprehensive plan approval application for the CHP, an analysis was conducted to determine that emissions from the new facility would represent the application of Best Available Control Technology (BACT). A BACT analysis is required for all new sources in Massachusetts that are subject to plan approval requirements under 310 CMR 7.02, and BACT is defined as *"an emission limitation based on the maximum degree of reduction of any regulated air contaminant emitted from or which results from any regulated facility which the Department, on a case-by-case basis taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques for control of each such contaminant."*

As part of the original comprehensive plan application for the CHP, a BACT analysis was conducted for the following BACT components:

- Combustion turbine technology
- Combustion controls
- Natural gas availability
- Distillate oil sulfur content
- Add-on controls

The results of that BACT analysis are summarized in Air Plan Approval 1B-02-043, included in Appendix B of this application package. Pursuant to discussions with John Kirzec at the DEP, the previous BACT analysis as provided in the application dated August 2002 for Air Plan Approval 1B-02-043 is provided below. According to the John Kirzec the existing BACT should still be applicable to the facility.

A subsequent BACT analysis was conducted for PM_{10} as part of the PSD application submitted in 2004 and a copy of the text associated with this analysis from the application is included in Appendix B.

Note that the values below in brackets are the values for the facility as built regarding the equipment specifications or information for the facility as built.

4.1 Technical Approach

The University of Massachusetts [UMBA] proposes to install [installed] a cogeneration unit at the CHP at its campus in Amherst, Massachusetts. This cogeneration unit will be based on a single Solar Mars Model 100 combustion turbine capable of firing natural gas and transportation grade fuel oil. The combustion turbine will have a nominal heat input of 121.9 MMBtu/hr [137.9 MMBtu/hr firing natural gas based on higher heating value] and nominal power output of 10 megawatts. The combustion turbine will be configured with a heat recovery steam generator (HRSG) equipped with a natural gas-fired duct burner with a heat input of 77.4 MMBtu/hr (natural gas only) [91.8 MMBtu/hr]. In addition to the combustion turbine/HRSG installation, the new CHP will include four [three] water-tube, package boilers capable of firing natural gas and transportation grade fuel oil. The nominal heat input to each boiler will be 226.8 MMBtu/hr firing gas and 216.2 MMBtu/hr fuel oil. [The low pressure boilers are each rated at 156.1 MMBtu/hr firing oil at an ambient temperature of 80 degrees Fahrenheit or 162.1 MMBtu/hr fring natural gas at an ambient air temperature of 80 degrees Fahrenheit and 125,000 lbs/hr of superheated steam. The high pressure boiler rated at 173.4 MMBtu/hr firing oil at an ambient temperature of 80 degrees Fahrenheit or 179.7 MMBtu/hr fring natural gas at an ambient air temperature of 80 degrees Fahrenheit and 125,000 lbs/hr of superheated steam. The original approved plan approval was for four boilers each rated at 170 MMBtu/hr and 175,000 lb/hr of superheated steam.]

The combustion turbine, duct burner, and package boilers will use either natural gas when available or transportation grade (red dye) fuel oil when natural gas is unavailable. Because of the remote location of the site relative to major natural gas supplies, a firm gas supply contract cannot be procured for the proposed project as large quantities of gas are not presently available for long-term operation of the new combustion turbine and boilers. During natural gas curtailment, UMass is proposing that transportation grade fuel oil be used for the combustion turbine (not the duct burner) and package boilers. The use of fuel oil for year round operation represents the most conservative option. The BACT analysis, therefore, assumes that fuel oil will be the primary fuel for the combustion turbine and package boilers. A more detailed discussion on the availability of natural gas is provided later in this section.

A BACT analysis is required for all new sources in Massachusetts that are subject to plan approval requirements under 310 CMR 7.02. In the regulations, BACT is defined as *"an emission limitation based on the maximum degree of reduction of any regulated air contaminant emitted from or which results from any regulated facility which the Department, on a case-by-case basis taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques for control of each such contaminant."*

A "top-down" approach was used in the determination of BACT. First, control technology options were identified for each pollutant emitted from the combustion turbine and package boilers. Those control options found to be technically unfeasible were eliminated from further consideration, while the remaining technologies were ranked by their performance levels. The technically feasible control options were then evaluated on the bases of their economic, energy, and environmental impacts. If an alternative technology, starting with the most stringent, was eliminated based on these criteria, the next most stringent technology was evaluated until the identification of BACT.

This "top-down" approach is consistent with guidance provided for BACT analyses by both the USEPA and MADEP. To avoid a complicated matrix of add-on controls in combination with various turbine manufacturers, however, an evaluation was first conducted to select the preferred combustion turbine technology and associated combustion controls for the cogeneration installation. This established the baseline for the top-down evaluation of add-on control technologies. The evaluation began with the most stringent level of control and proceeded to the next highest degree until the identification of the appropriate BACT control. The basic steps for this analysis were as follows:

- Step 1 - Identify all control technologies/strategies.
- Step 2 - Eliminate technically infeasible options.
- Step 3 - Rank remaining control technologies by control effectiveness.
- Step 4 - Evaluate controls and document results.
- Step 5 - Select BACT.

For control technologies that have been demonstrated to be technically proven, their suitability for this project was evaluated based on economic, environmental, and energy considerations. The key criterion for identifying BACT was the estimated cost-effectiveness of control, expressed in terms of cost per ton of the pollutant removed. In the case where the top control option is selected for this project, no economic evaluation was necessary. The BACT analysis addresses the emissions of NO_x, CO, SO_2, PM_{10}, and VOC from both the combustion turbine and package boilers to be installed at the proposed CHP.

4.2 Fuel Availability

The UMass Amherst Campus is located in a relatively remote, low population density area of Northwestern Massachusetts. Because of the low population density and lack of large industrial complexes, natural gas supplies have not yet been extended to this area to support continuous availability for both residential customers and large industrial/institutional end users. To provide firm gas supplies to the UMass campus in the quantities necessary to operate the new combustion equipment, it would require modifications and upgrades to both the local distribution company's (LDC) system and the major pipeline systems. The extent of these upgrades would involve significant secondary environmental impacts, such as wetland disturbances, water crossings, roadway excavations, and disruptions of forested and agricultural lands. Although these upgrades would not be under the control of UMass, the substantial cost of providing the upgrades by the pipeline operators and LDC would likely have to be borne, in part or in whole, by UMass. The estimated costs associated with such upgrades would be on the order of $15,000,000. The level of NO_x reduction associated with that upgrade would be approximately 31 tons, which result in a cost of control in excess of $63,000 per ton of NO_x removed. Therefore, UMass plans to negotiate its fuel contracts based on the present fuel availability and use low sulfur fuel oil as the primary fuel. Natural gas will be burned to the extent allowable by the capability of the existing fuel distribution system. Should natural gas be made available in larger quantities in the future, UMass would re-negotiate its contracts to allow for more natural gas utilization.

4.3 Selection of Combustion Turbine Technology

Combustion turbine technology represents an efficient, environmentally clean, and compact method of generating electrical power. The combustion technology has advanced to the point of being an extremely reliable and cost-effective source of onsite power generation. As an example of the environmental advantage of combustion turbine-based power generation, the NO_x emission levels (in equivalent units) associated with alternative technologies available for power generation are summarized in Table 4-1. This comparison focuses on NO_x because of its important role as a precursor to ozone in the northeast. As can be seen in Table 4-1, combustion turbines are capable of achieving the lowest NO_x emission levels, when compared with alternative power generation systems. Consequently, a combustion turbine was selected as the most environmentally sound method of power generation for UMass. Note that this evaluation is based on simple-cycle operation of the combustion turbine and does not reflect the added benefit of thermal recovery of the exhaust gases, which is an essential component of the proposed cogeneration project. Furthermore, because the project will utilize fuel oil for a significant portion of the year, the evaluation considered both gas-fired and oil-fired combustion turbines.

Table 4-1: Comparison of NO_x Emissions from Alternative Power Generation Systems

Technology	Heat Rate (Btu/kW)	NO_x Emissions (lb/MW)
Diesel-fired Engine/Generator	10,190	25.6
Gas-Fired Utility Boiler	10,000	0.36
Oil-Fired Utility Boiler	10,000	1.2
Gas-Fired Combustion Turbine[a]	10,762	0.14
Oil-Fired Combustion Turbine[a]	10,903	0.34

[a] Based on a simple-cycle combustion turbine.

4.4 Selection of Combustion Controls

With combustion turbine technology found to be the most environmentally sound method of power generation, the BACT analysis continues with an evaluation of the combustion controls available for the proposed cogeneration project. The alternative combustion controls are catalytic combustors, dry low-NO_x combustors, and water or steam injection.

4.4.1 Catalytic Combustor

The combustion control technology with the lowest reported NO_x emissions is a catalytic-lined combustor that bums the fuel at a temperature below that promoting thermal NO_x formation. This allows for the efficient combustion of a portion of the fuel over a catalyst without the associated heat of normal combustion. This form of combustion reportedly results in turbine emissions of less than 5 ppmvd at 15 percent O_2. Although the technology has been applied successfully to small turbines in the testing stages of its development, it is not commercially available for cogeneration projects of this size at this time. Additionally, the development of catalytic combustors has been based on natural gas firing only. Therefore, the requirement for fuel oil firing in the proposed combustion turbine restricts the ability to use catalytic combustion for this project. Because this technology is not considered commercially available, it was given no further consideration in the BACT analysis.

4.4.2 Dry Low-NOx Combustor

Dry low-NO_x combustors (DLN) pre-mix the fuel and compressed air to prevent local zones of high temperatures that promote thermal NO_x formation. The lean combustion reduces the air:fuel ratio maintaining peak flame temperatures below the adiabatic flame temperature and limiting the availability of O_2 required for NO_x formation. Such DLN combustion requires an integrated approach to turbine and combustor design. Solar offers a DLN combustor, known as $SoLoNO_x$, capable of reducing NO_x concentrations at the diffuser outlet to 38 ppmvd when firing natural gas and 96 ppmvd when firing fuel oil, both corrected to 15 percent O_2.

4.4.3 Water or Steam Injection

The earliest method employed to reduce NO_x emissions from combustion turbines was the injection of water or steam into the high temperature zone of the flame. Water and steam are strong diluents that can quench hot spots in the flame reducing thermal NO_x formation. Although water or steam injection reduces NO_x emissions to levels equivalent to that achieved with DLN combustors when firing natural gas, NO_x emissions are not significantly reduced when firing fuel oil. On the other hand, water or steam injection increases CO emissions appreciably due to the lower temperatures in the burnout zone. For these reasons, water or steam injection was given no further consideration in the BACT analysis.

4.4.4 *Conclusion*

In summary, the baseline for this BACT assessment is dry low-NO_x combustion technology with an outlet NO_x concentration of 38 ppmvd when firing natural gas and 96 ppmvd when firing fuel oil, both corrected to 15 percent O_2.

4.5 Nitrogen Oxides

4.5.1 *Gas Turbine/HRSG*

Nitrogen oxides are formed during the combustion process in fuel utilization facilities. There are two general mechanisms that result in the formation of NO_x. thermal NO_x and fuel NO_x. Thermal NO_x is formed via the dissociation of nitrogen in the combustion air at elevated temperatures and reaction with oxygen. Fuel NO_x is a result of the reaction of fuel-bound nitrogen with oxygen present for combustion. Natural gas has negligible fuel-bound nitrogen and thus virtually all the NO_x formed with natural gas combustion is thermal NO_x. Distillate fuel oil contains a small percentage of nitrogen, which results in slightly higher NO_x emissions during oil firing.

There are three basic types of approaches for controlling NO_x emissions from a combustion turbine cogeneration unit: (1) lower emitting generating technologies; (2) combustion modifications; or (3) flue gas treatment. Lower emitting generating technologies and combustion controls were addressed earlier; flue gas treatment applied to the base case is considered in the remainder of this section. The two flue gas treatment systems capable of achieving the most stringent level of control currently available for combustion turbines are selective catalytic reduction (SCR) and $SCONO_x$™.

$SCONO_x$™

The $SCONO_x$ system is a pollution control technology that utilizes a single catalyst for the reduction of CO and NO_x. The technology simultaneously oxidizes CO to CO_2 and NO to NO_2 and then absorbs the NO_2 onto its surface through the use of a potassium carbonate absorber coating. The reaction IS known as the oxidation/absorption cycle. During the oxidation/absorption cycle, the potassium carbonate coating reacts with NO_x to form potassium nitrites or nitrates, which are then retained on the surface of the catalyst. When all of the carbonate absorber coating on the surface of the catalyst has reacted to form nitrogen compounds, NO_x will no longer be absorbed and the catalyst must enter a regeneration cycle.

The regeneration cycle uses a dilute hydrogen reducing gas across the surface of the catalyst in the absence of oxygen. The hydrogen in this gas reacts with the nitrites and nitrates to form water and elemental nitrogen. Carbon dioxide in the regeneration gas reacts with potassium nitrites and nitrates to form potassium carbonate, the original coating on the surface of the catalyst before the oxidation/absorption cycle began. A typical system has four to sixteen sections each with both upstream and downstream louvers to isolate sections for regeneration. Therefore, the system does require gas seals and contains moving' parts. The system uses no ammonia, as is required for SCR.

The system has been demonstrated to achieve the same reductions as SCR (approximately 85 percent) during its trials on a General Electric LM2500, which is substantially larger than the proposed Solar Mars 100 machine. Further, the catalyst is easily poisoned by even the minute amounts of sulfur found in natural gas and cannot be used on oil-fired gas turbines without first desulfurizing the fuel. A $SCONO_x$ system has been in service for the past two years on a Solar Taurus machine at Genetics Institute in Andover, Massachusetts. The system reportedly has not been able to consistently meet the emission limits nor demonstrate steady-state operation while firing oil. Because $SCONO_x$ has not been demonstrated as commercially available for a combustion turbine firing oil as the primary fuel or in significant amounts, it is considered to be technically infeasible for this project.

Selective Catalytic Reduction

The most effective means of reducing NO_x emissions from combustion turbines is the use of the add-on control technology known as selective catalytic reduction (SCR). Selective catalytic reduction has been successfully installed and operated for over ten years on similar type of combustion turbine installations. The technology uses ammonia to reduce NO_x to N_2 and H_2O in the presence of a catalyst. The general chemical reactions are:

$$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$$

$$2NO + 4NH_3 + O_2 \rightarrow 2N_2 + 6H_2O$$

The SCR system is comprised of an ammonia storage tank, ammonia forwarding pumps and control, an injection grid (system of nozzles that spray ammonia into the exhaust gas ductwork), a reactor which contains the catalyst, and instrumentation and controls. Aqueous ammonia (a solution of ammonia and water) is pumped into the injection grid and sprayed into the gas flow upstream of the reactor. The hot exhaust gas vaporizes the water and the ammonia is released and mixed with the exhaust. As the flow passes through the reactor, the reactions cited above are triggered by the presence of the catalyst. In order to achieve high NO_x removal and to compensate for imperfect distribution of NO_x and NH_3, thermal decomposition of some NH_3, and other factors, excess ammonia is injected at levels greater than required for stoichiometric balance.

Operation of an SCR system significantly reduces NO_x emissions (~90%); however; it does result in NH3 emissions called "ammonia slip." Additionally, SCR may increase particulate and/or acid mist emissions. Catalysts that oxidize NO_x also convert some percentage of SO_2 to SO_3. The higher temperature SCR systems operate in the ideal range for such SO_2/SO_3 conversion. In the presence of ammonia, the S03 may form ammonia salts. In the absence of ammonia, SO_3 combines with water to form sulfuric acid. The SO_2 emissions during natural gas-firing emissions will be very low. During oil firing with low sulfur oil, increased particulate and/or acid mist emissions may be more significant. Although there are minor adverse environmental impacts associated with SCR systems treating combustion gases from sulfur bearing fuels, those impacts are not considered to be significant for this installation. UMass proposes to use SCR for control of NO_x emissions; therefore, no further evaluation of economic, environmental or energy impacts was deemed necessary.

4.5.2 Boilers

The formation of NO_x during combustion in boilers is identical to that explained above for gas turbines. The NO_x emitted during natural gas firing is primarily a result of thermal NO_x formation, while fuel-bound NO_x adds to NO_x emissions during oil firing. Because the boilers may use low-sulfur fuel oil as the primary fuel, available controls for NO_x that are considered technically feasible for natural gas may be prohibitive during oil firing.

There are two basic types of approaches for control of NO_x from a dual fuel boiler of the size proposed: (1) combustion controls; and (2) flue gas treatment. Combustion controls include the use of low-NO_x burner (LNB) that uses flame geometry control and fuel/air mixing to reduce the formation of thermal NO_x. Another technique, generally used in combination with LNB, is flue gas recirculation (FGR). Flue gas recirculation utilizes a portion of the boiler exhaust, which is then re-introduced to the burner assembly along with the fuel/air mixture. This recirculated exhaust serves as a diluent to decrease flame temperature and reduce the formation of thermal NO_x. More recently, burners have been developed with sophisticated control systems and FGR to result in very low NO_x emissions (~9 ppmvd). These configurations are effective while firing natural gas, but have not been used with oil firing and may actually result in higher emissions than other LNB technologies. Therefore, during fuel oil firing, no significant NO_x reduction is accomplished.

Selective catalytic reduction (SCR) is a flue gas treatment that represents the most stringent level of add-on control currently available for boilers. The system is basically identical to that described above for combustion turbine emissions and provides emission control independent of the fuel fired in the boiler. The combination of the use of LNB and SCR is the most stringent of the technically feasible control schemes. Several recent permits in the Northeast have deemed this control scheme as BACT. UMass proposes to use LNB and SCR to control NO_x emissions during natural gas and oil firing. Therefore, no further evaluation of cost or other factors was deemed necessary.

4.5.3 Conclusions

Gas Turbine/HRSG

The combustion turbine/HRSG will use SCR to control NO_x to 3.8 ppmvd firing natural gas and to 10 ppm firing distillate oil (including the duct burner emissions). Ammonia slip will be maintained at less than 2 ppmvd at 15 percent O_2 under either fuel firing configuration.

Package Boilers

The package boilers will employ LNB in combination with SCR to limit NO_x emissions to 5.0 ppmvd during gas firing and 9.0 ppmvd during oil firing, both corrected to 3 percent O_2. Ammonia slip will be maintained below 2 ppmvd at 3 percent O_2 under either fuel firing configuration.

4.6 Sulfur Dioxide

As stated previously, the UMass campus is located in area with a limited supply of natural gas. Therefore, the facility proposes to fire transportation grade fuel oil with a sulfur content of 0.05 percent by weight as the primary fuel for the combustion turbine and package boilers. Natural gas will be fired in the combustion turbine and package boilers as available based on the present natural gas supply in the area. The duct burner will be fired exclusively with natural gas. These fuels have the lowest sulfur contents of any fossil fuels that are available for the combustion installations at the CHP.

4.7 Carbon Monoxide

Carbon monoxide (CO) is a product of incomplete combustion. The only available techniques for the reduction of CO from combustion units such as combustion turbines and boilers are good combustion practices or the use of an add-on technology in the form of an oxidation catalyst. Oxidation catalysts, which provides the most stringent level of control for CO, are considered both technically feasible and commercially demonstrated for combustion installations. Accordingly, UMass will use an oxidation catalyst for the control of CO from both the combustion turbine/HRSG and package boilers. The proposed BACT limits are consistent with recent determinations in the Northeast (see Table 4-2).

Table 4-2: Proposed CO Emission Limits

Unit	CO Limits Natural Gas Firing (ppmvd @ 15% O_2)	CO Limits Fuel Oil Firing (ppmvd @ 15% O_2)
Combustion Turbine/HRSG	5	5
Boilers	20	25

4.8 Particulate Matter

Particulate matter (PM_{10}) emissions from fuel utilization facilities are generally a result of incomplete combustion or non-combustible components in the fuel (i.e., ash). Particulate matter emissions from natural gas combustion are generally very low due to the negligible non-combustible component and high efficiency of combustion. Particulate emissions during fuel oil firing are somewhat higher due to the higher sulfur and ash contents of the fuel. There are no technically feasible or commercially available add-on controls for particulate emissions from combustion turbines or boilers fired with either natural gas or distillate fuel oil. Therefore, the most stringent level of control of particulates from the proposed combustion equipment is based on good operating practices resulting in the emission levels presented in Table 4-3. These levels are consistent with recent determinations of BACT for similar sources in the Northeast.

Table 4-3: Proposed PM_{10} Emission Limits

Unit	PM10 Limits Natural Gas Firing (lb/MMBtu)	PM10 Limits Fuel Oil Firing (lb/MMBtu)
Combustion Turbine/HRSG	0.01	0.01
Boilers	0.01	0.011

4.9 Volatile Organic Compounds

Volatile organic compounds (VOC), like CO and particulate matter, are also products of incomplete combustion, and typically are emitted in very low quantities from fuel utilization facilities. In addition, there will be some level of control of VOC emissions resulting from the installation of the oxidation catalyst for CO reduction. Although the oxidation catalyst may reduce of VOC emissions by as much as 15 percent in the exhaust from both the combustion turbine/HRSG and package boilers, catalyst vendors generally will not provide any guarantees for removal of VOC from BACT is proposed to be the uncontrolled limits from the combustion equipment as shown in Table 4-4.

Table 4-4: Proposed VOC Emission Limits

Unit	VOC Limits Natural Gas Firing (lb/MMBtu)	VOC Limits Fuel Oil Firing (lb/MMBtu)
Combustion Turbine/HRSG	0.0021	0.0021
Boilers	0.001	0.005

The portion of the BACT analysis pertaining to add-on controls that was provided in the application for Plan Approvals Nos. 1B-07-018 and 1B-07-019 is presented below.

For add-on controls, SCR is the most effective add-on control technology for reducing NO_x emissions from combustion turbines. SCR has been successfully installed and operated for over ten years on similar types of combustion turbine installations. The technology uses ammonia to reduce NO_x to N_2 and H_2O in the presence of a catalyst. An SCR system significantly reduces NO_x emissions (typically 90%). Accordingly, UMass proposes to use SCR for control of NO_x emissions. Oxidation catalysts are the only available add-on controls for the reduction of CO from CTGs. Accordingly, UMass will use an oxidation catalyst and good combustion practices for the control of CO from the CTG/HRSG.

UMass proposes as BACT the use of the Mars Solar 100 CTG with SoLoNO_x dry low-NO_x technology, burning natural gas with up to 90 days of 15/500 ppm sulfur transportation grade fuel oil as backup.

SCR add-on controls will be designed to reduce NO_x to 2.5 ppmvd firing natural gas and 6.0 ppmvd firing transportation grade fuel oil, both at 15 percent O_2 (including the duct burner emissions), and to keep ammonia slip to less than 2.0 ppmvd at 15 percent O_2 with either fuel. An oxidation catalyst will control CO emissions to 2.0 ppmvd on natural gas and 5.0 ppmvd while burning transportation grade fuel oil, both at 15 percent O_2.[CO emissions is 5.0 ppm on natural gas].

These emission limits for NO_x and NH_3 have not been demonstrated in practice on the Solar Model 100 combustion turbine. Solar indicated that a modified combustion turbine capable of achieving NO_x outlet concentrations of 25 ppmvd firing natural gas and 60 ppmvd firing fuel oil.

Since the emission limits of NO_x and NH_3 have not been demonstrated in practice with the Solar Mars 100 CTG, UMass will conduct an optimization program during the commissioning of the combustion turbine that is designed to minimize NO_x and NH_3 emissions. If the combustion turbine cannot meet the NO_x and NH_3 limits on a sustainable basis over the life of the catalyst, UMass will propose revised NO_x and

NH_3 emission limits that can be sustained on a consistent basis, subject to Department review and written approval. If the revised emission rates exceed those used in the original modeling analysis, UMass will perform additional ambient air quality modeling to demonstrate compliance with the NAAQS.

4.10 Revised Conclusions

The summaries of the conclusions from the orginal BACT analysis submitted in the 2002 application and the changes to the facility are in brackets.

Nitrogen Oxide

Gas Turbine/HRSG

The combustion turbine/HRSG will use SCR to control NO_x to 3.8 ppmvd firing natural gas [2.5 ppmvd firing natural gas] and to 10 ppm firing distillate oil (including the duct burner emissions) [6 ppm firing distillate oil]. Ammonia slip will be maintained at less than 2 ppmvd at 15 percent O_2 under either fuel firing configuration.

Package Boilers

The package boilers will employ LNB in combination with SCR to limit NO_x emissions to 5.0 ppmvd during gas firing and 9.0 ppmvd during oil firing, both corrected to 3 percent O_2. Ammonia slip will be maintained below 2 ppmvd at 3 percent O_2 under either fuel firing configuration.

Sulfur Dioxide

As stated previously, the UMass campus is located in area with a limited supply of natural gas. Therefore, the facility proposes to fire transportation grade fuel oil with a sulfur content of 0.05 percent by weight as the primary fuel for the combustion turbine and package boilers. Natural gas will be fired in the combustion turbine and package boilers as available based on the present natural gas supply in the area. The duct burner will be fired exclusively with natural gas. These fuels have the lowest sulfur contents of any fossil fuels that are available for the combustion installations at the CHP.

Carbon Monoxide

Oxidation catalysts, which provides the most stringent level of control for CO, are considered both technically feasible and commercially demonstrated for combustion installations. Accordingly, UMass will use an oxidation catalyst for the control of CO from both the combustion turbine/HRSG and package boilers. The proposed BACT limits are consistent with recent determinations in the Northeast (see Table 4-

2). The proposed limits are 5 ppmvd when firing either natural gas of fuel oil for the combustion turbine. The proposed limits for the boilers are as permitted at 20 ppmvd firing natural gas and 25 ppmvd firing fuel oil.

Particulate Matter

There are no technically feasible or commercially available add-on controls for particulate emissions from combustion turbines or boilers fired with either natural gas or distillate fuel oil. Therefore, the most stringent level of control of particulates from the proposed combustion equipment is based on good operating practices resulting in the emission levels presented in Table 4-5. These levels are consistent with recent determinations of BACT for similar sources in the Northeast.

Table 4-5: New Proposed PM_{10} Emission Limits

Unit	PM_{10} Limits Natural Gas Firing (lb/MMBtu)	PM_{10} Limits Fuel Oil Firing (lb/MMBtu)
Combustion Turbine/HRSG	0.01* [0.03]	0.01* [0.05]
Boilers	0.01*	0.011** [0.04]

* Particulate matter measured as filterable particulate (front half)
**BACT limit established in the EPA PSD permit is 0.04 lb/MMBtu for fuel oil

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT

RBLC ID:	TX-0492
*Corporate/Company Name:	VIRTEX PETROLEUM INC.
*Facility Name:	VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT
Facility County:	FRIO
Facility State:	TX
Facility ZIP Code:	780170230
Facility Country:	USA
Facility Contact Name:	MR. DALE PHIPPS
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	6
Agency Code:	TX001
Agency Name:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)
Agency Contact:	JEAN XU SHAW, P.E.
Agency Phone:	(512) 239-1823
Agency Email:	JXUSHAW@TCEQ.STATE.TX.US
Other Agency Contact Info:	PERMIT ENGINEER: ANNA DE LA GARZA
*Permit Number:	P1041
*SIC:	2911
NAICS:	324110
Facility Registry System Number #:	UNKNOWN
Application Accepted Received Date:	10/28/2004 ACT
Permit Issuance Date:	05/05/2005 ACT
Date determination entered in RBLC:	01/31/2007
Date determination last updated:	08/17/2007
Permit Type:	C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description:	VIRTEX CURRENTLY OPERATES A GAS PLANT WHICH IS AUTHORIZED UNDER AN OIL AND GAS STANDARD PERMIT. THE MAXIMUM PRODUCTION IS CURRENTLY AUTHORIZED AT 0.3 LONG TONS PER DAY OF SULFUR. THEY ARE REQUESTING AUTHORIZATION TO MODIFY THE EXISTING FACILITY TO PROCESS SOUR GAS FROM NEW FIELD WELLS AND INCREASE MAXIMUM PRODUCTION TO 0.75 LONG TONS PER DAY OF SULFUR (4.0 MMSDFD OF GAS WITH AN H2S CONTENT OF 8.000 PPM). MODIFICATIONS INCLUDE THE INSTALLATION OF NEW COMPRESSORS, AUTHORIZING AN AMINE SWEETENING UNIT, A LARGER CAPACITY GLYCOL DEHYDRATOR, AND ALL ASSOCIATED PIPING. THE INCREASE IN SO2 REQUIRES PSD ANALYSIS.
Other Permitting	

Information:

Facility-wide Emissions : VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	-4.7400 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	-34.3000 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	0.3000 (Tons/Year)
*Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	370.2000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	-3.8700 (Tons/Year)

Process Information : VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT

*Process Name:	AJAX DPC-115 COMPRESSOR ENGINE
*Process Type:	11.390
Primary Fuel:	GAS
Throughput:	0.75
Throughput Unit:	LTPD
Process Notes:	

Pollutant Information: VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT - AJAX DPC-115 COMPRESSOR ENGINE

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.7300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	3.1900
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg.	

Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.5300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2.3400
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency No

(Y/N)?:
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.3400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.4900
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0500
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg.

Time/Condition:
Emission Limit 2: 0.2100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: LOWERED THROUGHPUT
Emission Limit 1: 0.0100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air U

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT

*Process Name: 3 AJAX DPC-360LE COMPRESSOR ENGINES
*Process Type: 11.390
Primary Fuel:
Throughput: 0.75
Throughput Unit: LTPD
Process Notes:

Pollutant Information: VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT - 3 AJAX DPC-360LE COMPRESSOR ENGINES

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.5300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 6.6800
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air U

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.7600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	3.3400
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.7600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	3.3400
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.1500
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.6400
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	

Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: LOWER THROUGHPUT
Emission Limit 1: 0.0100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT

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*Process Name: 1.8 MMBTU AMINE REBOILER
*Process Type: 12.390
Primary Fuel: SWEET NATURAL GAS
Throughput: 1.80
Throughput Unit: MMBTU
Process Notes:

Pollutant Information: VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT - 1.8 MMBTU AMINE REBOILER

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*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.1700
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.7600
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.6400
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method	

Description:	
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0400
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0600
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	

*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT

*Process Name: 1.0 MMBTU DEHY REBOILER
*Process Type: 12.290
Primary Fuel: SWEET NATURAL GAS
Throughput: 1.00
Throughput Unit: MMBtu
Process Notes:

Pollutant Information: VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT - 1.0 MMBTU DEHY REBOILER

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.4200
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0800
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.3600
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:

Emission Limit 2: 0.0200
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0300
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology

considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT

*Process Name: FACILITY FLARE-AMINE UNIT STILL VENT
*Process Type: 19.330
Primary Fuel: SWEET NATURAL GAS
Throughput: 0.75
Throughput Unit: LTPD
Process Notes:

Pollutant Information: VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT - FACILITY FLARE-AMINE UNIT STILL VENT

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.1900
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.8500
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.6600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	7.2500
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.7200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	3.1600
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	

Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	140.5000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	615.3900
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	

Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.4900
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 6.5500
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT

*Process Name: LOADING LOSSES
*Process Type: 50.007

Primary Fuel: SWEET NATURAL GAS
Throughput: 0.75
Throughput Unit: LTPD
Process Notes: LOADING EMISSIONS ARE .58 TPY DUE TO VAPOR PRESSURE OF .5 PSIA

Pollutant Information: VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT - LOADING LOSSES

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 5.1600
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.2900
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: N
*Control Method Description:

Emission Limit 1: 0.0500
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT

*Process Name:	FUGITIVES (4)
*Process Type:	50.007
Primary Fuel:	SWEET NATURAL GAS
Throughput:	
Throughput Unit:	
Process Notes:	TOTAL UNCONTROLLED FUGITIVE EMISSIONS ARE LESS THAN 10 TPY, SO NO MONITORING IS REQUIRED. THE COMPANY WILL IMPLEMENT DAILY WALKTHROUGHS TO INSPECT THE PIPING. THERE ARE ALSO H2S MONITORS ON SITE TO CAPTURE ANY H2S LEAKS.

Pollutant Information: VIRTEX PETROLEUM COMPANY DOERING RANCH GAS PLANT - FUGITIVES (4)

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC

*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.8800
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 3.8500
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.1100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:

Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL

RBLC ID:	GA-0114
*Corporate/Company Name:	TEMPLE INLAND, INC.
*Facility Name:	INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL
Facility County:	FLOYD
Facility State:	GA
Facility ZIP Code:	301659245
Facility Country:	USA
Facility Contact Name:	ANNETTE WHITE
Facility Contact Phone:	7062365321
Facility Contact Email:	ANNETTEWHITE@TEMPLEINLAND.COM
EPA Region:	4
Agency Code:	GA001
Agency Name:	GEORGIA DEPARTMENT OF NATURAL RESOURCES
Agency Contact:	MS. HEATHER ABRAMS
Agency Phone:	(404)363-7127
Agency Email:	HEATHER_ABRAMS@DNR.STATE.GA.US
Other Agency Contact Info:	AIR PROTECTION BRANCH HEATHER COTTRELL 404/362-4843 HEATHER_COTTRELL@DNR.STATE.GA.US
*Permit Number:	2631-115-0021-V-01-4

*SIC:	2631
NAICS:	322130
Facility Registry System Number #:	110013763034
Application Accepted Received Date:	10/06/2003 ACT
Permit Issuance Date:	10/13/2004 ACT
Date determination entered in RBLC:	05/12/2005
Date determination last updated:	05/31/2005
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	THIS FACILITY MANUFACTURES UNBLEACHED KRAFT LINERBOARD.
Other Permitting Information:	

Affected Boundaries: INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL

*Limit (Class 1 Area or Name of the border of the U.S.):	Cohutta
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	98.00
Class 1 Area State:	GA
*Limit (Class 1 Area or Name of the border of the U.S.):	Great Smoky Mountains NP
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	200.00
Class 1 Area State:	NC
*Limit (Class 1 Area or Name of the border of the U.S.):	Joyce Kilmer-Slickrock
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	200.00
Class 1 Area State:	NC
*Limit (Class 1 Area or Name of the border of the U.S.):	Sipsey
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	200.00
Class 1 Area State:	AL

Facility-wide Emissions : INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	643.0000 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	-119.0000 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	239.0000 (Tons/Year)
*Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	39.0000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	864.0000 (Tons/Year)

Process Information : INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL

*Process Name:	RECOVERY FURNACE, BLS FUEL
*Process Type:	30.211
Primary Fuel:	BLS
Throughput:	5.30
Throughput Unit:	MMLB/D
Process Notes:	THROUGHPUT IS MMLB OF BLS PER DAY. ADDITIONAL FUEL DISTILLATE OIL ONLY, MODIFICATION OF EXISTING FURNACE. UNIT CAPABLE OF FIRING FUEL OIL AT 850 MMBTU/HR. DISTILLATE FUEL FIRING IN SEPARATE PROCESS.

Pollutant Information: INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL - RECOVERY FURNACE, BLS FUEL

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	ESP
Emission Limit 1:	0.0210
Emission Limit 1 Unit:	GR/DSCF @ 8% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0210
Standard Emission Limit Unit:	GR/DSCF @ 8% O2
Standard Limit Avg.	

Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	MACT, NESHAP, NSPS, SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	STAGED COMBUSTION AND GOOD COMBUSTION PRACTICES
Emission Limit 1:	650.0000
Emission Limit 1 Unit:	PPM @ 8% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency	No

(Y/N)?:
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: EMISSION LIMIT WHILE BURNING BLS (BLACK LIQUOR SOLIDS)

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: STAGED COMBUSTION AND GOOD COMBUSTION PRACTICES
Emission Limit 1: 0.0400
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: N
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: EMISSION LIMIT 1: WHILE FIRING BLS

*Pollutant Name Sulfur, Total Reduced (TRS)
*CAS Number: 7704
*Control Method Code: P
*Control Method Description: SYSTEM DESIGN AND GOOD OPERATION PRACTICES
Emission Limit 1: 5.0000
Emission Limit 1 Unit: PPM @ 8% O2
Emission Limit 1 Avg.

Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS, SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: P
*Control Method Description: SYSTEM DESIGN AND GOOD OPERATION PRACTICES
Emission Limit 1: 4.0000
Emission Limit 1 Unit: PPM @ 8% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air U

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

Process Information : INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL

*Process Name:	BOILER, COAL FIRED
*Process Type:	11.110
Primary Fuel:	COAL
Throughput:	565.00
Throughput Unit:	MMBTU/H
Process Notes:	MODIFICATION TO A 1962 BOILER

Pollutant Information: INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL - BOILER, COAL FIRED

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	ESP
Emission Limit 1:	0.0500
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0500
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	MACT, NESHAP, SIP
Did factors, other then air	N

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	STAGED COMBUSTION AND GOOD COMBUSTION PRACTICES
Emission Limit 1:	300.0000
Emission Limit 1 Unit:	PPM @ 3% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE, SEE NOTE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	MACT, NESHAP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	PERMITTED LIMIT IS 300 PPM. EMISSION RATE LIMIT AS LB/MMBTU NOT AVAILABLE.

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	STAGED COMBUSTION AND GOOD COMBUSTION PRACTICES.
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

Process Information : INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL

*Process Name:	BOILER, OIL-FIRED
*Process Type:	12.220
Primary Fuel:	NO. 2 FUEL OIL
Throughput:	192.00
Throughput Unit:	MMBTU/H
Process Notes:	NATURAL GAS BACKUP

Pollutant Information: INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL - BOILER, OIL-FIRED

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0500
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.5000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NESHAP, SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES
Emission Limit 1:	0.2000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	

Standard Emission Limit:	0.2000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0200
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN

Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

Process Information : INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL

*Process Name:	BOILER, SOLID FUEL
*Process Type:	11.120
Primary Fuel:	BARK
Throughput:	856.00
Throughput Unit:	MMBTU/H
Process Notes:	BARK, WASTEWATER SLUDGE, TDF, FUEL OIL; MAY BE USED TO INCIENRATE NCG GASES; NEW BOILER

Pollutant Information: INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL - BOILER, SOLID FUEL

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	ESP
Emission Limit 1:	0.0250
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0250
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	MACT, NESHAP, NSPS, SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	

Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: STAGED COMBUSTION AND GOOD COMBUSTION PRACTICES
Emission Limit 1: 368.0000
Emission Limit 1 Unit: PPM @ 3% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE, SEE NOTE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: PERMIT LIMIT IS 368 PPM. EMISSION LIMIT AS LB/MMBTU IS NOT AVAILABLE.

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P

*Control Method Description: STAGED COMBUSTION AND GOOD COMBUSTION PRACTICES
Emission Limit 1: 0.0500
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0500
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: N
*Control Method Description: BOILER IS CONTROL DEVICE -- DESTROYS HVLC NCGS IN WASTE FUEL
Emission Limit 1: 99.0000
Emission Limit 1 Unit: % REDUCTION
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg.

Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: N
*Estimated Efficiency(%): 99.000
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: 99% DESTRUCTION OF H2S GASES.

*Pollutant Name: Sulfur, Total Reduced (TRS)
*CAS Number: 7704
*Control Method Code: N
*Control Method Description: BOILER IS CONTROL DEVICE -- DESTROYS HVLC NCGS IN WASTE FUEL
Emission Limit 1: 99.0000
Emission Limit 1 Unit: % REDUCTION
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: N
*Estimated Efficiency(%): 99.000
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency No

(Y/N)?:
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: 99% DESTRUCTION OF TRS GASES

Process Information : INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL

*Process Name: KRAFT PULP MILLS - LINERBOARD MACHINES
*Process Type: 30.290
Primary Fuel:
Throughput: 2600.00
Throughput Unit: MDT/D
Process Notes: 2600 MACHINE DRIED TONS PER DAY LINERBOARD

Pollutant Information: INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL - KRAFT PULP MILLS - LINERBOARD MACHINES

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD WORK PRACTICES
Emission Limit 1:
Emission Limit 1 Unit:
Emission Limit 1 Avg. Time/Condition: SEE NOTE
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency No

(Y/N)?:
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: NO EMISSIONS LIMIT SET.

Process Information : INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL

*Process Name:	RECOVERY FURNACE, FUEL OIL
*Process Type:	11.220
Primary Fuel:	FUEL OIL
Throughput:	850.00
Throughput Unit:	mmbtu/h
Process Notes:	SEPARATE PROCESS FOR RECOVERY FURNACE, WHEN IT IS FIRING DISTILLATE FUEL OIL.

Pollutant Information: INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL - RECOVERY FURNACE, FUEL OIL

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	STAGED COMBUSTION AND GOOD COMBUSTION PRACTICES
Emission Limit 1:	0.2000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.2000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	STAGED COMBUSTION AND GOOD COMBUSTION PRACTICES
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: C. W. BURDICK GENERATING STATION

RBLC ID:	NE-0022
*Corporate/Company Name:	Grand Island Utilities
*Facility Name:	C. W. BURDICK GENERATING STATION
Facility County:	HALL
Facility State:	NE
Facility ZIP Code:	
Facility Country:	USA
Facility Contact Name:	
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	7
Agency Code:	NE001
Agency Name:	NEBRASKA DEPT. OF ENVIRONMENTAL QUALITY
Agency Contact:	MR. CLARK SMITH
Agency Phone:	(402) 471-4204
Agency Email:	CLARK.SMITH@NDEQ.STATE.NE.US
Other Agency Contact Info:	CLARK SMITH SUITE 400, THE ATRIUM, 1200 N STREET, PO BOX 98922 LINCOLN, NE 68509 402-471-2186
*Permit Number:	54712C01
*SIC:	4911
NAICS:	221112
Facility Registry System Number #:	
Application Accepted Received Date:	
Permit Issuance Date:	06/22/2004 EST
Date determination entered in RBLC:	06/22/2004
Date determination last updated:	07/08/2004
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	ELECTRIC GENERATION
Other Permitting Information:	Construction Permit for 2, 40 MW Simple-cycle Combustion Turbines.

Process Information : C. W. BURDICK GENERATING STATION

*Process Name:	OIL-FIRED COMBUSTION TURBINES
*Process Type:	12.220
Primary Fuel:	NO. 2 DISTILATE
Throughput:	8000.00
Throughput Unit:	GAL/H
Process Notes:	Oil burning rate is for both turbines. Sulfur content is limited to a max of 0.05% by weight

Pollutant Information: C. W. BURDICK GENERATING STATION - OIL-FIRED COMBUSTION

TURBINES

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	WATER INJECTION
Emission Limit 1:	141.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg.	

Time/Condition:
Standard Emission Limit: 65.0000
Standard Emission Limit Unit: PPM @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO_2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: SULFUR CONTENT OF NO. 2 LIMITED TO UNDER LESS THAN 0.05 % BY WEIGHT.
Emission Limit 1: 26.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):

Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: LOW ASH CONTENT OF NO. 2 FUEL OIL.
Emission Limit 1: 23.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Visible Emissions (VE)
*CAS Number: VE
*Control Method Code: P

*Control Method Description:	LOW ASH CONTENT OF NO. 2 FUEL OIL
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : C. W. BURDICK GENERATING STATION

*Process Name:	GAS-FIRED COMBUSTION TURBINE
*Process Type:	15.110
Primary Fuel:	NATURAL GAS
Throughput:	1.00
Throughput Unit:	MILLION SCF/H
Process Notes:	Sulfur content of NG limited to under 0.05%.

Pollutant Information: C. W. BURDICK GENERATING STATION - GAS-FIRED COMBUSTION TURBINE

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P

*Control Method Description:	GOOD COMBUSTION PRACTICES
Emission Limit 1:	34.7000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	40.0000
Standard Emission Limit Unit:	PPM @ 15% O2
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Dioxide (NO2)
*CAS Number:	10102-44-0
*Control Method Code:	A
*Control Method Description:	DLN COMBUSTION
Emission Limit 1:	30.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	15.0000
Standard Emission Limit Unit:	PPM @ 15% O2
Standard Limit Avg.	

Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	FUEL LIMITED TO PIPE LINE QUALITY NG, LOW ASH AND SULFUR CONTENT UNDER 0.05%.
Emission Limit 1:	5.4000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2.5000
Emission Limit 2 Unit:	LB/MMBTU
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency	No

(Y/N)?:
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	LOW ASH CONTENT NG
Emission Limit 1:	10.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	P
*Control Method Description:	FUEL LIMITED TO LOW ASH CONTENT.
Emission Limit 1:	20.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg.	

Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	20.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: MILLER BREWING COMPANY - TRENTON

RBLC ID:	OH-0241
*Corporate/Company Name:	MILLER BREWING COMPANY
*Facility Name:	MILLER BREWING COMPANY - TRENTON
Facility County:	BUTLER
Facility State:	OH
Facility ZIP Code:	450679760
Facility Country:	USA
Facility Contact Name:	MARK KOCH
Facility Contact Phone:	5138969200
Facility Contact Email:	
EPA Region:	5
Agency Code:	OH006
Agency Name:	HAMILTON CO-SOUTHWESTERN OH APCA
Agency Contact:	MR. BRADLEY MILLER

Agency Phone:	(513)946-7731
Agency Email:	bradley.miller@hamilton.co.org
Other Agency Contact Info:	BRADLEY MILLER OH (513) 651-9437
*Permit Number:	14-05515
*SIC:	2082
NAICS:	312120
Facility Registry System Number #:	110000392673
Application Accepted Received Date:	05/03/2001 ACT
Permit Issuance Date:	05/27/2004 ACT
Date determination entered in RBLC:	01/30/2002
Date determination last updated:	07/11/2005
Permit Type:	B: ADD NEW PROCESS TO EXISTING FACILITY C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description:	BEER BREWING AND PACKAGING.
Other Permitting Information:	THIS FACILITY BREWS AND PACKAGES BEER. EACH BOILER NOT TO EXCEED 180,000 LB STEAM/H OR 238 MMBTU/H. BOTH BOILERS TOGETHER NOT TO EXCEED 125,682 TONS COAL/ROLLING 12-MONTHS. THIS PTI, 14-05515, IS A MODIFICATION TO PTI #14-05143 ISSUED 11/15/01 FOR THE ADDITION OF AN 8.5 MW STEAM TURBINE GENERATOR TO AN EXISTING COAL FIRED BOILER (THERE WERE NO EMISSIONS FROM THE STEAM TURBINE ITSELF). THIS MODIFICATION WAS TO INCREASE THE HCL HOURLY AND T/YR LIMITS AND SO2/MMBTU LIMIT. THE T/YR FACILITYWIDE LIMITS HAVE NOT CHANGED, EXCEPT FOR HCL WHICH HAS INCREASE BY 46.1 T/YR IN THIS NEW PERMIT.

Facility-wide Emissions : MILLER BREWING COMPANY - TRENTON

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	175.2000 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	1375.9000 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	122.9000 (Tons/Year)
*Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	2758.0000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	23.0000 (Tons/Year)

Process Information : MILLER BREWING COMPANY - TRENTON

*Process Name:	BOILER (2), COAL FIRED
*Process Type:	12.110
Primary Fuel:	COAL
Throughput:	238.00
Throughput Unit:	MMBTU/H
Process Notes:	TWO BOILERS, CAPABLE OF BURNING AND WITH LIMITS FOR COAL, NATURAL GAS, NUMBERS 2 AND 6 FUEL OILS. POUND PER HOUR LIMITS ARE FOR EACH BOILER; AND EXCEPT FOR VOC AND CO, ALL T/YR LIMITS ARE FOR BOTH BOILERS COMBINED. COAL USAGE FOR BOTH BOILERS TOGETHER NOT TO EXCEED 125,682 TONS/ROLLING 12 MONTHS. THESE LIMITS FOR THE COAL.

Pollutant Information: MILLER BREWING COMPANY - TRENTON - BOILER (2), COAL FIRED

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	OVERFIRE AND SIDE FIRE AIR TO REDUCE FLAME TEMERATURE
Emission Limit 1:	0.7000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1375.9000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	0.7000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005

Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	5.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	87.6000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:	0.0220
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.6200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	11.5000
Emission Limit 2 Unit:	T/YR

Emission Limit 2 Avg. Time/Condition: EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO_2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.6000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2758.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 1.6000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U

*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: PERMIT MODIFIED FROM 1.4 LB SO2/MMBTU WHICH COULD NOT BE MET.

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: BAGHOUSE
Emission Limit 1: 0.0100
Emission Limit 1 Unit: GR/ACF
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 122.9000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 0.0310
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Hydrochloric Acid
*CAS Number: 7647-01-0

*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	21.4000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	187.6000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	LIMITS HAVE INCREASED IN THIS MODIFICATION.

*Pollutant Name	Hydrogen Fluoride
*CAS Number:	7664-39-3
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.6000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	17.7000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	
Standard Emission Limit Unit:	

Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

Process Information : MILLER BREWING COMPANY - TRENTON

*Process Name:	BOILER (2), NO. 6 FUEL OIL
*Process Type:	12.210
Primary Fuel:	NO. 6 FUEL OIL
Throughput:	238.00
Throughput Unit:	MMBTU/H
Process Notes:	TWO BOILERS, CAPABLE OF BURNING AND WITH LIMITS FOR COAL, NATURAL GAS, NUMBERS 2 AND 6 FUEL OILS. POUND PER HOUR LIMITS ARE FOR EACH BOILER; AND EXCEPT FOR VOC AND CO, ALL T/YR LIMITS ARE FOR BOTH BOILERS COMBINED. THESE LIMITS FOR THE #6 FUEL OIL.

Pollutant Information: MILLER BREWING COMPANY - TRENTON - BOILER (2), NO. 6 FUEL OIL

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/ACF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	122.9000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO

Standard Emission Limit: 0.1250
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: OVERFIRE AND SIDE FIRE AIR TO REDUCE FLAME TEMERATURE
Emission Limit 1: 0.7000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1375.9000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 0.7000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.2000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: EACH BOILER
Emission Limit 2: 11.5000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method

Description:	
Emission Limit 1:	8.1500
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	87.6000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:	0.0340
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.6000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2758.0000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	1.6000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	

*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	PERMIT MODIFIED FROM 1.4 LB SO2/MMBTU WHICH COULD NOT BE MET.

Process Information : MILLER BREWING COMPANY - TRENTON

*Process Name:	BOILER (2), NO. 2 FUEL OIL
*Process Type:	12.220
Primary Fuel:	NO. 2 FUEL OIL
Throughput:	238.00
Throughput Unit:	MMBTU/H
Process Notes:	TWO BOILERS, CAPABLE OF BURNING AND WITH LIMITS FOR COAL, NATURAL GAS, NUMBERS 2 AND 6 FUEL OILS. POUND PER HOUR LIMITS ARE FOR EACH BOILER; AND EXCEPT FOR VOC AND CO, ALL T/YR LIMITS ARE FOR BOTH BOILERS COMBINED. THESE LIMITS FOR THE #2 FUEL OIL.

Pollutant Information: MILLER BREWING COMPANY - TRENTON - BOILER (2), NO. 2 FUEL OIL

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/ACF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	122.9000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	0.0200
Standard Emission Limit	LB/MMBTU

Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	OVERFIRE AND SIDE FIRE AIR TO REDUCE FLAME TEMERATURE
Emission Limit 1:	0.7000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1375.9000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	0.7000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost	

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.3800
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	11.5000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	8.5000

Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	87.6000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:	0.0360
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.6000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2758.0000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	1.6000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable	SIP

Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	PERMIT MODIFIED FROM 1.4 LB SO2/MMBTU WHICH COULD NOT BE MET.

Process Information : MILLER BREWING COMPANY - TRENTON

*Process Name:	BOILER (2), NATURAL GAS
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	238.00
Throughput Unit:	MMBTU/H
Process Notes:	TWO BOILERS, CAPABLE OF BURNING AND WITH LIMITS FOR COAL, NATURAL GAS, NUMBERS 2 AND 6 FUEL OILS. POUND PER HOUR LIMITS ARE FOR EACH BOILER; AND EXCEPT FOR VOC AND CO, ALL T/YR LIMITS ARE FOR BOTH BOILERS COMBINED. THESE LIMITS FOR THE NATURAL GAS.

Pollutant Information: MILLER BREWING COMPANY - TRENTON - BOILER (2), NATURAL GAS

*Pollutant Name	Particulate Matter < 10 μ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/ACF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	122.9000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	0.0200
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg.	

Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	OVERFIRE AND SIDE FIRE AIR TO REDUCE FLAME TEMERATURE
Emission Limit 1:	0.7000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1375.9000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	0.7000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency	No

(Y/N)?:	
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	2.6000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	11.5000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	20.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg.	EACH BOILER

Time/Condition:
Emission Limit 2: 87.6000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit: 0.0840
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.6000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2758.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 1.6000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air

pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: PLUM POINT ENERGY

RBLC ID: AR-0074
*Corporate/Company Name: PLUM POINT ASSOCIATES, LLC
*Facility Name: PLUM POINT ENERGY
Facility County: MISSISSIPPI
Facility State: AR
Facility ZIP Code: 72370
Facility Country: USA
Facility Contact Name: D. BLAKE WHEATLEY
Facility Contact Phone: 636-532-2200
Facility Contact Email:
EPA Region: 6
Agency Code: AR001
Agency Name: ARKANSAS DEPT OF ENVIRONMENTAL QUALITY
Agency Contact: MR. TOM RHEAUME
Agency Phone: (501)682-0762
Agency Email: rheaume@adeq.state.ar.us
Other Agency Contact Info: SHAWN HUTCHINGS
8001 NATIONAL DRIVE
LITTLE ROCK, AR 72209
(501) 682-0761
*Permit Number: 1995-AOP-R0
*SIC: 4911
NAICS: 221112
Facility Registry System Number #: 110017421725
Application Accepted Received Date: 04/20/2001 ACT
Permit Issuance Date: 08/20/2003 ACT

Date determination entered in RBLC:	10/28/2003
Date determination last updated:	03/02/2004
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	
Other Permitting Information:	THE FACILITY IS A SINGLE PULVERIZED COAL FIRED BOILER. BETWEEN 550 AND 800 MW.

Facility-wide Emissions : PLUM POINT ENERGY

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	5858.6000 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	3299.3000 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	815.6000 (Tons/Year)
*Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	4395.3000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	733.2000 (Tons/Year)

Process Information : PLUM POINT ENERGY

*Process Name:	BOILER , UNIT 1 - SN-01
*Process Type:	11.110
Primary Fuel:	SUB-BITUMINOUS COAL
Throughput:	800.00
Throughput Unit:	MW
Process Notes:	THE BOILER IS A 550-800 MW PULVERIZED COAL FIRED BOILER.

Pollutant Information: PLUM POINT ENERGY - BOILER , UNIT 1 - SN-01

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	BAGHOUSE
Emission Limit 1:	0.0180
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	

Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0180
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO_2)
*CAS Number:	7446-09-5
*Control Method Code:	A
*Control Method Description:	DRY FLUE GAS DESULFURIZATION
Emission Limit 1:	0.1600
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1600
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	

*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: COMBUSTION CONTROLS
Emission Limit 1: 0.0200
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0

*Control Method Code: P
*Control Method Description: COMBUSTION CONTROLS
Emission Limit 1: 0.1600
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1600
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method Description: LOW NOX BURNERS
Emission Limit 1: 0.0900
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0900
Standard Emission Limit Unit: LB/MMBTU

Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: A
*Control Method Description: DRY FGD/FABRIC FILTER
Emission Limit 1: 0.0061
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Lead (Pb) / Lead Compounds
*CAS Number: 7439-92-1
*Control Method Code: P
*Control Method Description: FABRIC FILTER
Emission Limit 1: 2.5600
Emission Limit 1 Unit: E-5 LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Fluorine
*CAS Number: 7782-41-4
*Control Method Code: A
*Control Method Description: DRY FGD/FABRIC FILTER
Emission Limit 1: 0.0004
Emission Limit 1 Unit: LB/MMBTU

Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	90.000
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	% efficiency is 90% control by weight

Process Information : PLUM POINT ENERGY

*Process Name:	COOLING TOWER , SN-03
*Process Type:	99.009
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	

Pollutant Information: PLUM POINT ENERGY - COOLING TOWER , SN-03

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	MIST ELIMINATORS
Emission Limit 1:	0.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg.	

Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	OTHER
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : PLUM POINT ENERGY

*Process Name:	AUXILLARY BOILER
*Process Type:	12.220
Primary Fuel:	#2 FUEL OIL
Throughput:	175.00
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: PLUM POINT ENERGY - AUXILLARY BOILER

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	LOW ASH FUEL
Emission Limit 1:	0.4000
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	

Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0071
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: LOW SULFUR FUEL OIL
Emission Limit 1: 2.3000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0510
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology

considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: COMBUSTION CONTROLS
Emission Limit 1: 0.1000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0015
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: COMBUSTION CONTROLS
Emission Limit 1: 1.6000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0360
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method Description: LOW NOX BURNERS WITH FLUE GAS RECIRCULATION
Emission Limit 1: 4.4000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1000

Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: P
*Control Method Description: LOW SULFUR FUEL OIL
Emission Limit 1: 0.0300
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0008
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:

Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLUM POINT ENERGY

*Process Name:	MATERIAL HANDLING, COAL, PARTIALLY INCLOSED
*Process Type:	90.011
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	THESE SOURCES CONSIST OF BARGE UNLOADING, and COAL TRANSFER CONVEYORS.

Pollutant Information: PLUM POINT ENERGY - MATERIAL HANDLING, COAL, PARTIALLY INCLOSED

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	PARTIAL ENCLOSURES
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.4000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: Stackput conveyors 1& 3, barge unloading,reclaim conveyors 1& 2, reclaim transfer - limit is 0.1 lb/h. Stackout conveyor 2 - limit is 0.4 lb/h. stackout transfer - limit is 0.2 lb/h

Process Information : PLUM POINT ENERGY

*Process Name:	MATERIAL HANDLING, COAL, SUPPRESSION
*Process Type:	90.011
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	THESE SOURCES CONSIST OF RAILCAR UNLOADING, COAL STORAGE PILES, and coal storage pile transfer

Pollutant Information: PLUM POINT ENERGY - MATERIAL HANDLING, COAL, SUPPRESSION

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	WATER SPRAYS, DUST SUPPRESSANTS, ETC
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.2000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	

Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: Rail car unloading - limit is 0.1 lb/h, active coal piles - limit is 1.2 lb/h, and inactive coal piles, and pile transfer - limit is 0.5 lb/h

Process Information : PLUM POINT ENERGY

*Process Name: MATERIAL HANDLING, COAL, BAGHOUSES
*Process Type: 90.011
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: process covers transfer house, tripper deck conveyor, reclaim transfer #3.

Pollutant Information: PLUM POINT ENERGY - MATERIAL HANDLING, COAL, BAGHOUSES

*Pollutant Name Particulate Matter < 10 μ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: BAGHOUSES
Emission Limit 1: 0.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLUM POINT ENERGY

*Process Name: MATERIAL HANDLING, FLYASH, BAGHOUSES
*Process Type: 99.120
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: Fly ash silos, rail and barge transport, pneamatic transfer

Pollutant Information: PLUM POINT ENERGY - MATERIAL HANDLING, FLYASH, BAGHOUSES

*Pollutant Name Particulate Matter < 10 μ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: BAGHOUSE
Emission Limit 1: 0.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:

Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLUM POINT ENERGY

*Process Name:	MATERIAL HANDLING, LIME, BAGHOUSES
*Process Type:	90.019
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	lime storage, controlled by baghouse

Pollutant Information: PLUM POINT ENERGY - MATERIAL HANDLING, LIME, BAGHOUSES

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	BAGHOUSE
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost	

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLUM POINT ENERGY

*Process Name:	MATERIAL HANDLING, FLY ASH, SUPPRESSION
*Process Type:	99.120
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	fly ash transfer and disposal

Pollutant Information: PLUM POINT ENERGY - MATERIAL HANDLING, FLY ASH, SUPPRESSION

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	DUST SUPPRESSION - WATER SPRAYS
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	ash transfer
Emission Limit 2:	0.6000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	ash disposal area
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : PLUM POINT ENERGY

*Process Name:	ROAD DUST
*Process Type:	99.190
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	paved and unpaved roads

Pollutant Information: PLUM POINT ENERGY - ROAD DUST

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	DUST SUPPRESSION - WATERING, DUST SUPPRESSANTS
Emission Limit 1:	0.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	paved roads
Emission Limit 2:	0.3000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	unpaved roads
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency	No

(Y/N)?:	
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: PLUM POINT ENERGY

RBLC ID:	AR-0079
*Corporate/Company Name:	PLUM POINT ASSOCIATES, LLC
*Facility Name:	PLUM POINT ENERGY
Facility County:	MISSISSIPPI
Facility State:	AR
Facility ZIP Code:	72370
Facility Country:	USA
Facility Contact Name:	D. BLAKE WHEATLEY
Facility Contact Phone:	6365322200
Facility Contact Email:	
EPA Region:	6
Agency Code:	AR001
Agency Name:	ARKANSAS DEPT OF ENVIRONMENTAL QUALITY
Agency Contact:	MR. TOM RHEAUME
Agency Phone:	(501)682-0762
Agency Email:	rheaume@adeq.state.ar.us
Other Agency Contact Info:	
*Permit Number:	1995-AOP-R0
*SIC:	4911
NAICS:	221112
Facility Registry System Number #:	110017421725
Application Accepted Received Date:	04/20/2001 ACT
Permit Issuance Date:	08/20/2003 ACT
Date determination entered in RBLC:	11/10/2004
Date determination last updated:	05/02/2006
Permit Type:	
Facility Description:	PLUM POINT ENERGY ASSOCIATES, LLC (PERMITTEE) PROPOSES TO CONSTRUCT AND OPERATE A NOMINAL 550-800 MW COAL FIRED GENERATING STATION
Other Permitting Information:	THE FACILITY IS A SINGLE PULVERIZED COAL FIRED BOILER. BETWEEN 550 AND 800 MW.

Facility-wide Emissions : PLUM POINT ENERGY

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	5858.6000 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	3299.3000 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	815.6000 (Tons/Year)
*Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	4395.3000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	733.2000 (Tons/Year)

Process Information : PLUM POINT ENERGY

*Process Name:	BOILER - SN-01
*Process Type:	11.110
Primary Fuel:	SUB-BITUMINOUS COAL
Throughput:	800.00
Throughput Unit:	MW
Process Notes:	THE BOILER IS A 550-800 MW PULVERIZED COAL FIRED BOILER.

Pollutant Information: PLUM POINT ENERGY - BOILER - SN-01

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	BAGHOUSE
Emission Limit 1:	0.0180
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0180
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable	

Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	A
*Control Method Description:	DRY FLUE GAS DESULFURIZATION
Emission Limit 1:	0.1600
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1600
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004

Pollutants/Compliance Notes:

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	COMBUSTION CONTROLS
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	COMBUSTION CONTROLS
Emission Limit 1:	0.1600
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	

Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1600
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	LOW NOX BURNERS
Emission Limit 1:	0.0900
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0900
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U

*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2004
Pollutants/Compliance Notes:

*Pollutant Name Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: A
*Control Method Description: DRY FGD/FABRIC FILTER
Emission Limit 1: 0.0061
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Lead (Pb) / Lead Compounds
*CAS Number: 7439-92-1

*Control Method Code: P
*Control Method Description: FABRIC FILTER
Emission Limit 1: 2.5600
Emission Limit 1 Unit: E-5 LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2004
Pollutants/Compliance Notes:

*Pollutant Name Fluorine
*CAS Number: 7782-41-4
*Control Method Code: A
*Control Method Description: DRY FGD/FABRIC FILTER
Emission Limit 1: 0.0004
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:

Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%): 90.000
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2004
Pollutants/Compliance Notes:

Process Information : PLUM POINT ENERGY

*Process Name:	COOLING TOWER - SN-03
*Process Type:	99.003
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	

Pollutant Information: PLUM POINT ENERGY - COOLING TOWER - SN-03

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	MIST ELIMINATORS
Emission Limit 1:	0.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg.	

Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: OTHER
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2004
Pollutants/Compliance Notes:

Process Information : PLUM POINT ENERGY

*Process Name:	AUXILIARY BOILER
*Process Type:	12.220
Primary Fuel:	#2 FUEL OIL
Throughput:	175.00
Throughput Unit:	MMBTU
Process Notes:	

Pollutant Information: PLUM POINT ENERGY - AUXILIARY BOILER

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	LOW ASH FUEL
Emission Limit 1:	0.4000
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0071
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	

*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW SULFUR FUEL OIL. SULFUR CONTENT < 0.05% S BY WT.
Emission Limit 1:	2.3000
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0510
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No

Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	COMBUSTION CONTROLS
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0015
Emission Limit 2 Unit:	LB/MMBTU
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	COMBUSTION CONTROLS
Emission Limit 1:	1.6000
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	

Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0360
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: B
*Control Method Description: LOW NOX BURNERS WITH FLUE GAS RECIRCULATION
Emission Limit 1: 4.4000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology U

considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2004
Pollutants/Compliance Notes:

*Pollutant Name Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: P
*Control Method Description: LOW SULFUR FUEL OIL
Emission Limit 1: 0.0300
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0008
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLUM POINT ENERGY

*Process Name:	CONTROLLED DUST SOURCES
*Process Type:	19.900
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	THESE SOURCES CONSIST OF PNEUMATIC FLY ASH TRANSFER SOURCES, COAL CRUSHERS, CRUSH COAL TRANSFER AND COAL STORAGE SILOS, AND PNUMATIC LIME RECEIVING AND STORAGE.

Pollutant Information: PLUM POINT ENERGY - CONTROLLED DUST SOURCES

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	FABRIC FILTER
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	SEE NOTE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance Notes:	BACT IS CONTROL, NO EMISSION RATE LIMIT.

Process Information : PLUM POINT ENERGY

*Process Name:	PARTIALLY INCLOSED DUST SOURCES
*Process Type:	19.900
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	THESE SOURCES CONSIST OF BARGE UNLOADING, RAILCAR UNLOADING, COAL TRANSFER CONVEYORS, AND ASH CONVEYORS.

Pollutant Information: PLUM POINT ENERGY - PARTIALLY INCLOSED DUST SOURCES

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	PARTIAL ENCLOSURES
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	SEE NOTE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance Notes:	BACT IS CONTROL, NO EMISSION RATE LIMIT. FUGITIVE EMISSIONS

Process Information : PLUM POINT ENERGY

*Process Name:	OTHER DUST SOURCES
*Process Type:	19.900
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	THESE SOURCES CONSIST OF RAILCAR UNLOADING, COAL STORAGE PILES, ASH TRUCK TRANSFER, THE WASTE DISPOSAL AREA, AND PAVE AND UNPAVED ROADWAY TRAVEL.

Pollutant Information: PLUM POINT ENERGY - OTHER DUST SOURCES

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	WATER SPRAYS, DUST SUPPRESSANTS, ETC
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	SEE NOTE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance	BACT IS CONTROLS, NO EMISSION RATE LIMIT. FUGITIVE EMISSIONS.

Notes:

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: VCU EAST PLANT

RBLC ID:	VA-0270
*Corporate/Company Name:	VIRGINIA COMMONWEALTH UNIVERSITY
*Facility Name:	VCU EAST PLANT
Facility County:	RICHMOND CITY
Facility State:	VA
Facility ZIP Code:	23298
Facility Country:	USA
Facility Contact Name:	DAVID MITCHELL
Facility Contact Phone:	(804)828-3766
Facility Contact Email:	
EPA Region:	3
Agency Code:	VA001
Agency Name:	VIRGINIA ENVIRONMENTAL QUALITY AIR DIV.
Agency Contact:	MS. MONICA A. HARVEY
Agency Phone:	(804)698-4300
Agency Email:	MAHARVEY@DEQ.VIRGINIA.GOV
Other Agency Contact Info:	STANLEY FAGGERT VA (804)527-5078
*Permit Number:	50126
*SIC:	8062
NAICS:	622110
Facility Registry System Number #:	110006176823
Application Accepted Received Date:	07/09/2001 EST
Permit Issuance Date:	03/31/2003 EST
Date determination entered in RBLC:	04/21/2003
Date determination last updated:	07/15/2003
Permit Type:	B: ADD NEW PROCESS TO EXISTING FACILITY C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description:	
Other Permitting Information:	Three natural gas, #2 fuel oil, and #6 fuel oil boilers each with a maximum rated heat input capacity of 150.6 MMBtu/hr.

Process Information : VCU EAST PLANT

*Process Name:	BOILER - NO 6 FUEL OIL
*Process Type:	12.210

Primary Fuel: FUEL OIL #6
Throughput: 150.00
Throughput Unit: MMBTU/H
Process Notes: This is one of 3 boilers.

Pollutant Information: VCU EAST PLANT - BOILER - NO 6 FUEL OIL

*Pollutant Name Particulate Matter (PM), Filterable
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 9.3000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0630
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 8.0000

Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0500
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW SULFUR FUELS.
Emission Limit 1: 78.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit 3hr rolling avg
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.5200
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Nitrogen Dioxide (NO2)
*CAS Number: 10102-44-0
*Control Method Code: B
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW NOX COMBUSTION AND FGR. CEM SYSTEM.
Emission Limit 1: 0.4000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2: 57.5000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition: each unit
Standard Emission Limit: 0.4000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:

Pollutants/Compliance Notes:

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 15.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1050
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 2.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:

Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VCU EAST PLANT

*Process Name:	BOILER NATUAL GAS
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	150.00
Throughput Unit:	MMBTU/H
Process Notes:	This is one of 3 boilers

Pollutant Information: VCU EAST PLANT - BOILER NATUAL GAS

*Pollutant Name: Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 1.2000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg.

Time/Condition:
Standard Emission Limit: 0.0100
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 1.2000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0100
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):

Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW SULFUR FUELS.
Emission Limit 1: 0.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit 3hr rolling avg
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0010
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Dioxide (NO2)
*CAS Number: 10102-44-0
*Control Method Code: B

*Control Method Description: GOOD COMBUSTION PRACTICES. LOW NOX COMBUSTION AND FGR. CEM SYSTEM.
Emission Limit 1: 0.1000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2: 15.6000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition: each unit
Standard Emission Limit: 0.1000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 14.9000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg.

Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB\H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency	No

(Y/N)?:
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VCU EAST PLANT

*Process Name:	BOILER - DISTILLATE
*Process Type:	12.220
Primary Fuel:	FUEL OIL #2
Throughput:	150.00
Throughput Unit:	MMBTU
Process Notes:	This is one of 3 units.

Pollutant Information: VCU EAST PLANT - BOILER - DISTILLATE

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	3.3000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0220
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	1.7000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	N
*Control Method Description:	GOOD COMBUSTION PRACTICES. LOW SULFUR FUELS.
Emission Limit 1:	78.5000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit 3hr rolling avg

Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.5300
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Dioxide (NO2)
*CAS Number:	10102-44-0
*Control Method Code:	B
*Control Method Description:	GOOD COMBUSTION PRACTICES. LOW NOX COMBUSTION AND FGR. CEM SYSTEM.
Emission Limit 1:	0.2000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	30.1000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	each unit
Standard Emission Limit:	0.2000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology	

considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	15.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1050
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : VCU EAST PLANT

*Process Name:	BOILER - OIL OR GAS
*Process Type:	12.290
Primary Fuel:	GAS OR OIL
Throughput:	150.00
Throughput Unit:	MMBTU
Process Notes:	Throughput for is for one of 3 units.

Pollutant Information: VCU EAST PLANT - BOILER - OIL OR GAS

*Pollutant Name	Particulate Matter (PM)

*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 23.3000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 20.0000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit

Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW SULFUR FUELS.
Emission Limit 1: 196.3000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Dioxide (NO2)
*CAS Number: 10102-44-0
*Control Method Code: B
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW NOX COMBUSTION AND FGR. CEM SYSTEM.
Emission Limit 1: 145.6000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 172.9000

Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 23.7000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable

Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: VCU EAST PLANT

RBLC ID:	VA-0278
*Corporate/Company Name:	Virginia Commonwealth University
*Facility Name:	VCU EAST PLANT
Facility County:	RICHMOND
Facility State:	VA
Facility ZIP Code:	23298
Facility Country:	USA
Facility Contact Name:	
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	3
Agency Code:	VA001
Agency Name:	VIRGINIA ENVIRONMENTAL QUALITY AIR DIV.
Agency Contact:	MR. YOGESH DOSHI
Agency Phone:	(804)698-4017
Agency Email:	YNDOSHI@DEQ.VIRGINIA.GOV
Other Agency Contact Info:	JOHN REINHARDT VA (804) 527-5012
*Permit Number:	VA-50126
*SIC:	8221
NAICS:	611310
Facility Registry System Number #:	110017420897
Application Accepted Received Date:	12/11/2002 ACT

Permit Issuance Date:	03/31/2003 ACT
Date determination entered in RBLC:	03/04/2004
Date determination last updated:	06/21/2004
Permit Type:	B: ADD NEW PROCESS TO EXISTING FACILITY C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description:	STEAM GENERATING PLANT AT UNIVERSITY
Other Permitting Information:	Steam generating plant consisting of 3 natural gas/No. 2 fuel oil/No. 6 fuel oil-fired boilers, each with a max rated heat capacity of 150.6 mmbtu/h

Process Information : VCU EAST PLANT

*Process Name:	BOILER, NATURAL GAS, (3)
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	150.60
Throughput Unit:	MMBTU/H
Process Notes:	Throughput for each. The 3 boilers shall consume no more than 3,500 million cf of natural gas per year

Pollutant Information: VCU EAST PLANT - BOILER, NATURAL GAS, (3)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0080
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	

Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW SULFUR FUEL
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0007
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P

*Control Method Description:	LOW NOX BURNERS, FLUE GAS RECIRCULATION, AND GOOD OPERATING PROCEDURES
Emission Limit 1:	15.6000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1000
Emission Limit 2 Unit:	LB/MMBTU
Emission Limit 2 Avg. Time/Condition:	30-day rolling avg
Standard Emission Limit:	0.0800
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	annual avg
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	14.9000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg.	calculated

Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency	No

(Y/N)?:
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	10.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	20.0000
Emission Limit 2 Unit:	% OPACITY
Emission Limit 2 Avg. Time/Condition:	6-min period per hour
Standard Emission Limit:	10.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : VCU EAST PLANT

*Process Name:	BOILER, #6 FUEL OIL, (3)
*Process Type:	12.210
Primary Fuel:	# 6 FUEL OIL
Throughput:	150.60
Throughput Unit:	MMBTU/H

Process Notes: Throughput for each. The 3 boilers shall consume no more than a total of 5,000,000 gal of fuel oil (#2 and #6 combined) per year.

Pollutant Information: VCU EAST PLANT - BOILER, #6 FUEL OIL, (3)

*Pollutant Name: Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 9.3000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 23.3000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: combined operation, all fuels
Standard Emission Limit: 0.0600
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 8.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg.

Time/Condition:
Emission Limit 2: 20.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: combined operation, all fuels
Standard Emission Limit: 0.0500
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: FUEL SULFUR LIMIT: < 0.5% S BY WT
Emission Limit 1: 78.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 196.3000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: combined operation, all fuels
Standard Emission Limit: 0.5200
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	LOW NOX BURNERS, FLUE GAS RECIRCULATION, AND GOOD OPERATING PROCEDURES.
Emission Limit 1:	57.5000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	145.6000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	combined operation, all fuels
Standard Emission Limit:	0.4000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	15.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	

Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : VCU EAST PLANT

*Process Name:	BOILER, #2 FUEL OIL, (3)
*Process Type:	12.220
Primary Fuel:	NO. 2 FUEL OIL
Throughput:	150.60
Throughput Unit:	MMBTU/H
Process Notes:	Throughput for each. The 3 boilers shall consume no more than a total of 5,000,000 gal of fuel oil (#2 and #6 combined) per year.

Pollutant Information: VCU EAST PLANT - BOILER, #2 FUEL OIL, (3)

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	3.3000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	

Standard Emission Limit:	0.0200
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.7000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0100
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: FUEL SULFUR LIMITS: <0.5% S BY WT.
Emission Limit 1: 78.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.5000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method LOW NOX BURNERS, FLUE GAS RECIRCULATION, AND GOOD

Description: OPERATING PROCEDURES.
Emission Limit 1: 30.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.2000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICE
Emission Limit 1: 15.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated

*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No

Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: TECO-POLK POWER STATION/MULBERRY

RBLC ID:	FL-0081
*Corporate/Company Name:	TAMPA ELECTRIC COMPANY
*Facility Name:	TECO-POLK POWER STATION/MULBERRY
Facility County:	POLK
Facility State:	FL
Facility ZIP Code:	33601
Facility Country:	USA
Facility Contact Name:	MARK J. HORNICK
Facility Contact Phone:	813-228-1111
Facility Contact Email:	
EPA Region:	4
Agency Code:	FL001
Agency Name:	FLORIDA DEPT. OF ENVIRONMENTLA PROTECTION
Agency Contact:	MS. TERESA HERON
Agency Phone:	(850)921-9529
Agency Email:	teresa.heron@dep.state.fl.us
Other Agency Contact Info:	MICHAEL HALPIN FL (850) 921-9519
*Permit Number:	PSD-FL-194
*SIC:	4911
NAICS:	221112
Facility Registry System Number #:	110000365113
Application Accepted Received Date:	08/27/1992 ACT
Permit Issuance Date:	12/23/2002 ACT
Date determination entered in RBLC:	03/18/1994
Date determination last updated:	11/03/2003
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	ELECTRIC GENERATION PLANT
Other Permitting Information:	Additional Permit Nos.:Pa 92-32 & 1050233-002-ac. DOE Coal Gasification Demonstration Project. Coal Gasification System Includes Capability for Cold and Hot Gas Cleanup. PSD-FL-194B Extends Demo Period for Unit 1 (Turbine) from 2 to 3 Years, and Associated Date Corrections. No Emission Limit Changes. PSD-FL-194C Allows Temp Burning of Syngas from Pet Coke and Coal in Unit 1. Emis

Limits from Bact are Effective after 3 Year Demo Period. NOX Emis Limit for Syngas Will Be Reevaluated after the 3 Year Demo Project and an 18 Month Nox Emissions Test Period. Modification for Boiler (Unit 2) Increases Boiler Hours, From 1000 to 3000 H/yr; and Heat Input, from 49.5 Mmbtu to 120 Mmbtu When Firing No.2 Fuel Oil. PSD-FL-194E allows production of syngas from blends of petroleum coke and coal only. PSD-FL-194F re-visited the BACT NOx emissions of the IGCC unit. The original NOX limit of 25 ppmvd was reduced to 15 ppmvd @15%O2 PSD-FL-194G allows the use of nitrogen oxide CEM to substitute for the fuel nitrogen sampling required by 40CFR 60, Subpart GG. Additional plantwide emissions: Pb = 0.19 t/yr; HAP = 247.2 t/yr

Affected Boundaries: TECO-POLK POWER STATION/MULBERRY

*Limit (Class 1 Area or Name of the border of the U.S.):	Chassahowitzka
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	118.00
Class 1 Area State:	FL

Facility-wide Emissions : TECO-POLK POWER STATION/MULBERRY

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	537.7000 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	3169.1000 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	86.5000 (Tons/Year)
*Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	2873.8000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	438.8000 (Tons/Year)

Process Information : TECO-POLK POWER STATION/MULBERRY

*Process Name:	BOILER, NO 2 FUEL OIL
*Process Type:	12.220
Primary Fuel:	NO. 2 FUEL OIL
Throughput:	120.00
Throughput Unit:	MMBTU/H
Process Notes:	POWER PLANT AUX BOILER, IGCC UNIT. ADDITIONAL PERMIT NO.: 92-32. MODIFIED OPERATING HOURS = 3000 H/Y.

Pollutant Information: TECO-POLK POWER STATION/MULBERRY - BOILER, NO 2 FUEL OIL

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	LOW-NOX BURNERS.
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	70.000
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW SULFUR FUEL OIL, < 0.05% S BY WEIGHT
Emission Limit 1:	0.8000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	

Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.8000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.1000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:

*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Visible Emissions (VE)
*CAS Number: VE
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 20.0000
Emission Limit 1 Unit: % OPACITY
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 20.0000
Standard Emission Limit Unit: % OPACITY
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : TECO-POLK POWER STATION/MULBERRY

*Process Name:	TURBINE, COMBINED CYCLE, FUEL OIL
*Process Type:	15.290
Primary Fuel:	NO. 2 FUEL OIL
Throughput:	1765.00
Throughput Unit:	MMBTU/H
Process Notes:	Combined cycle turbine uses syngas and No. 2 fuel oil. Fuel oil is used < 876 h/yr. Limits for each fuel are listed under separate processes.

Pollutant Information: TECO-POLK POWER STATION/MULBERRY - TURBINE, COMBINED CYCLE, FUEL OIL

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	WET INJECTION
Emission Limit 1:	42.0000
Emission Limit 1 Unit:	PPMVD @ 15 % O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	311.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	42.0000
Standard Emission Limit Unit:	PPM @ 15% O2
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)

*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	FUEL SPEC: LOW SULFUR FUEL OIL
Emission Limit 1:	0.0480
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	92.2000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION
Emission Limit 1:	40.0000
Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	99.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	40.0000
Standard Emission Limit	PPM @ 15% O2

Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION
Emission Limit 1:	0.0280
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	32.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost	

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION
Emission Limit 1:	0.0090
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	17.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Lead (Pb) / Lead Compounds
*CAS Number:	7439-92-1
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION
Emission Limit 1:	5.3000

Emission Limit 1 Unit:	E-5 LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1010
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : TECO-POLK POWER STATION/MULBERRY

*Process Name:	TURBINE, COMBINED CYCLE, SYNGAS
*Process Type:	15.250
Primary Fuel:	PROCESS GAS
Throughput:	1755.00
Throughput Unit:	MMBTU/H
Process Notes:	FUEL: SYNGAS FROM PET COKE AND COAL. ALTERNATIVE THROUGHPUTS: 190 MW CT AND 70 MW HRSG.

Pollutant Information: TECO-POLK POWER STATION/MULBERRY - TURBINE, COMBINED CYCLE, SYNGAS

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	COMBUSTION IMPROVEMENTS, NITROGEN DILUENT INJECTION

Emission Limit 1:	15.0000
Emission Limit 1 Unit:	PPMVD @ 15 % O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	132.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	15.0000
Standard Emission Limit Unit:	PPM @ 15 % O2
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	Modification of permit PSD-FL-194F issued on 2/5/2002 re-visited BACT original NOX BACT emission limit of 25 ppmvd at 15%O2 and reduced to 15 ppmvd at 15% O2. Fuel is a "synthetic gas", made from a coal gasification plant. Limit established via a settlement agreement (does not represent BACT-PSD).

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	A
*Control Method Description:	ACID GAS ABSORPTION.
Emission Limit 1:	0.1700
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	357.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg.	

Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION
Emission Limit 1: 25.0000
Emission Limit 1 Unit: PPMVD
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 98.0000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 25.0000
Standard Emission Limit Unit: PPM @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency No

(Y/N)?:
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION.
Emission Limit 1: 0.0017
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 3.0000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION
Emission Limit 1: 0.0130
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg.

Time/Condition:
Emission Limit 2: 17.0000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Lead (Pb) / Lead Compounds
*CAS Number: 7439-92-1
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION
Emission Limit 1: 2.4100
Emission Limit 1 Unit: E-6 LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0035
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: SANDY CREEK ENERGY STATION

RBLC ID:	*TX-0499
*Corporate/Company Name:	SANDY CREEK ENERGY ASSOCIATES
*Facility Name:	SANDY CREEK ENERGY STATION
Facility County:	MCLENNAN
Facility State:	TX
Facility ZIP Code:	
Facility Country:	USA
Facility Contact Name:	
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	6
Agency Code:	TX001
Agency Name:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)
Agency Contact:	JEAN XU SHAW, P.E.
Agency Phone:	(512) 239-1823
Agency Email:	JXUSHAW@TCEQ.STATE.TX.US
Other Agency Contact Info:	
*Permit Number:	PSD-TX 1039 AND 70861
*SIC:	173
NAICS:	221122
Facility Registry System Number #:	UNKNOWN
Application Accepted Received Date:	01/09/2004 ACT
Permit Issuance Date:	07/24/2006 ACT
Date determination entered in RBLC:	04/03/2007
Date determination last updated:	11/08/2007
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	THE PROPOSED SCES IS A GRASSROOTS NEW, 860 MW GROSS (800 MW NET) ELECTRIC OUTPUT, PC BOILER STEAM ELECTRIC GENERATING FACILITY. THE MAXIMUM HEAT INPUT IS 8,185 MILLION BRITISH THERMAL UNITS PER HOUR (MMBTU/HR). ONLY PRELIMINARY ENGINEERING DESIGN HAS BEEN COMPLETED AT THIS TIME AND THE PERMIT APPLICATION NET PLANT EFFICIENCY OF 10,231 BTU/KWHR (HEAT ENERGY INPUT DIVIDED BY NET ELECTRIC ENERGY OUTPUT) WILL NOT BE FINALIZED UNTIL PROJECT FUNDING IS COMPLETE. THE BOILER MAY BE DESIGNED AS A SUBCRITICAL STEAM PRESSURE UNIT, OR A MORE EFFICIENT, HIGHER PRESSURE, SUPERCRITICAL STEAM UNIT. THE ELECTRIC GENERATING PROCESS IS THE STANDARD RANKINE CLOSED CYCLE: BOILER FEEDWATER IS PUMPED, CONVERTED TO STEAM IN THE BOILER, PASSED THROUGH

STEAM TURBINES WHICH TURN ELECTRIC GENERATORS, AND CONDENSED IN WATER-COOLED CONDENSERS TO AGAIN BECOME BOILER FEEDWATER. HEAT IS REMOVED FROM THE TURBINE CONDENSERS VIA A WET COOLING TOWER WHICH EVAPORATES TO THE ATMOSPHERE WATER OBTAINED FROM WACO'S MUNICIPAL WASTE WATER TREATMENT FACILITY.

Other Permitting Information:

Process Information : SANDY CREEK ENERGY STATION

*Process Name:	PULVERIZED CAOL BOILER
*Process Type:	11.110
Primary Fuel:	COAL
Throughput:	8185.00
Throughput Unit:	MMBTU/H
Process Notes:	COAL (TYPICALLY 72% CARBON, 0.4% SULFUR, 6% ASH; REMAINDER HYDROGEN, OXYGEN AND NITROGEN) IS RECEIVED FROM RAILCAR, UNLOADED AND STORED IN A LARGE OPEN PILE FOR LONG-TERM STORAGE (INACTIVE PILE), OR IN ONE OF TWO SMALLER PILES FOR MORE IMMEDIATE USE (ACTIVE PILES). FROM THE ACTIVE PILE, COAL IS FED TO SILOS IN THE UPPER BOILER STRUCTURE. THE COAL IS THEN PULVERIZED, BLOWN THROUGH BURNERS, AND COMBUSTED IN THE FIREBOX.

Pollutant Information: SANDY CREEK ENERGY STATION - PULVERIZED CAOL BOILER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	AT THIS POINT, THE FLUE GAS HAS BEEN COOLED TO THE APPROPRIATE TEMPERATURE FOR SCR, SO IT NEXT PASSES THROUGH THE SCR REACTOR, WHERE NOX IS REDUCED TO FORM NITROGEN.
Emission Limit 1:	1637.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	1-HR
Emission Limit 2:	573.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	30-DAY
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	2456.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	1-HR
Emission Limit 2:	982.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	30-DAY
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance	

Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	123.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	1-HR
Emission Limit 2:	327.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	30-DAY
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	2456.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	1-HR
Emission Limit 2:	1228.0000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg.	30-DAY

Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 29.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):

Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 127.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 133.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Ammonia (NH3)
*CAS Number: 7664-41-7
*Control Method Code: N

*Control Method Description:
Emission Limit 1: 41.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Hydrogen Fluoride
*CAS Number: 7664-39-3
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 23.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 24.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg.

Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Hydrochloric Acid
*CAS Number: 7647-01-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 72.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 47.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency No

(Y/N)?:
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Lead (Pb) / Lead Compounds
*CAS Number:	7439-92-1
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.5500
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.4100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Mercury
*CAS Number:	7439-97-6
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.9400
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg.	

Time/Condition:	
Emission Limit 2:	0.0750
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : SANDY CREEK ENERGY STATION

*Process Name:	AUXILLARY BOILER
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	175.00
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: SANDY CREEK ENERGY STATION - AUXILLARY BOILER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	

Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.1100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology

considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 6.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.8800
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.7000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	

Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : SANDY CREEK ENERGY STATION

*Process Name:	PLANT-EMISSION CAP
*Process Type:	19.900
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	

Pollutant Information: SANDY CREEK ENERGY STATION - PLANT-EMISSION CAP

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1804.0000
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit	

Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 3585.0000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 5380.0000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1490.0000

Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1487.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 135.0000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:

Pollutants/Compliance Notes:

*Pollutant Name	Ammonia (NH_3)
*CAS Number:	7664-41-7
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	56.0000
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: FORSYTH ENERGY PLANT

RBLC ID:	NC-0101
*Corporate/Company Name:	FORSYTH ENERGY PROJECTS, LLC
*Facility Name:	FORSYTH ENERGY PLANT

Facility County:	FORSYTH
Facility State:	NC
Facility ZIP Code:	27107
Facility Country:	USA
Facility Contact Name:	WILLIAM J. MARTIN
Facility Contact Phone:	6179482165
Facility Contact Email:	WMARTIN@CME-ENERGY.COM
EPA Region:	4
Agency Code:	NC004
Agency Name:	FORSYTH COUNTY ENV AFFAIRS DEPT, NC
Agency Contact:	MR. PETER LLOYD
Agency Phone:	(336)727-8060
Agency Email:	lloydpb@co.forsyth.nc.us
Other Agency Contact Info:	JEFF EBBITT NC (336)703-2440
*Permit Number:	00986R1
*SIC:	4911
NAICS:	221112
Facility Registry System Number #:	NEW NOT FOUND
Application Accepted Received Date:	12/13/2002 ACT
Permit Issuance Date:	09/29/2005 ACT
Date determination entered in RBLC:	08/31/2004
Date determination last updated:	08/30/2006
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	THREE COMBINED-CYCLE COMBUSTION TURBINE GENERATORS, EACH WITH A HEAT RECOVERY STEAM GENERATORS (HRSG) ALONG WITH NATURAL GAS-FIRED DUCT BURNERS TO MEET PEAK DEMAND. THE STEAM GENERATED THROUGH THE THREE HRSGS WILL DRIVE A STEAM TURBINE. THE ENTIRE PLANT WILL BE CAPABLE OF GENERATING A NOMINAL POWER OUTPUT OF 812 MEGAWATTS.
Other Permitting Information:	PERMIT WAS REVISED AND ISSUED WITH A NEW EFFECTIVE DATE OF SEPTEMBER 29, 2005 AS A RESULT OF THE APPLICANT"S REQUEST TO EXTEND THE 18-MONTH CONSTRUCTION TIME FRAME. THE REVIEW INCLUDED A REANALYSIS OF BACT FOR NOX FROM THE COMBUSTION TURBINES.

Affected Boundaries: FORSYTH ENERGY PLANT

*Limit (Class 1 Area or Name of the border of the U.S.):	James River Face
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	180.00
Class 1 Area State:	VA

*Limit (Class 1 Area or Name of the border of the U.S.): Linville Gorge
Boundary Type (Class 1 or Intl Border): CLASS1
Distance: 150.00
Class 1 Area State: NC

Facility-wide Emissions : FORSYTH ENERGY PLANT

*Pollutant Name: Carbon Monoxide
Facility-wide Emissions Increase: 1264.8000 (Tons/Year)
*Pollutant Name: Nitrogen Oxides (NOx)
Facility-wide Emissions Increase: 706.6000 (Tons/Year)
*Pollutant Name: Particulate Matter (PM)
Facility-wide Emissions Increase: 487.1000 (Tons/Year)
*Pollutant Name: Sulfur Oxides (SOx)
Facility-wide Emissions Increase: 205.1000 (Tons/Year)
*Pollutant Name: Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase: 166.3000 (Tons/Year)

Process Information : FORSYTH ENERGY PLANT

*Process Name: TURBINE, COMBINED CYCLE, NATURAL GAS, (3)
*Process Type: 15.210
Primary Fuel: NATURAL GAS
Throughput: 1844.30
Throughput Unit: MMBTU/H
Process Notes: Each of these units have a natural gas-fired heat recovery steam generator and a natural gas-fired duct burner. Each CT combusts natural gas as the primary fuel and very low- sulfur No. 2 fuel oil as a backup fuel. The use of fuel oil is limited to 1,200 hours per year and only during the months of November through March, and is listed as a separate process. These units are listed as a combined source (all three units) for each type of fuel.

Pollutant Information: FORSYTH ENERGY PLANT - TURBINE, COMBINED CYCLE, NATURAL GAS, (3)

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES AND EFFICIENT PROCESS DESIGN.
Emission Limit 1: 11.6000

Emission Limit 1 Unit: PPM @ 15% O2
Emission Limit 1 Avg. Time/Condition: 3-hour average
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 11.6000
Standard Emission Limit Unit: PPM @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: B
*Control Method Description: DRY LOW-NOX COMBUSTORS AND SELECTIVE CATALYTIC REDUCTION (SCR)
Emission Limit 1: 2.5000
Emission Limit 1 Unit: PPM @ 15% O2
Emission Limit 1 Avg. Time/Condition: 24 HOUR ROLLING AVERAGE, FIRST 500 HOURS
Emission Limit 2: 3.0000
Emission Limit 2 Unit: PPM @ 15% O2
Emission Limit 2 Avg. Time/Condition: 24 HOUR ROLLING AVERAGE, AFTER 500 HOURS
Standard Emission Limit: 3.0000
Standard Emission Limit Unit: PPM @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%): 53.000
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: EMISSION LIMITS WERE MODIFIED AS THE RESULT OF A REANALYSIS OF BACT ON SEPTEMBER 29, 2005. NO ECONOMIC COST ANALYSIS PROVIDED BECAUSE APPLICANT CHOSE THE MOST STRINGENT CONTROL ALTERNATIVE.

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: USE OF ONLY CLEAN-BURNING LOW-SULFUR FUELS AND GOOD COMBUSTION PRACTICES.
Emission Limit 1: 0.0190
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: based on 3-hour average
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: USE OF VERY LOW-SULFUR FUEL (NATURAL GAS)
Emission Limit 1: 0.0006
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: based on 3-hour average
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: P
*Control Method Description: VERY LOW-SULFUR FUEL (NATURAL GAS) OR NO. 2 FUEL OIL (0.015% SULFUR CONTENT BY WEIGHT).
Emission Limit 1:
Emission Limit 1 Unit:
Emission Limit 1 Avg. Time/Condition: SEE NOTE

Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	REGULATED POLLUTANT IS SULFURIC ACID MIST. BACT IS USE OF LOW SULFUR FUEL

Process Information : FORSYTH ENERGY PLANT

*Process Name:	AUXILLIARY BOILER
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	110.20
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: FORSYTH ENERGY PLANT - AUXILLIARY BOILER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	LOW-NOX BURNERS, GOOD COMBUSTION CONTROL AND CLEAN BURNING, LOW-SULFUR FUEL (NATURAL GAS).
Emission Limit 1:	15.1300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	based on 3-hour average
Emission Limit 2:	

Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1370
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Oxides (SOx)
*CAS Number:	7446
*Control Method Code:	P
*Control Method Description:	LOW-NOX BURNERS, GOOD COMBUSTION CONTROL AND CLEAN BURNING, LOW-SULFUR FUEL (NATURAL GAS).
Emission Limit 1:	0.6100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	based on 3-hour average
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0055
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the	

BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: LOW-NOX BURNERS, GOOD COMBUSTION CONTROL AND CLEAN BURNING, LOW-SULFUR FUEL (NATURAL GAS).
Emission Limit 1: 9.0800
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: based on 3-hour average
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0824
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)

*CAS Number: VOC
*Control Method Code: P
*Control Method Description: LOW-NOX BURNERS, GOOD COMBUSTION CONTROL AND CLEAN BURNING, LOW-SULFUR FUEL (NATURAL GAS).
Emission Limit 1: 0.5900
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: based on 3-hour average
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description: LOW-NOX BURNERS, GOOD COMBUSTION CONTROL AND CLEAN BURNING, LOW-SULFUR FUEL (NATURAL GAS).
Emission Limit 1: 0.8200
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: based on 3-hour average
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0070
Standard Emission Limit LB/MMBTU

Unit:
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : FORSYTH ENERGY PLANT

*Process Name:	IC ENGINE, EMERGENCY GENERATOR
*Process Type:	17.210
Primary Fuel:	DIESEL FUEL
Throughput:	11.40
Throughput Unit:	MMBTU/H
Process Notes:	usage limited to 500 h/yr

Pollutant Information: FORSYTH ENERGY PLANT - IC ENGINE, EMERGENCY GENERATOR

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 36.4800
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 7.7000
Standard Emission Limit Unit: G/B-HP-H

Standard Limit Avg. Time/Condition: calculated, assumes 48% efficiency
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: emergency use only

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.5800
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: emergency use only

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.0400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: emergency use only

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 9.6900
Emission Limit 1 Unit: LB/H

Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 2.0500
Standard Emission Limit Unit: G/B-HP-H
Standard Limit Avg. Time/Condition: calculated, assumes 48% efficiency
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: emergency use only

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.1400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:

Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	emergency use only

Process Information : FORSYTH ENERGY PLANT

*Process Name:	IC ENGINE, EMERGENCY FIREWATER PUMP
*Process Type:	17.210
Primary Fuel:	DIESEL FUEL
Throughput:	11.40
Throughput Unit:	MMBTU/H
Process Notes:	usage limited to 200 h/yr

Pollutant Information: FORSYTH ENERGY PLANT - IC ENGINE, EMERGENCY FIREWATER PUMP

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	36.4800
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	7.7000
Standard Emission Limit Unit:	G/B-HP-H
Standard Limit Avg. Time/Condition:	calculated, assumes 48% efficiency
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air	

pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	emergency use only

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.5800
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	emergency use only

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.0400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: emergency use only

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 9.6900
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:

Standard Emission Limit: 2.0500
Standard Emission Limit Unit: G/B-HP-H
Standard Limit Avg. Time/Condition: calculated, assumes 48% efficiency
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: emergency use only

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.1400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: emergency use only

Process Information : FORSYTH ENERGY PLANT

*Process Name:	COOLING TOWER
*Process Type:	99.003
Primary Fuel:	
Throughput:	3834.00
Throughput Unit:	GAL/MIN
Process Notes:	

Pollutant Information: FORSYTH ENERGY PLANT - COOLING TOWER

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0070
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	based on 3-hour average
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	

Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 μ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0020
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	based on 3-hour average
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : FORSYTH ENERGY PLANT

*Process Name:	TURBINE, COMBINED CYCLE, FUEL OIL, (3)
*Process Type:	15.290

Primary Fuel: LOW-SULFUR FUEL OIL
Throughput: 2003.20
Throughput Unit: MMBTU/H
Process Notes: These units are listed in addition to the natural gas units because they account for the emissions while firing very low-sulfur No. 2 fuel oil. FUEL USAGE LIMITED TO MAXIMUM OF 1,200 HOURS PER YEAR PER TURBINE DURING THE MONTHS OF NOVEMBER THROUGH MARCH. Limits for operation without duct burner.

Pollutant Information: FORSYTH ENERGY PLANT - TURBINE, COMBINED CYCLE, FUEL OIL, (3)

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: DRY LOW NOX COMBUSTORS AND USE OF WATER INJECTION.
Emission Limit 1: 8.0000
Emission Limit 1 Unit: PPM @ 15% O2
Emission Limit 1 Avg. Time/Condition: FOR FIRST 500 HOURS OF OPERATION
Emission Limit 2: 10.0000
Emission Limit 2 Unit: PPM @ 15% O2
Emission Limit 2 Avg. Time/Condition: AFTER FIRST 500 HOURS OF OPERATION
Standard Emission Limit: 10.0000
Standard Emission Limit Unit: PPM @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%): 53.000
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: EMISSION LIMITS WERE MODIFIED AS THE RESULT OF A REANALYSIS OF BACT ON SEPTEMBER 29, 2005. COST DATA NOT PROVIDED BECAUSE MOST STRINGENT CONTROL METHOD WAS CHOSEN.

*Pollutant Name: Sulfur Dioxide (SO2)

*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: USE OF VERY LOW-SULFUR NO. 2 FUEL OIL (0.015% SULFUR) LIMITED TO 1,200 HOURS PER YEAR PER TURBINE.
Emission Limit 1: 0.0162
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: EFFICIENT COMBUSTION PROCESS DESIGN.
Emission Limit 1: 15.7000
Emission Limit 1 Unit: PPM @ 15% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 15.7000
Standard Emission Limit: PPM @ 15% O2

Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	USE OF ONLY CLEAN-BURNING, LOW- SULFUR FUELS AND GOOD COMBUSTION PRACTICES.
Emission Limit 1:	0.0358
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	based on 3-hour average
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost	

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Sulfuric Acid (mist, vapors, etc)
*CAS Number:	7664-93-9
*Control Method Code:	P
*Control Method Description:	VERY LOW-SULFUR NO. 2 FUEL OIL, WITH AND W/OP DUCT BURNERS. USAGE OF FUEL OIL LIMITED TO A MAXIMUM OF 1,200 HOURS PER YEAR DURING THE MONTHS OF NOVEMBER THROUGH MARCH.
Emission Limit 1:	0.0150
Emission Limit 1 Unit:	% SULFUR BY WEIGHT
Emission Limit 1 Avg. Time/Condition:	SULFURIC ACID MIST
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : FORSYTH ENERGY PLANT

*Process Name:	TURBINE & DUCT BURNER, COMBINED CYCLE, FUEL OIL, 3
*Process Type:	15.290

Primary Fuel:	FUEL OIL
Throughput:	2003.20
Throughput Unit:	MMBTU/H
Process Notes:	Combined turbine and duct burner emission limits.

Pollutant Information: FORSYTH ENERGY PLANT - TURBINE & DUCT BURNER, COMBINED CYCLE, FUEL OIL, 3

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	VERY LOW SULFUR NO. 2 FUEL OIL (0.015% S) LIMITED TO 1,200 H/YR PER TURBINE
Emission Limit 1:	0.0154
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	EFFICIENT COMBUSTION PROCESS DESIGN

Emission Limit 1:	25.1000
Emission Limit 1 Unit:	PPM @ 15% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	25.1000
Standard Emission Limit Unit:	PPM @ 15% O2
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	EFFICIENT COMBUSTION DESIGN
Emission Limit 1:	6.0000
Emission Limit 1 Unit:	PPM @ 15% O2
Emission Limit 1 Avg. Time/Condition:	3-h avg
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD

Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 μ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	CLEAN-BURNING, LOW SULFUR FUELS (< 0.015% S), GOOD COMBUSTION PRACTICES.
Emission Limit 1:	0.0248
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3-hr avg
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost	

Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Sulfuric Acid (mist, vapors, etc)
*CAS Number:	7664-93-9
*Control Method Code:	P
*Control Method Description:	VERY LOW SULFUR NO. 2 FUEL OIL (< 0.015% S). USAGE OF FUEL OIL LIMITED TO A MAXIMUM OF 1,200 H/YR DURING THE MONTHS OF NOVEMBER THROUGH MARCH.
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	SEE NOTE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	REGULATED POLLUTANT IS SULFURIC ACID MIST. BACT IS LIMIT ON FUEL SULFUR

Process Information : FORSYTH ENERGY PLANT

*Process Name:	TURBINE & DUCT BURNER, COMBINED CYCLE, NAT GAS, 3
*Process Type:	15.210
Primary Fuel:	NATURAL GAS
Throughput:	1844.30
Throughput Unit:	MMBTU/H
Process Notes:	Each of these units have a natural gas-fired HRSG & a natural gas fired duct burner.

Limits for this process are for turbines and duct burners.

Pollutant Information: FORSYTH ENERGY PLANT - TURBINE & DUCT BURNER, COMBINED CYCLE, NAT GAS, 3

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES AND EFFICIENT PROCESS DESIGN
Emission Limit 1:	25.9000
Emission Limit 1 Unit:	PPM @ 15% O2
Emission Limit 1 Avg. Time/Condition:	3-hr avg
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	25.9000
Standard Emission Limit Unit:	PPM @ 15% O2
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES AND EFFICIENT PROCESS DESIGN
Emission Limit 1:	5.7000
Emission Limit 1 Unit:	PPM @ 15% O2
Emission Limit 1 Avg.	

Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	CLEAN BURNING LOW-SULFUR FUELS AND GOOD COMBUSTION PRACTICES
Emission Limit 1:	0.0210
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3-hr avg
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air	

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW SULFUR FUEL (NATURAL GAS)
Emission Limit 1:	0.0006
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3-hr avg
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfuric Acid (mist, vapors, etc)
*CAS Number:	7664-93-9
*Control Method Code:	P
*Control Method Description:	USE OF LOW SULFUR FUEL (NATURAL GAS)
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	SEE NOTE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	REGULATED POLLUTANT IS SULFURIC ACID MIST. BACT IS USE OF LOW SULFUR FUEL.

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: PLAQUEMINE PVC PLANT

RBLC ID:	LA-0204
*Corporate/Company Name:	SHINTECH LOUISIANA LLC
*Facility Name:	PLAQUEMINE PVC PLANT
Facility County:	IBERVILLE
Facility State:	LA

Facility ZIP Code:	
Facility Country:	USA
Facility Contact Name:	DAVID WISE
Facility Contact Phone:	2256851113
Facility Contact Email:	
EPA Region:	6
Agency Code:	LA001
Agency Name:	LOUISIANA DEPARTMENT OF ENV QUALITY
Agency Contact:	MR. SYED QUADRI
Agency Phone:	(225)219-3123
Agency Email:	syed.quadri@la.gov
Other Agency Contact Info:	PERMIT WRITER: DAN NGUYEN, 225-219-3181
*Permit Number:	PSD-LA-709
*SIC:	2821
NAICS:	325211
Facility Registry System Number #:	110020900104
Application Accepted Received Date:	02/09/2005 ACT
Permit Issuance Date:	07/27/2005 ACT
Date determination entered in RBLC:	06/25/2006
Date determination last updated:	08/07/2007
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	NEW 1.3 BILLION POUND PER YEAR PVC PLANT CONSISTING OF A CHLOR-ALKALI UNIT, AND EDC/VCM UNIT, AND A PVC UNIT.
Other Permitting Information:	VINYL CHLORIDE - 28.82 TPY. VINYL CHLORIDE (VC) WAS REGULATED AS A PSD POLLUTANT (SIGNIFICANCE LEVEL OF 1 TPY) IN LOUISIANA WHEN THIS PERMIT WAS ISSUED. LOUISIANA""S NSR REFORM RULES, ADOPTED DECEMBER 20, 2005, DELISTED VC. HAPS FROM THE PVC UNIT WERE SUBJECTED TO A 112(J) MACT DETERMINATION AFTER VACATURE OF 40 CFR 63 SUBPART J ON APRIL 19, 2005. BACT FOR VC IS EQUIVALENT TO MACT FOR VC. NNSR: BECAUSE VOC AND NOX EMISSIONS ARE LESS THAN 100 TPY, LAER WAS NOT REQUIRED. OFFSETS WERE REQUIRED PURSUANT TO A STATE-ONLY PROVISION IN LAC 33:III.504.

Facility-wide Emissions : PLAQUEMINE PVC PLANT

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	211.0300 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	92.8500 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	78.7100 (Tons/Year)
*Pollutant Name:	Sulfur Oxides (SOx)

Facility-wide Emissions Increase:	2.8000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	62.3600 (Tons/Year)

Process Information : PLAQUEMINE PVC PLANT

*Process Name:	ANALYZER VENT 2 (M-10)
*Process Type:	63.999
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	

Pollutant Information: PLAQUEMINE PVC PLANT - ANALYZER VENT 2 (M-10)

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.1700
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLAQUEMINE PVC PLANT

*Process Name:	BOILERS A & B (U-1 & U-2)
*Process Type:	12.390
Primary Fuel:	
Throughput:	250.00
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: PLAQUEMINE PVC PLANT - BOILERS A & B (U-1 & U-2)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES AND USE OF GASEOUS FUEL
Emission Limit 1:	0.0050
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	THREE ONE-HOUR TEST AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0050
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost	

Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	B
*Control Method Description:	LOW NOX BURNERS AND FLUE GAS RECIRCULATION
Emission Limit 1:	0.0400
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	24-HR ROLLING AVG BASED ON A 1-HR AVG
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0400
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS, OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES AND USE OF GASEOUS FUEL
Emission Limit 1:	0.0360
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	

Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0360
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: THREE ONE-HOUR TEST AVERAGE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLAQUEMINE PVC PLANT

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*Process Name: BOILERS C & D (U-3 & U-4)
*Process Type: 12.390
Primary Fuel:
Throughput: 250.00
Throughput Unit: MMBTU/H
Process Notes:

Pollutant Information: PLAQUEMINE PVC PLANT - BOILERS C & D (U-3 & U-4)

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*Pollutant Name Particulate Matter < 10 μ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES AND USE OF NATURAL GAS AS FUEL
Emission Limit 1: 0.0050
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:

Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0050
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: THREE ONE-HOUR TEST AVERAGE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method Description: LOW NOX BURNERS AND FLUE GAS RECIRCULATION
Emission Limit 1: 0.0120
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0120
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: 24-HR ROLLING AVG BASED ON A 1-HR AVG
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS, OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U

*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES AND USE OF NATURAL GAS AS FUEL
Emission Limit 1: 0.0360
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0360
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: THREE ONE-HOUR TEST AVERAGE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLAQUEMINE PVC PLANT

*Process Name: CRACKING FURNACES A-D
*Process Type: 13.310
Primary Fuel:
Throughput: 90.00
Throughput Unit: MMBTU/H EA.
Process Notes:

Pollutant Information: PLAQUEMINE PVC PLANT - CRACKING FURNACES A-D

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES AND USE OF NATURAL GAS AS FUEL
Emission Limit 1: 0.0070
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0070
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: THREE ONE-HOUR TEST AVERAGE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: B

*Control Method Description:	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION (SCR)
Emission Limit 1:	0.0090
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0090
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	THREE ONE-HOUR TEST AVERAGE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES AND USE OF NATURAL GAS AS FUEL
Emission Limit 1:	0.0460
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0460
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg.	THREE ONE-HOUR TEST AVERAGE

Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	MACT, OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : PLAQUEMINE PVC PLANT

*Process Name:	GAS THERMAL OXIDIZERS A & B (M-5 & M-6)
*Process Type:	19.200
Primary Fuel:	
Throughput:	72.00
Throughput Unit:	MMBTU/H
Process Notes:	AVERAGE OPERATING RATE PROJECTED TO BE 36 MM BTU/HR

Pollutant Information: PLAQUEMINE PVC PLANT - GAS THERMAL OXIDIZERS A & B (M-5 & M-6)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES AND USE OF GASEOUS FUEL
Emission Limit 1:	0.0075
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	THREE ONE-HOUR TEST AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0075
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	THREE ONE-HOUR TEST AVERAGE

*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: B
*Control Method Description: GOOD COMBUSTION PRACTICES AND SELECTIVE CATALYTIC REDUCTION (SCR)
Emission Limit 1: 0.0250
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0250
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: 24-HR ROLLING AVG BASED ON A 1-HR AVG
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES AND USE OF GASEOUS FUEL
Emission Limit 1: 0.1100
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1100
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: THREE ONE-HOUR TEST AVERAGE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLAQUEMINE PVC PLANT

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*Process Name: PVC DRYER SCRUBBERS A & B (P-1 & P-2)
*Process Type: 63.036
Primary Fuel:
Throughput: 650.00
Throughput Unit: MM LB/YR EA.
Process Notes:

Pollutant Information: PLAQUEMINE PVC PLANT - PVC DRYER SCRUBBERS A & B (P-1 & P-2)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	CYCLONE AND SCRUBBER
Emission Limit 1:	0.0053
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	THREE ONE-HOUR TEST AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0053
Standard Emission Limit Unit:	GR/DSCF
Standard Limit Avg. Time/Condition:	THREE ONE-HOUR TEST AVERAGE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : PLAQUEMINE PVC PLANT

*Process Name:	C/A COOLING TOWER (C-4)
*Process Type:	99.009
Primary Fuel:	
Throughput:	38750.00
Throughput Unit:	GALS/MIN
Process Notes:	

Pollutant Information: PLAQUEMINE PVC PLANT - C/A COOLING TOWER (C-4)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD DESIGN, MAINTENANCE, AND INTEGRATED DRIFT ELIMINATORS
Emission Limit 1:	0.0800
Emission Limit 1 Unit:	LB/MM GALS
Emission Limit 1 Avg. Time/Condition:	HOURLY AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : PLAQUEMINE PVC PLANT

*Process Name:	VCM COOLING TOWERS 1 & 2 (M-7 & M-8)
*Process Type:	99.009
Primary Fuel:	
Throughput:	80000.00
Throughput Unit:	GALS/MIN EA.
Process Notes:	

Pollutant Information: PLAQUEMINE PVC PLANT - VCM COOLING TOWERS 1 & 2 (M-7 & M-8)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD DESIGN, MAINTENANCE, AND INTEGRATED DRIFT ELIMINATORS
Emission Limit 1:	0.0600
Emission Limit 1 Unit:	LB/MM GALS
Emission Limit 1 Avg. Time/Condition:	HOURLY AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : PLAQUEMINE PVC PLANT

*Process Name:	COOLING TOWER (P-15)
*Process Type:	99.009
Primary Fuel:	
Throughput:	43000.00
Throughput Unit:	GALS/MIN
Process Notes:	

Pollutant Information: PLAQUEMINE PVC PLANT - COOLING TOWER (P-15)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD DESIGN, MAINTENANCE, AND INTEGRATED DRIFT ELIMINATORS
Emission Limit 1:	0.0570
Emission Limit 1 Unit:	LB/MM GALS
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0570
Standard Emission Limit Unit:	LB/MM GALS
Standard Limit Avg. Time/Condition:	HOURLY AVERAGE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : PLAQUEMINE PVC PLANT

*Process Name:	DELIVERY SILOS A-F (P-3 - P-8)
*Process Type:	63.999
Primary Fuel:	
Throughput:	650.00
Throughput Unit:	MM LB/YR EA.
Process Notes:	

Pollutant Information: PLAQUEMINE PVC PLANT - DELIVERY SILOS A-F (P-3 - P-8)

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: CYCLONE FOLLOWED BY A BAGHOUSE
Emission Limit 1: 0.0100
Emission Limit 1 Unit: GR/DSCF
Emission Limit 1 Avg. Time/Condition: THREE ONE-HOUR TEST AVERAGE
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLAQUEMINE PVC PLANT

*Process Name: ROAD - FUGITIVE DUST
*Process Type: 99.140
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes:

Pollutant Information: PLAQUEMINE PVC PLANT - ROAD - FUGITIVE DUST

*Pollutant Name: Particulate Matter < 10 µ (PM10)

*CAS Number: PM
*Control Method Code: P
*Control Method Description: PAVINGS ROADS AS MUCH AS PRACTICABLE
Emission Limit 1: 0.2200
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : PLAQUEMINE PVC PLANT

*Process Name: H/C CLEANING SILO (P-9)
*Process Type: 63.999
Primary Fuel:
Throughput: 1.00
Throughput Unit: MM LB/YR
Process Notes:

Pollutant Information: PLAQUEMINE PVC PLANT - H/C CLEANING SILO (P-9)

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM

*Control Method Code:	A
*Control Method Description:	CYCLONE FOLLOWED BY A BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	THREE ONE-HOUR TEST AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: TURNER ENERGY CENTER, LLC

RBLC ID:	OR-0046
*Corporate/Company Name:	CALPINE
*Facility Name:	TURNER ENERGY CENTER, LLC
Facility County:	MARION
Facility State:	OR
Facility ZIP Code:	97392
Facility Country:	USA
Facility Contact Name:	UNKNOWN

Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	10
Agency Code:	OR001
Agency Name:	OREGON DEPT OF ENVIRONMENTAL QUALITY
Agency Contact:	MR. DAVE KAUTH
Agency Phone:	(503)229-5655
Agency Email:	kauth.dave@deq.state.or.us
Other Agency Contact Info:	GARY ANDES DEQ SALEM OFFICE 750 FRONT ST. NE SALEM, OR 97301-1039 503/378-8240, EXT. 234
*Permit Number:	24-0047
*SIC:	4911
NAICS:	221112
Facility Registry System Number #:	110018492576
Application Accepted Received Date:	02/26/2002 ACT
Permit Issuance Date:	01/06/2005 ACT
Date determination entered in RBLC:	01/10/2006
Date determination last updated:	08/31/2006
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	620 MW TOTAL COMBINED CYCLE GAS TURBINES (2 TURBINES WITH HRSGS)
Other Permitting Information:	FACILITY WILL NEVER BE BUILT. DID NOT RECEIVE A SITE CERTIFICATE FROM THE OREGON ENERGY FACILITY SITING COUNCIL.

Affected Boundaries: TURNER ENERGY CENTER, LLC

*Limit (Class 1 Area or Name of the border of the U.S.):	Diamond Peak
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	150.00
Class 1 Area State:	OR
*Limit (Class 1 Area or Name of the border of the U.S.):	Mount Adams
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	181.00
Class 1 Area State:	WA
*Limit (Class 1 Area or Name of the border of the U.S.):	Mount Hood

Boundary Type (Class 1 or Intl Border): CLASS1
Distance: 102.00
Class 1 Area State: OR
*Limit (Class 1 Area or Name of the border of the U.S.): Mount Jefferson
Boundary Type (Class 1 or Intl Border): CLASS1
Distance: 82.00
Class 1 Area State: OR
*Limit (Class 1 Area or Name of the border of the U.S.): Mount Washington
Boundary Type (Class 1 or Intl Border): CLASS1
Distance: 93.00
Class 1 Area State: OR
*Limit (Class 1 Area or Name of the border of the U.S.): Three Sisters
Boundary Type (Class 1 or Intl Border): CLASS1
Distance: 98.00
Class 1 Area State: OR

Facility-wide Emissions : TURNER ENERGY CENTER, LLC

*Pollutant Name: Carbon Monoxide
Facility-wide Emissions Increase: 267.0000 (Tons/Year)
*Pollutant Name: Nitrogen Oxides (NOx)
Facility-wide Emissions Increase: 217.0000 (Tons/Year)
*Pollutant Name: Particulate Matter (PM)
Facility-wide Emissions Increase: 139.0000 (Tons/Year)
*Pollutant Name: Sulfur Oxides (SOx)
Facility-wide Emissions Increase: 39.0000 (Tons/Year)
*Pollutant Name: Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase: 47.0000 (Tons/Year)

Process Information : TURNER ENERGY CENTER, LLC

*Process Name: ELECTRICAL POWER GENERATION
*Process Type: 11.310
Primary Fuel: NATURAL GAS

Throughput: 34507448.00
Throughput Unit: MMBTU/YR
Process Notes: NATURAL GAS THROUGHPUT IS TOTAL FOR THE TWO TURBINES AND TWO DUCT BURNERS.

Pollutant Information: TURNER ENERGY CENTER, LLC - ELECTRICAL POWER GENERATION

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: A
*Control Method Description: OXIDATION CATALYST
Emission Limit 1: 2.0000
Emission Limit 1 Unit: PPMVD
Emission Limit 1 Avg. Time/Condition: 3-H ROLLING/@>70% CAPACITY
Emission Limit 2: 3.0000
Emission Limit 2 Unit: PPMVD
Emission Limit 2 Avg. Time/Condition: 3-HR ROLLING/@<70% CAPACITY
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%): 92.000
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: LIMITS APPLY TO COMBINED TURBINE/HRSG EXHAUST.

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method Description: SELECTIVE CATALYTIC REDUCTION
Emission Limit 1: 2.0000

Emission Limit 1 Unit:	PPMVD
Emission Limit 1 Avg. Time/Condition:	1-H BLOCK
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	92.000
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	LIMIT APPLIES TO COMBINED TURBINE/HRSG EXHAUST.

*Pollutant Name	Particulate Matter < 10 μ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	USE OF NATURAL GAS AND GOOD COMBUSTION PRACTICES
Emission Limit 1:	18.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	3-H BLOCK
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable	N/A

Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	LIMIT APPLIES TO COMBINED TURBINE/HRSG EXHAUST.

*Pollutant Name	Ammonia (NH3)
*CAS Number:	7664-41-7
*Control Method Code:	P
*Control Method Description:	USE OF NATURAL GAS
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	SEE NOTE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006

Pollutants/Compliance Notes: USE OF NATURAL GAS IS RACT.

*Pollutant Name Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: N
*Control Method Description: USE OF NATURAL GAS
Emission Limit 1:
Emission Limit 1 Unit:
Emission Limit 1 Avg. Time/Condition: SEE NOTE
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: N
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: REGULATED POLLUTANT IS SULFURIC ACID MIST. USE OF NATURAL GAS IS RACT. NO NUMERIC LIMITS WERE SET.

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: A
*Control Method Description: OXIDATION CATALYST
Emission Limit 1: 1.0000
Emission Limit 1 Unit: PPMVD
Emission Limit 1 Avg. Time/Condition: 3-H BLOCK
Emission Limit 2:
Emission Limit 2 Unit:

Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: N
*Estimated Efficiency(%): 90.000
Compliance Verified: N
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: LIMIT APPLIES TO COMBINED TURBINE/HRSG EXHAUST.

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description: USE OF NATURAL GAS
Emission Limit 1: 0.8000
Emission Limit 1 Unit: % SULFUR CONTENT
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?: N

*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	SO2 EMISSION LIMIT SET BY NSPS GG.

Process Information : TURNER ENERGY CENTER, LLC

*Process Name:	AUXILIARY BOILER
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	417904.00
Throughput Unit:	MMBTU/YR
Process Notes:	BOILER USED TO PROVIDE AUXILIARY STEAM FOR STANDBY AND STARTUP CONDITIONS WILL BE OPERATED A MAXIMUM OF 3000 HOURS/YR.

Pollutant Information: TURNER ENERGY CENTER, LLC - AUXILIARY BOILER

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	A
*Control Method Description:	OXIDATION CATALYST
Emission Limit 1:	0.0380
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3-H BLOCK
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0380
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the	N

BACT decisions?:	
*Estimated Efficiency(%):	92.000
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfuric Acid (mist, vapors, etc)
*CAS Number:	7664-93-9
*Control Method Code:	N
*Control Method Description:	USE OF NATURAL GAS
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	SEE NOTE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	REGULATED POLLUTANT IS SULFURIC ACID MIST. USE OF NATURAL GAS IS RACT.

*Pollutant Name	Nitrogen Oxides (NOx)

*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	SELECTIVE CATALYTIC REDUCTION
Emission Limit 1:	0.0110
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3-H BLOCK
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0110
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	92.000
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	USE OF NATURAL GAS
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	SEE NOTE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit	

Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	USE OF NATURAL GAS IS RACT.

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	A
*Control Method Description:	OXIDATION CATALYST
Emission Limit 1:	0.0044
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3-H BLOCK
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	90.000
Compliance Verified:	N
Cost Effectiveness:	
Incremental Cost	0

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: VOC AS METHANE.

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: WPS - WESTON PLANT

RBLC ID:	WI-0228
*Corporate/Company Name:	WISCONSIN PUBLIC SERVICE
*Facility Name:	WPS - WESTON PLANT
Facility County:	MARATHON
Facility State:	WI
Facility ZIP Code:	54474
Facility Country:	USA
Facility Contact Name:	DAVID HARPOLE
Facility Contact Phone:	9204331264
Facility Contact Email:	
EPA Region:	5
Agency Code:	WI001
Agency Name:	WISCONSIN DEPT OF NATURAL RESOURCES
Agency Contact:	MR. JEFFREY C. HANSON
Agency Phone:	(608)266-6876
Agency Email:	JEFFREY.HANSON@DNR.STATE.WI.US
Other Agency Contact Info:	JEFFREY C. HANSON (608) 266-6876 DATA ENTERED DON C. FAITH III (608) 267 3135 HTTP://DNR.WI.GOV/ORG/AW/AIR/PERMITS/APM_TOC.HTM
*Permit Number:	04-RV-248
*SIC:	4911
NAICS:	22
Facility Registry System Number #:	110008231412
Application Accepted Received Date:	09/29/2004 ACT
Permit Issuance Date:	10/19/2004 ACT
Date determination entered in RBLC:	03/06/2006
Date determination last updated:	08/31/2006
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	ELECTRICAL UTILITY

Other Permitting Information:	SUPER CRITICAL PULVERIZED COAL (SCPC) FIRED ELECTRIC STEAM BOILER AND ASSOCIATED OPERATIONS 500 MW BASELOAD

Process Information : WPS - WESTON PLANT

*Process Name:	SUPER CRITICAL PULVERIZED COAL ELECTRIC STEAM BOILER (S04, P04)
*Process Type:	11.110
Primary Fuel:	PRB COAL
Throughput:	5173.07
Throughput Unit:	MMBTU/H
Process Notes:	500 MW CAPACITY, BASE LOAD OPERATION (30% TO 100% CAPACITY) BACKUP / STARTUP FUEL, NATURAL GAS (5.07 CF6) PRB COAL (~0.5 WT. % S MAX., 5.5 WT % ASH); ~ 8100 BTU / LB; 319.3 TPH

Pollutant Information: WPS - WESTON PLANT - SUPER CRITICAL PULVERIZED COAL ELECTRIC STEAM BOILER (S04, P04)

*Pollutant Name	Hydrochloric Acid
*CAS Number:	7647-01-0
*Control Method Code:	A
*Control Method Description:	DRY FGD
Emission Limit 1:	10.9400
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	24 HR AVG.
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	MACT
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency	No

(Y/N)?:
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	B
*Control Method Description:	FABRIC FILTER BAGHOUSE (WHEN FIRING COAL). NATURAL GAS USE (W/O BAGHOUSE) IS LIMITED TO 500 MMBTU/HR.
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3 HR. AVG
Emission Limit 2:	103.5200
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	3 HR. AVG.
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	POLLUTANT MEASUREMENT INCLUDES BACKHALF (METHOD 5 OR 5B + METHOD 202)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	B
*Control Method Description:	FABRIC FILTER BAGHOUSE (WHEN FIRING COAL) NATURAL GAS USE (W/O BAGHOUSE) LIMITED TO 500 MMBTU/HR
Emission Limit 1:	0.0180
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg.	3 HOUR AVG.

Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	INCLUDES BACKHALF

*Pollutant Name	Sulfur Dioxide (SO_2)
*CAS Number:	7446-09-5
*Control Method Code:	B
*Control Method Description:	DRY FGD, LIMIT ON EMISSIONS ENTERING CONTROL SYSTEM: 1.23 LBS/MMBTU 30 DAY AVG.
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	30 DAY AVG.
Emission Limit 2:	0.0900
Emission Limit 2 Unit:	LB/MMBTU
Emission Limit 2 Avg. Time/Condition:	12 MO. ROLLING AVG.
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air	

pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	92.000
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	POLLUTANT LIMITS INCLUDE STARTUP / SHUTDOWN AND ATOMIZER CHANGEOUT. PERMITTEE MAY ONLY USE ACTUAL HOURS OF OPERATION WHEN DETERMINING TIME AVERAGED EMISSIONS. WHEN CONDUCTING MAINTENANCE ON CONTROL SYSTEM (ROUTINE ATOMIZER CHANGEOUT): 3491.8 POUNDS PER HOUR ON A 3-HOUR AVERAGE AND 1508.9 POUNDS PER HOUR ON A 24-HOUR AVERAGE. CONTROLLED EMISSIONS: SULFUR DIOXIDE EMISSIONS SHALL BE LIMITED TO 621 POUNDS PER HOUR AVERAGED OVER ANY CONSECUTIVE 3-HOUR PERIOD AND SULFUR DIOXIDE EMISSIONS SHALL BE LIMITED TO 589 POUNDS PER HOUR AVERAGED OVER ANY CONSECUTIVE 24-HOUR PERIOD

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	B
*Control Method Description:	LOW NOX BURNERS, GOOD COMBUSTION PRACTICES SELECTIVE CATALYTIC REDUCTION (SCR)
Emission Limit 1:	0.0700
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	30 DAY AVG. EXCL. STARTUP/SHUTDOWN
Emission Limit 2:	0.0600
Emission Limit 2 Unit:	LB/MMBTU
Emission Limit 2 Avg. Time/Condition:	12 MO. AVG. INCL. STARTUP / SHUTDOWN
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	

Cost Effectiveness:	6,116 ($/ton)
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2003
Pollutants/Compliance Notes:	COST EFFECTIVENESS BASED ON 30 DAY AVG. VALUE.

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES; LOW NOX BURNERS
Emission Limit 1:	0.1500
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	CALENDAR DAY AVG.
Emission Limit 2:	3399.0000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	12 MO. ROLLING INCL. STARTUP / SHUTDOWN
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method	GOOD COMBUSTION PRACTICES, LOW NOX BURNERS

Description:
Emission Limit 1: 0.0036
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 81.6000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: 12 MO. ROLLING, INCL. STARTUP / SHUTDOWN
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Lead (Pb) / Lead Compounds
*CAS Number: 7439-92-1
*Control Method Code: A
*Control Method Description: FABRIC FILTER BAGHOUSE
Emission Limit 1: 0.1300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:

*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Mercury
*CAS Number: 7439-97-6
*Control Method Code: P
*Control Method Description: FABRIC FILTER BAGHOUSE, SORBENT INJECTION OPTIMIZATION STUDY
Emission Limit 1: 1.7000
Emission Limit 1 Unit: LB/TRILLION-BTU
Emission Limit 1 Avg. Time/Condition: 12 MO. ROLLING
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OTHER
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 83.000
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Fluorine
*CAS Number: 7782-41-4
*Control Method Code: A
*Control Method Description: DRY FGD, BAGHOUSE
Emission Limit 1: 0.0002
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.1200
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Beryllium / Beryllium Compounds
*CAS Number: 7440-41-7
*Control Method Code: A
*Control Method Description: FABRIC FILTER BAGHOUSE
Emission Limit 1: 1.3000
Emission Limit 1 Unit: LB/TRILLION-BTU
Emission Limit 1 Avg. Time/Condition:

Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Hazardous Air Pollutants (HAP)
*CAS Number: HAP
*Control Method Code: P
*Control Method Description: FABRIC FILTER BAGHOUSE, DRY FGD, GOOD COMBUSTION PRACTICES
Emission Limit 1:
Emission Limit 1 Unit:
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: MACT
Other Applicable Requirements:
Did factors, other then air pollution technology

considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: SOURCE SHALL MEET THE BACT PM AND SO2 LIMITS TO COMPLY WITH CASE BY CASE MACT FOR INORGANIC SOLID HAPS AND INORGANIC ACID HAPS. SOURCE SHALL MEET THE VOC BACT LIMIT TO COMPLY WITH MACT FOR ORGANIC HAPS.

*Pollutant Name	Ammonia (NH3)
*CAS Number:	7664-41-7
*Control Method Code:	P
*Control Method Description:	
Emission Limit 1:	3.0000
Emission Limit 1 Unit:	PPMDV
Emission Limit 1 Avg. Time/Condition:	3% O2
Emission Limit 2:	55.5200
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	
Other Applicable Requirements:	OTHER
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance	STATE HAP

Notes:

*Pollutant Name	Sulfuric Acid (mist, vapors, etc)
*CAS Number:	7664-93-9
*Control Method Code:	A
*Control Method Description:	FGD SYSTEM
Emission Limit 1:	0.0050
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	24 HR AVG.
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	REGULATED POLLUTANT IS SULFURIC ACID MIST.

Process Information : WPS - WESTON PLANT

*Process Name:	AUXILLIARY NAT. GAS FIRED BOILER (B25, S25)
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	229.80
Throughput Unit:	MMBTU/H
Process Notes:	THE AUXILIARY BOILER WILL BE USED TO PREHEAT STEAM TURBINE, PROVIDE PLANT HEATING AND PROVIDE SUPPLEMENTAL STEAM TO AUXILIARY EQUIPMENT WHEN THE MAIN SCPC BOILER IS OFFLINE. THE AUXILIARY BOILER WILL BE PACKAGED BOILER THAT WILL

COMBUST ONLY NATURAL GAS. THE HOURS OF THE OPERATION OF THE AUXILIARY BOILER WILL BE LIMITED TO 2,000 HOURS IN ANY 12 CONSECUTIVE MONTHS.

Pollutant Information: WPS - WESTON PLANT - AUXILLIARY NAT. GAS FIRED BOILER (B25, S25)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	NATURAL GAS ONLY, GOOD COMBUSTION PRACTICES
Emission Limit 1:	0.0075
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	2000 H / 12 MO. ROLLING
Emission Limit 2:	1.7120
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	BOTH PM AND PM10 (INCLUDES BACKHALF M202 CATCH)

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0.0006
Emission Limit 1 Unit:	LB/MMBTU

Emission Limit 1 Avg. Time/Condition:	2000 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	0.1400
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	NATURAL GAS, GOOD COMBUSTION PRACTICES, LOW NOX BURNERS
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	2000 H / 12 MO. ROLLING
Emission Limit 2:	22.9000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS

Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: HIGH HEAT RELEASE RATE BOILER (NSPS LIMIT OF 0.2 LBS/MMBTU)

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: NATURAL GAS, GOOD COMBUSTION PRACTICES, LOW NOX BURNER
Emission Limit 1: 0.0800
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: 2000 H / 12 MO. ROLLING
Emission Limit 2: 18.4000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0800
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance

Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: NATURAL GAS, GOOD COMBUSTION PRACTICES, LOW NOX BURNERS
Emission Limit 1: 0.0054
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: 2000 H / 12 MO. ROLLING
Emission Limit 2: 1.2400
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

*Pollutant Name: Lead (Pb) / Lead Compounds
*CAS Number: 7439-92-1
*Control Method Code: P
*Control Method Description: NATURAL GAS FUEL, GOOD COMBUSTION PRACTICES
Emission Limit 1: 0
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: 2000 H / 12 MO. ROLLING
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg.

Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: 8.84 E-8 LBS/MMBTU

*Pollutant Name Mercury
*CAS Number: 7439-97-6
*Control Method Code: P
*Control Method Description: NATURAL GAS
Emission Limit 1: 0.0001
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 2000 H / 12 MO. ROLLING
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):

Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

*Pollutant Name Fluorine
*CAS Number: 7782-41-4
*Control Method Code: P
*Control Method Description: NATURAL GAS
Emission Limit 1: 0.0003
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: 2000 H / 12 MO. ROLLING LIMIT
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

*Pollutant Name Hazardous Air Pollutants (HAP)
*CAS Number: HAP
*Control Method Code: P

*Control Method Description:	GOOD COMBUSTION PRACTICES
Emission Limit 1:	400.0000
Emission Limit 1 Unit:	PPM CO @ 3% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	MACT
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	CASE BY CASE MACT

*Pollutant Name	Sulfuric Acid (mist, vapors, etc)
*CAS Number:	7664-93-9
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0.0210
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	2000 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg.	

Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	REGULATED POLLUTANT IS SULFURIC ACID MIST.

Process Information : WPS - WESTON PLANT

*Process Name:	UNIT 4 WATER COOLING TOWER (P26, S26)
*Process Type:	99.009
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	A NEW WET COOLING TOWER WILL BE BUILT TO REMOVE EXCESS HEAT FROM THE STEAM CYCLE. SOME PARTICULATE MATTER CAN BECOME ENTRAINED IN THE PLUMES EXISTING THE CELLS OF THE COOLING TOWER. THESE EMISSIONS WILL BE MINIMIZED THROUGH THE USE OF DRIFT ELIMINATORS. 12-CELL COOLING TOWER WITH DRIFT ELIMINATORS 34.20 FEET PER CELL DIAMETER 1,189,342 ACFM FLOW RATE

Pollutant Information: WPS - WESTON PLANT - UNIT 4 WATER COOLING TOWER (P26, S26)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	B
*Control Method Description:	HIGH EFFICIENCY DRIFT ELIMINATORS (0.002%)
Emission Limit 1:	3.7600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg.	

Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: CHROMIUM PROHIBITED

Process Information : WPS - WESTON PLANT

*Process Name:	DIESEL BOOSTER PUMP (B27, S27)
*Process Type:	17.210
Primary Fuel:	DIESEL FUEL OIL
Throughput:	265.00
Throughput Unit:	HP
Process Notes:	THIS UNIT WILL ASSIST IN CIRCULATING THE WATER FOR THE STEAM TURBINE DURING STARTUP AND SHUT DOWNS. THE BOOSTER PUMP WILL HAVE OPERATIONAL LIMIT OF 200 HOURS PER YEAR. 0.003% BY WEIGHT SULFUR FUEL

Pollutant Information: WPS - WESTON PLANT - DIESEL BOOSTER PUMP (B27, S27)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES, DIESEL FUEL SULFUR CONTENT (0.003 WT. % S)
Emission Limit 1:	0.5800
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	200 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	0.0003

Emission Limit 2 Unit: WT % S
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: BOTH PM AND PM 10 (INCL. M202 BACKHALF CATCH)

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	FUEL SULFUR CONTENT LIMIT (0.003 WT. % S) GOOD COMBUSTION PRACTICES
Emission Limit 1:	0.5400
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	200 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	0.0030
Emission Limit 2 Unit:	WT % S
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the	U

BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: 'ULTRA LOW SULFUR DIESEL FUEL'

*Pollutant Name	Sulfuric Acid (mist, vapors, etc)
*CAS Number:	7664-93-9
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1:	0.0832
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	200 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	0.0030
Emission Limit 2 Unit:	WT. % S
Emission Limit 2 Avg. Time/Condition:	DIESEL FUEL OIL
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	REGULATED POLLUTANT IS SULFURIC ACID MIST.

*Pollutant Name Nitrogen Oxides (NOx)

*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES WITH IGNITION RETARD ULTRA LOW SULFUR (0.003 WT% S) DIESEL FUEL OIL
Emission Limit 1:	8.2100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	200 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	0.0030
Emission Limit 2 Unit:	WT % S
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES, ULTRA LOW S DIESEL FUEL OIL
Emission Limit 1:	1.7700
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	200 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	0.0030
Emission Limit 2 Unit:	WT % S
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit	

Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT% S) DIESEL FUEL OIL
Emission Limit 1: 0.7000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 H/ 12 MO. ROLLING LIMIT
Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT % S
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost 0

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

*Pollutant Name: Lead (Pb) / Lead Compounds
*CAS Number: 7439-92-1
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1: 0
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 HRS. / 12 MO. ROLLING LIMIT
Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT % S
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Mercury
*CAS Number: 7439-97-6
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1: 0

Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 HRS. / 12 MO. ROLLING LIMIT
Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT. % S
Emission Limit 2 Avg. Time/Condition: DIESEL FUEL OIL
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Fluorine
*CAS Number: 7782-41-4
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1: 0.0017
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 HRS. / 12 MO. ROLLING LIMIT
Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT % S
Emission Limit 2 Avg. Time/Condition: DIESEL FUEL
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : WPS - WESTON PLANT

*Process Name: MAIN FIRE PUMP (DIESEL ENGINE)
*Process Type: 17.210
Primary Fuel: DIESEL FUEL OIL
Throughput: 460.00
Throughput Unit: HP
Process Notes: THIS UNIT WILL BE USED AS THE MAIN FIRE PUMP AND ONLY WILL BE USED FOR FIRE SUPPRESSION PURPOSES. THE MAIN FIRE PUMP WILL HAVE OPERATIONAL LIMIT OF 200 HOURS PER YEAR. 0.003% BY WEIGHT SULFUR FUEL

Pollutant Information: WPS - WESTON PLANT - MAIN FIRE PUMP (DIESEL ENGINE)

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1: 1.1400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 H / 12 MO. ROLLING LIMIT
Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT. % S
Emission Limit 2 Avg. Time/Condition: DIESEL FUEL OIL
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:

*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

*Pollutant Name Lead (Pb) / Lead Compounds
*CAS Number: 7439-92-1
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1: 0
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 H / 12 MO. ROLLING LIMIT
Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT. % S
Emission Limit 2 Avg. Time/Condition: DIESEL FUEL OIL
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

*Pollutant Name Mercury
*CAS Number: 7439-97-6
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1: 0
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 H / 12 MO. ROLLING LIMIT
Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT. % S
Emission Limit 2 Avg. Time/Condition: DIESEL FUEL OIL
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

*Pollutant Name Fluorine
*CAS Number: 7782-41-4
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1: 0.0028
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 H / 12 MO. ROLLING LIMIT

Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT. % S
Emission Limit 2 Avg. Time/Condition: DIESEL FUEL OIL
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

*Pollutant Name Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1: 0.1400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 H / 12 MO. ROLLING LIMIT
Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT. % S
Emission Limit 2 Avg. Time/Condition: DIESEL FUEL OIL
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology

considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: REGULATED POLLUTANT IS SULFURIC ACID MIST.

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1: 1.0100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 200 H / 12 MO. ROLLING LIMIT
Emission Limit 2: 0.0030
Emission Limit 2 Unit: WT. % S
Emission Limit 2 Avg. Time/Condition: DIESEL FUEL OIL
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: PM AND PM10 (INCL. M202 BACKHALF CATCH)

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1:	0.9400
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	200 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	0.0030
Emission Limit 2 Unit:	WT. % S
Emission Limit 2 Avg. Time/Condition:	DIESEL FUEL
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES, IGNITION TIMING RETARD, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1:	14.2600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	200 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	0.0030
Emission Limit 2 Unit:	WT. % S
Emission Limit 2 Avg. Time/Condition:	DIESEL FUEL OIL
Standard Emission Limit:	

Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES, ULTRA LOW SULFUR (0.003 WT. % S) DIESEL FUEL OIL
Emission Limit 1:	3.0700
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	200 H / 12 MO. ROLLING LIMIT
Emission Limit 2:	0.0030
Emission Limit 2 Unit:	WT. % S
Emission Limit 2 Avg. Time/Condition:	DIESEL FUEL OIL
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	

Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes:

Process Information : WPS - WESTON PLANT

*Process Name: SYSTEM 1 - NEW RECLAIM TUNNEL EXIT, #34 (P30, S30)
*Process Type: 90.011
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: CONTROL EQUIPMENT: FABRIC FILTER BAGHOUSE

Pollutant Information: WPS - WESTON PLANT - SYSTEM 1 - NEW RECLAIM TUNNEL EXIT, #34 (P30, S30)

*Pollutant Name: Particulate Matter < 10 μ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: FABRIC FILTER BAGHOUSE
Emission Limit 1: 0.0100
Emission Limit 1 Unit: GR/DSCF
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.7900
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:

Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: PM AND PM10 (INCLUDING M202 BACKHALF CATCH). 10% OPACITY LIMIT

Process Information : WPS - WESTON PLANT

*Process Name: P40, S40, CONVEYOR 11 TELESCOPIC CHUTE #29
*Process Type: 90.011
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: FABRIC FILTER BAGHOUSE

Pollutant Information: WPS - WESTON PLANT - P40, S40, CONVEYOR 11 TELESCOPIC CHUTE #29

*Pollutant Name: Particulate Matter < 10 μ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: TELESCOPIC CHUTE, FUGITIVE DUST PLAN
Emission Limit 1: 0.2300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost 0

Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	10% OPACITY

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	TELESCOPIC CHUTE, FUGITIVE DUST PLAN
Emission Limit 1:	0.4840
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	10% OPACITY

Process Information : WPS - WESTON PLANT

*Process Name:	P41, S41, SYSTEM 2 - NEW JUNCTION HOUSE 2, #31 (13)
*Process Type:	90.011
Primary Fuel:	

Throughput:	
Throughput Unit:	
Process Notes:	CONTROL EQUIPMENT: FABRIC FILTER BAGHOUSE

Pollutant Information: WPS - WESTON PLANT - P41, S41, SYSTEM 2 - NEW JUNCTION HOUSE 2, #31 (13)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	FABRIC FILTER BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2.5900
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	PM AND PM10 (INCL. M202 BACKHALF CATCH).

Process Information : WPS - WESTON PLANT

*Process Name:	P42, S42, SYSTEM 3 - NEW JUNCTION HOUSE 3, #32
*Process Type:	90.011
Primary Fuel:	

Throughput:	
Throughput Unit:	
Process Notes:	CONTROL EQUIPMENT: FABRIC FILTER BAGHOUSE

Pollutant Information: WPS - WESTON PLANT - P42, S42, SYSTEM 3 - NEW JUNCTION HOUSE 3, #32

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	FABRIC FILTER BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.7900
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	PM AND PM10 (INCL. M202 BACKHALF CATCH)

Process Information : WPS - WESTON PLANT

*Process Name:	P43, S43, SYSTEM 4 - UNIT 4 SILO FILL SYSTEM #7
*Process Type:	90.011
Primary Fuel:	
Throughput:	

Throughput Unit:	
Process Notes:	CONTROL EQUIPMENT: FABRIC FILTER BAGHOUSE

Pollutant Information: WPS - WESTON PLANT - P43, S43, SYSTEM 4 - UNIT 4 SILO FILL SYSTEM #7

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	FABRIC FILTER BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	3.8400
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	PM AND PM10 (INCL. M202 BACKHALF CATCH)

Process Information : WPS - WESTON PLANT

*Process Name:	P44, S44, SYSTEM 1 - LIME STORAGE SILO BIN VENT #22
*Process Type:	90.019
Primary Fuel:	
Throughput:	
Throughput Unit:	

Process Notes:	SUPER CRITICAL PULVERIZED COAL BOILER (LIME STORAGE SILO) FABRIC FILTER BAGHOUSE

Pollutant Information: WPS - WESTON PLANT - P44, S44, SYSTEM 1 - LIME STORAGE SILO BIN VENT #22

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	FABRIC FILTER BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	PM AND PM10 (INCL. M202 BACKHALF CATCH)

Process Information : WPS - WESTON PLANT

*Process Name:	P45, S45, SYSTEM 2 - LIME DAY BIN VENT, #27
*Process Type:	90.019
Primary Fuel:	
Throughput:	

Throughput Unit:	
Process Notes:	LIME STORAGE FOR SUPER CRITICAL PULVERIZED COAL BOILER CONTROL EQUIPMENT: FABRIC FILTER BAGHOUSE

Pollutant Information: WPS - WESTON PLANT - P45, S45, SYSTEM 2 - LIME DAY BIN VENT, #27

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	FABRIC FILTER BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.2600
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	PM AND PM10 (INCL. M202 BACKHALF CATCH)

Process Information : WPS - WESTON PLANT

*Process Name:	P46, S46, SYSTEM 1 - FGD PRODUCT MECHANICAL EXHAUSTER, #23
*Process Type:	11.110
Primary Fuel:	
Throughput:	

Throughput Unit:
Process Notes:

Pollutant Information: WPS - WESTON PLANT - P46, S46, SYSTEM 1 - FGD PRODUCT MECHANICAL EXHAUSTER, #23

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	FABRIC FILTER BAGHOUSE
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.6500
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	PM AND PM10 (INCL. M202 BACKHALF CATCH)

Process Information : WPS - WESTON PLANT

*Process Name:	P47, S47, SYSTEM 2 - FGD PRODUCT MECHANICAL EXHAUSTER, #23
*Process Type:	11.110
Primary Fuel:	
Throughput:	

Throughput Unit:
Process Notes:

Pollutant Information: WPS - WESTON PLANT - P47, S47, SYSTEM 2 - FGD PRODUCT MECHANICAL EXHAUSTER, #23

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	FABRIC FILTER BAGHOUSE
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.6500
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	PM AND PM10 (INCL. M202 BACKHALF CATCH) 10% OPACITY

Process Information : WPS - WESTON PLANT

*Process Name:	P50, S50, SYSTEM 5 - FGD WASTE SILO BIN VENT, #20
*Process Type:	11.110
Primary Fuel:	
Throughput:	

Throughput Unit:
Process Notes: FABRIC FILTER BAGHOUSE

Pollutant Information: WPS - WESTON PLANT - P50, S50, SYSTEM 5 - FGD WASTE SILO BIN VENT, #20

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	B
*Control Method Description:	FABRIC FILTER BAGHOUSE, FUGITIVE DUST PLAN
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.1200
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	PM AND PM10 (INCL. M202 BACKHALF CATCH) 10% OPACITY

Process Information : WPS - WESTON PLANT

*Process Name: F56, WESTON UNIT 4 COAL PILE
*Process Type: 90.011
Primary Fuel:
Throughput:

Throughput Unit:
Process Notes: NORMAL OPERATING SCHEDULE: 24 HRS/DAY, 365 DAYS/YR PROCESS DESCRIPTION: COAL STORAGE PILE AND PILE TRAFFIC FUGITIVE EMISSIONS WILL BE CONTROLLED BY SUPPRESSION SYSTEM OPERATION. MONITORING AND RECORDING WILL BE DONE BY PLANT PERSONNEL INSPECT SYSTEM AND LOG OPERATION.

Pollutant Information: WPS - WESTON PLANT - F56, WESTON UNIT 4 COAL PILE

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	FUGITIVE DUST CONTROL PLAN; WET SUPRESSANTS OR SURFACE STABILIZING AGENTS; COAL PILE MAINTENACE PROCEDURES; WEEKLY INSPECTION OF INACTIVE PILE
Emission Limit 1:	10.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	FUGITIVE DUST (PM AND PM10); WEEKLY INSPECTION OF INACTIVE PILE

Process Information : WPS - WESTON PLANT

*Process Name: P61, S61, MACHINE SHOP / WELDING SHOP
*Process Type: 99.012
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: THE NEW WELDING SHOPS WILL BE AN EXTENSION ONTO THE EXISTING BUILDING WESTON WELDING SHOP. IT IS EXPECTED THAT THE EXPANDED SHOPS WILL INCLUDE EXHAUST FAN VENTILATION (WILL NOT INCLUDE BAGHOUSES), A VARIETY OF WELDING OPERATIONS OCCUR WITHIN THE WELD SHOPS INCLUDING SMALLER PIECES AND ASSEMBLY PROCESSES. ADDITIONAL WELDING DOES OCCUR THROUGHOUT THE PLANT FOR IN-STU WELDING. WELDING OPERATIONS INCLUDE GAS TUNGSTEN ARC WELDING (GTAW), SHIELDED METAL ARC WELDING (SMAW), GAS METAL ARC (GMAW), WIRE FEED WELDING AND OTHER WELDING TECHNIQUES AS NEEDED. OTHER USES IN THE WELD SHOP INCLUDE USING THE OXY-ACETYLENE TORCHES, CUT OFF TORCHES AND OTHER METAL WORKING EQUIPMENT. THERE IS NO CLEAR WAY TO DIFFERENTIATE THE FW4 WELDING FROM W1 , W2 AND W3 WITHIN THIS CENTRALIZED SHOP. THUS THE PROPOSED WELDING WILL BE ASSUMED TO BE THE MODIFICATION OF THE EXISTING WELDING OPERATION.

Pollutant Information: WPS - WESTON PLANT - P61, S61, MACHINE SHOP / WELDING SHOP

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: WELDING ROD USAGE LIMIT
Emission Limit 1: 0.0650
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):

Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: PM AND PM10 (INCL. M202 BACKHALF CATCH) THE TOTAL AMOUNT OF ELECTRODES USED MAY NOT EXCEED 35,148 POUNDS IN ANY 12 CONSECUTIVE MONTHS. THE TOTAL AMOUNT OF ELECTRODES MAY NOT EXCEED 96 POUNDS PER DAY ON A MONTHLY AVERAGE.

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: WELDING ROD USAGE LIMIT
Emission Limit 1: 0.2300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: THE TOTAL AMOUNT OF ELECTRODES USED MAY NOT EXCEED 35,148 POUNDS IN ANY 12 CONSECUTIVE MONTHS. THE TOTAL AMOUNT OF ELECTRODES MAY NOT EXCEED 96 POUNDS PER DAY ON A MONTHLY AVERAGE.

Process Information : WPS - WESTON PLANT

*Process Name: P62, S62, RAILCAR FACILITY WELDING SHOP
*Process Type: 99.012
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes:

Pollutant Information: WPS - WESTON PLANT - P62, S62, RAILCAR FACILITY WELDING SHOP

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: WELDING ROD USAGE LIMIT
Emission Limit 1: 0.0650
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BOTH PM AND PM10 (INCL. M202 BACKHALF CATCH) THE TOTAL AMOUNT OF ELECTRODES USED MAY NOT EXCEED 35,148 POUNDS IN ANY 12 CONSECUTIVE MONTHS. THE TOTAL AMOUNT OF

ELECTRODES MAY NOT EXCEED 96 POUNDS PER DAY ON A MONTHLY AVERAGE.

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: WELDING ROD USAGE LIMIT
Emission Limit 1: 0.2300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: THE TOTAL AMOUNT OF ELECTRODES USED MAY NOT EXCEED 35,148 POUNDS IN ANY 12 CONSECUTIVE MONTHS. THE TOTAL AMOUNT OF ELECTRODES MAY NOT EXCEED 96 POUNDS PER DAY ON A MONTHLY AVERAGE.

Process Information : WPS - WESTON PLANT

*Process Name: B63, S63; B64, S64 - NATURAL GAS STATION HEATER 1 AND 2
*Process Type: 13.310
Primary Fuel: NATURAL GAS
Throughput: 0.75
Throughput Unit: MMBTU/H
Process Notes: EMISSION LIMITS ARE THOSE FOR EACH UNIT.

Pollutant Information: WPS - WESTON PLANT - B63, S63; B64, S64 - NATURAL GAS STATION HEATER 1 AND 2

*Pollutant Name	Lead (Pb) / Lead Compounds
*CAS Number:	7439-92-1
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	(LIMIT IS FOR EACH UNIT)

*Pollutant Name	Mercury
*CAS Number:	7439-97-6
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	

Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	(LIMIT IS FOR EACH UNIT)

*Pollutant Name	Fluorine
*CAS Number:	7782-41-4
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0.0002
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology	

considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: FLUORIDES (LIMIT IS FOR EACH UNIT)

*Pollutant Name	Sulfuric Acid (mist, vapors, etc)
*CAS Number:	7664-93-9
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0.0001
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SULFURIC ACID MIST
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	(LIMIT IS FOR EACH UNIT)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	NATURAL GAS FUEL
Emission Limit 1:	0.0060
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	(LIMIT IS FOR EACH UNIT)

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	

Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	PM (INCL. M202 BACKHALF CATCH) (LIMIT IS FOR EACH UNIT)

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0.0004
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	

Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	(LIMIT IS FOR EACH UNIT)

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0.0730
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	(LIMIT IS FOR EACH UNIT)

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	NATURAL GAS

Emission Limit 1:	0.0600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2006
Pollutants/Compliance Notes:	(LIMIT IS FOR EACH UNIT)

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	NATURAL GAS
Emission Limit 1:	0.0040
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD

Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	(LIMIT IS FOR EACH UNIT)

Process Information : WPS - WESTON PLANT

*Process Name:	P65, S65, P66, S66; PAC TRUCK UNLOADING, PAC SILO LOADING
*Process Type:	90.011
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	NOTE TO RBLC REVIEWER ==> JOE S. (RBLC STAFF) FILLED IN BLANK PROC. TYPE CODE. PLEASE CHECK IT!! //// (LIMIT IS FOR EACH UNIT); FABRIC FILTER BAGHOUSE ON EACH.

Pollutant Information: WPS - WESTON PLANT - P65, S65, P66, S66; PAC TRUCK UNLOADING, PAC SILO LOADING

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	FABRIC FILTER BAGHOUSE
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.2100
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg.	NOT AVAILABLE

Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: PM AND PM10 (INCL. M202 BACKHALF CATCH); 10 % OPACITY LIMIT (LIMIT IS FOR EACH UNIT)

Process Information : WPS - WESTON PLANT

*Process Name: F134 ROADWAYS
*Process Type: 99.140
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: ALL HAUL ROADS ON-SITE WILL BE PAVED WHERE POSSIBLE. THE FOLLOWING ARE THE NEW ROADS FOR THE WESTON 4 PROJECT SOURCES. R09 -W4 FLY ASH ALTERNATE R10-W4 LINE DELIVERIES R11 - W4 BOTTOM ASH (DAILY ROUTE) R13 - W4 SALABLE FLY ASH (IN SEASON) R14 - W4 PAC DELIVERIES THESE ROADS WILL ONLY BE OPERATED FROM 6 AM TILL 10 PM (16 HOURS EACH DAY)

Pollutant Information: WPS - WESTON PLANT - F134 ROADWAYS

*Pollutant Name: Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: PAVE ALL HAUL ROADS WHERE POSSIBLE, FUGITIVE DUST CONTROL PLAN, WATERING ROADWAYS, SWEEPING ROADS, LIMIT ROAD HOURS OF OPERATION
Emission Limit 1:
Emission Limit 1 Unit:
Emission Limit 1 Avg. Time/Condition: SEE NOTE
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg.

Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2006
Pollutants/Compliance Notes: RACT REQUIRES THEY SWEEP DAILY (EXC. WHERE WEATHER PREVENTS). PAVE ALL HAUL ROADS WHERE POSSIBLE, FUGITIVE DUST CONTROL PLAN, WATERING ROADWAYS, SWEEPING ROADS, LIMIT ROAD HOURS OF OPERATION. NO EMISSION LIMITS GIVEN.

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: MICHOUD ELECTRIC GENERATING PLANT

RBLC ID: LA-0191
*Corporate/Company Name: ENTERGY NEW ORLEANS, INC.
*Facility Name: MICHOUD ELECTRIC GENERATING PLANT
Facility County: ORLEANS
Facility State: LA
Facility ZIP Code: 70129
Facility Country: USA
Facility Contact Name: RASHID JOHNSON
Facility Contact Phone: 9856533440
Facility Contact Email: RJOHNSO2@ENTERGY.COM
EPA Region: 6
Agency Code: LA001
Agency Name: LOUISIANA DEPARTMENT OF ENV QUALITY
Agency Contact: MR. SYED QUADRI
Agency Phone: (225)219-3123
Agency Email: syed.quadri@la.gov

Other Agency Contact Info: PERMIT WRITER: KERMIT WITTENBURG, 225-219-3181
*Permit Number: PSD-LA-700
*SIC: 4911
NAICS: 221112
Facility Registry System Number #: 110001248891
Application Accepted Received Date: 08/14/2002 ACT
Permit Issuance Date: 10/12/2004 ACT
Date determination entered in RBLC: 03/30/2006
Date determination last updated: 06/02/2006
Permit Type: B: ADD NEW PROCESS TO EXISTING FACILITY
Facility Description: EXISTING POWER PLANT COMPRISED OF 3 BOILERS CAPABLE OF FIRING NATURAL GAS & NO. 6 FUEL OIL. PROJECT INVOLVES ADDITION OF A 498 MW COMBINED CYCLE OPERATION CONSISTING OF 2 TURBINES AND SUPPLEMENTARY FIRED HRSGS (DUCT BURNERS). DURING PHASE I OF THE PROJECT, THE TURBINES WILL BE OPERATED IN SIMPLE CYCLE MODE.
Other Permitting Information: DURING PHASE I OF THE PROJECT, OPERATING TIME OF THE EACH TURBINE WILL BE LIMITED TO 3000 HOURS/YR, AND OPERATING OF THE EXISTING UNIT 2 BOILER WILL BE CURTAILED BY FEDERALLY ENFORCEABLE CONDITION SUCH THAT PSD REVIEW IS REQUIRED FOR ONLY PM10. DURING PHASE II (COMBINED CYCLE MODE), THE UNIT 2 BOILER WILL BE COMPLETELY SHUT DOWN SUCH THAT PSD REVIEW IS, LIKE BEFORE, REQUIRED FOR ONLY PM10.

Process Information : MICHOUD ELECTRIC GENERATING PLANT

*Process Name: COMBUSTION GAS TURBINES 4 & 5 (SIMPLE CYCLE)
*Process Type: 15.110
Primary Fuel:
Throughput: 1595.00
Throughput Unit: MMBTU/H ea.
Process Notes: EQT015 & 016; PHASE I

Pollutant Information: MICHOUD ELECTRIC GENERATING PLANT - COMBUSTION GAS TURBINES 4 & 5 (SIMPLE CYCLE)

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: USE OF CLEAN BURNING FUELS (NATURAL GAS)
Emission Limit 1: 7.8500
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: HOURLY MAXIMUM

Emission Limit 2: 9.8100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: ANNUAL MAXIMUM
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: N
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: OPERATION LIMITED TO 3000 HR/YR EACH. STARTUP/SHUTDOWN EMISSIONS ADDRESSED AS AN ALTERNATE OPERATING SCENARIO; PM10 LIMIT HERE ESTABLISHED AT 11.04 LB/HR FOR 200 HR/YR PER TURBINE (REPRESENTING 400 30 MINUTE SU/SD EVENTS EACH).

Process Information : MICHOUD ELECTRIC GENERATING PLANT

*Process Name: COMBUSTION GAS TURBINES 4 & 5 (COMBINED CYCLE)
*Process Type: 15.210
Primary Fuel:
Throughput: 1595.00
Throughput Unit: MM BTU/H ea.
Process Notes: EQT021 & 022; PHASE II

Pollutant Information: MICHOUD ELECTRIC GENERATING PLANT - COMBUSTION GAS TURBINES 4 & 5 (COMBINED CYCLE)

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: USE OF CLEAN BURNING FUELS (NATURAL GAS)
Emission Limit 1: 7.8500
Emission Limit 1 Unit: LB/H*

Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	25.7800
Emission Limit 2 Unit:	T/YR*
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	*EMISSION LIMITS REFLECT ONLY THOSE RATES ATTRIBUTED TO THE TURBINES. EMISSIONS FROM DUCT BURNERS ARE LISTED SEPARATELY. OPERATION LIMITED TO 7884 HR/YR EACH. STARTUP/SHUTDOWN EMISSIONS ADDRESSED AS AN ALTERNATE OPERATING SCENARIO; PM10 LIMIT HERE ESTABLISHED AT 11.04 LB/HR FOR 800 HR/YR PER TURBINE.

Process Information : MICHOUD ELECTRIC GENERATING PLANT

*Process Name:	HEAT RECOVERY STEAM GENERATORS 4 & 5
*Process Type:	12.310
Primary Fuel:	
Throughput:	200.00
Throughput Unit:	MM BTU/H ea.
Process Notes:	EQT017 & 018; PHASE II

Pollutant Information: MICHOUD ELECTRIC GENERATING PLANT - HEAT RECOVERY STEAM GENERATORS 4 & 5

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P

*Control Method Description:	USE OF CLEAN BURNING FUELS (NATURAL GAS)
Emission Limit 1:	1.9200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	HOURLY MAXIMUM
Emission Limit 2:	6.3200
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	ANNUAL MAXIMUM
Standard Emission Limit:	0.0080
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	ANNUAL AVERAGE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS, OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?:	N
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	STARTUP/SHUTDOWN RATES FOR THE HRSGS DO NOT EXCEED EMISSION LIMITS STATED.

Process Information : MICHOUD ELECTRIC GENERATING PLANT

*Process Name:	COOLING TOWERS (2)
*Process Type:	99.009
Primary Fuel:	
Throughput:	1728.00
Throughput Unit:	Gal/min
Process Notes:	

Pollutant Information: MICHOUD ELECTRIC GENERATING PLANT - COOLING TOWERS (2)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method	DRIFT ELIMINATORS AND GOOD OPERATING PRACTICES

Description:
Emission Limit 1: 0.0520
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: HOURLY MAXIMUM
Emission Limit 2: 0.2050
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: ANNUAL MAXIMUM
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Did factors, other then air pollution technology considerations influence the BACT decisions?: N
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: TDS CONCENTRATION OF 1200 PPM ASSUMED. PERMIT LIMITS APPEAR TO BE BASED ON A DRIFT RATE OF 0.005%; HOWEVER, THE PERMIT INDICATES THE DRIFT ELIMINATORS WILL BE DESIGNED TO ACHIEVE A DRIFT RATE OF 0.001%.

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: DUPONT DELISLE FACILITY

RBLC ID: MS-0069
*Corporate/Company Name: E. I. DUPONT DE NEMOURS
*Facility Name: DUPONT DELISLE FACILITY
Facility County: HARRISON
Facility State: MS
Facility ZIP Code: 39571
Facility Country: USA
Facility Contact Name: EDUARDO RAMOS

Facility Contact Phone: 2282554931
Facility Contact Email: ED.G.RAMOS@USA.DUPONT.COM
EPA Region: 4
Agency Code: MS001
Agency Name: MISSISSIPPI DEPT OF ENV QUALITY
Agency Contact: MS. CARLA BROWN
Agency Phone: (601) 961-5235
Agency Email: CARLA_BROWN@DEQ.STATE.MS.US
Other Agency Contact Info: CARLA BROWN
P.O. BOX 10385
JACKSON, MS 39289
601-961-5235
*Permit Number: 1020-00115
*SIC: 2816
NAICS: 325131
Facility Registry System Number #: 110005985416
Application Accepted Received Date: 12/09/2003 ACT
Permit Issuance Date: 06/08/2004 ACT
Date determination entered in RBLC: 09/20/2004
Date determination last updated: 11/18/2004
Permit Type: B: ADD NEW PROCESS TO EXISTING FACILITY
C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description: TITANIUM DIOXIDE PRODUCTION.
Other Permitting Information:

Affected Boundaries: DUPONT DELISLE FACILITY

*Limit (Class 1 Area or Name of the border of the U.S.): Breton
Boundary Type (Class 1 or Intl Border): CLASS1
Distance: 56.00
Class 1 Area State: LA

Facility-wide Emissions : DUPONT DELISLE FACILITY

*Pollutant Name: Nitrogen Oxides (NOx)
Facility-wide Emissions Increase: 198.2200 (Tons/Year)
*Pollutant Name: Particulate Matter (PM)
Facility-wide Emissions Increase: 81.7000 (Tons/Year)

Process Information : DUPONT DELISLE FACILITY

*Process Name:	DRYER - AB-202
*Process Type:	19.900
Primary Fuel:	NATURAL GAS
Throughput:	45.00
Throughput Unit:	MMBTU/H
Process Notes:	ORE DRYER. BURNER SIZE INCREASED FROM 22 MMBTU/H TO 45 MMBTU/H.

Pollutant Information: DUPONT DELISLE FACILITY - DRYER - AB-202

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	CYCLONE FOLLOWED BY TWO BAGHOUSES IN PARALLEL.
Emission Limit 1:	0.0110
Emission Limit 1 Unit:	GR/DSCF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	3.3200
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0738
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	ULTRA-LOW NOX BURNER
Emission Limit 1:	0.0430
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.9400
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0430
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : DUPONT DELISLE FACILITY

*Process Name:	HCL RECOVERY PROCESS
*Process Type:	62.999
Primary Fuel:	
Throughput:	25.00
Throughput Unit:	T/H
Process Notes:	2 PARALLEL PROCESS TRAINS. AC-101 AND AC-201. CEMS FOR CO AND COS. NO NOX EMISSIONS.

Pollutant Information: DUPONT DELISLE FACILITY - HCL RECOVERY PROCESS

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	4-STAGE REACTION FLUME SCRUBBING SYSTEM.
Emission Limit 1:	1.7000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	7.4500
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : DUPONT DELISLE FACILITY

*Process Name:	BOILER #3
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	231.00
Throughput Unit:	MMBTU/H
Process Notes:	AF-103. RETROFITTED TO BURN LANDFILL GAS IN ADDITION TO NATURAL GAS.

Pollutant Information: DUPONT DELISLE FACILITY - BOILER #3

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	USE OF NATURAL GAS CONSIDERED BACT.
Emission Limit 1:	1.7600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	7.6900
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0076
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	B
*Control Method Description:	LOW-NOX BURNER WITH FGR.
Emission Limit 1:	0.0900
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	20.7900
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0900

Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : DUPONT DELISLE FACILITY

*Process Name:	BOILER #4
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	231.00
Throughput Unit:	MMBTU/H
Process Notes:	MAY BURN LANDFILL GAS IN ADDITION TO NATURAL GAS.

Pollutant Information: DUPONT DELISLE FACILITY - BOILER #4

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	USE OF NATURAL GAS CONSIDERED BACT.
Emission Limit 1:	1.7600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	7.6900
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0076
Standard Emission Limit	LB/MMBTU

Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	B
*Control Method Description:	LOW-NOX BURNER AND FGR.
Emission Limit 1:	0.0580
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	13.4000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0580
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost	

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : DUPONT DELISLE FACILITY

*Process Name:	BOILER (RENTAL/TEMPORARY)
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	231.00
Throughput Unit:	MMBTU/H
Process Notes:	AF-202. RENTAL BOILER MAY ONLY OPERATE 2,085 H/YR.

Pollutant Information: DUPONT DELISLE FACILITY - BOILER (RENTAL/TEMPORARY)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	USE OF NATURAL GAS CONSIDERED BACT.
Emission Limit 1:	1.7600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.8300
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0076
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	B
*Control Method Description:	LOW-NOX BURNER WITH FGR.
Emission Limit 1:	0.0900
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	20.7900
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0900
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : DUPONT DELISLE FACILITY

*Process Name:	VAPORIZER (LINE I)
*Process Type:	19.900
Primary Fuel:	NATURAL GAS
Throughput:	40.00

Throughput Unit: MMBTU/H
Process Notes: AH-101. TICL4 OXIDATION PROCESS. BURNER SIZE INCREASED FROM 24 MMBTU/H TO 40 MMBTU/H.

Pollutant Information: DUPONT DELISLE FACILITY - VAPORIZER (LINE I)

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: USE OF NATURAL GAS CONSIDERED BACT.
Emission Limit 1: 0.3000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.3300
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0075
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: ULTRA-LOW NOX BURNER.
Emission Limit 1: 0.0430
Emission Limit 1 Unit: LB/MMBTU

Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.7200
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0430
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : DUPONT DELISLE FACILITY

*Process Name: VAPORIZER (LINE II)
*Process Type: 19.900
Primary Fuel: NATURAL GAS
Throughput: 40.00
Throughput Unit: MMBTU/H
Process Notes: AH-201. TICL4 OXIDATION PROCESS. BURNER SIZE INCREASED FROM 27 MMBTU/H TO 40 MMBTU/H.

Pollutant Information: DUPONT DELISLE FACILITY - VAPORIZER (LINE II)

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: USE OF NATURAL GAS CONSIDERED BACT.
Emission Limit 1: 0.3000
Emission Limit 1 Unit: LB/H

Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.3300
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0075
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: ULTRA-LOW NOX BURNER.
Emission Limit 1: 0.0430
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.7200
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0430
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:

Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : DUPONT DELISLE FACILITY

*Process Name: BULK SILO, PIGMENT PRODUCT
*Process Type: 62.999
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes:

Pollutant Information: DUPONT DELISLE FACILITY - BULK SILO, PIGMENT PRODUCT

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: BAGHOUSE.
Emission Limit 1: 0.0250
Emission Limit 1 Unit: GR/DSCF
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.9300
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: MILLER BREWING COMPANY - TRENTON

RBLC ID:	OH-0241
*Corporate/Company Name:	MILLER BREWING COMPANY
*Facility Name:	MILLER BREWING COMPANY - TRENTON
Facility County:	BUTLER
Facility State:	OH
Facility ZIP Code:	450679760
Facility Country:	USA
Facility Contact Name:	MARK KOCH
Facility Contact Phone:	5138969200
Facility Contact Email:	
EPA Region:	5
Agency Code:	OH006
Agency Name:	HAMILTON CO-SOUTHWESTERN OH APCA
Agency Contact:	MR. BRADLEY MILLER
Agency Phone:	(513)946-7731
Agency Email:	bradley.miller@hamilton.co.org
Other Agency Contact Info:	BRADLEY MILLER OH (513) 651-9437
*Permit Number:	14-05515
*SIC:	2082
NAICS:	312120
Facility Registry System Number #:	110000392673
Application Accepted Received Date:	05/03/2001 ACT
Permit Issuance Date:	05/27/2004 ACT
Date determination entered in RBLC:	01/30/2002

Date determination last updated:	07/11/2005
Permit Type:	B: ADD NEW PROCESS TO EXISTING FACILITY C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description:	BEER BREWING AND PACKAGING.
Other Permitting Information:	THIS FACILITY BREWS AND PACKAGES BEER. EACH BOILER NOT TO EXCEED 180,000 LB STEAM/H OR 238 MMBTU/H. BOTH BOILERS TOGETHER NOT TO EXCEED 125,682 TONS COAL/ROLLING 12-MONTHS. THIS PTI, 14-05515, IS A MODIFICATION TO PTI #14-05143 ISSUED 11/15/01 FOR THE ADDITION OF AN 8.5 MW STEAM TURBINE GENERATOR TO AN EXISTING COAL FIRED BOILER (THERE WERE NO EMISSIONS FROM THE STEAM TURBINE ITSELF). THIS MODIFICATION WAS TO INCREASE THE HCL HOURLY AND T/YR LIMITS AND SO2/MMBTU LIMIT. THE T/YR FACILITYWIDE LIMITS HAVE NOT CHANGED, EXCEPT FOR HCL WHICH HAS INCREASE BY 46.1 T/YR IN THIS NEW PERMIT.

Facility-wide Emissions : MILLER BREWING COMPANY - TRENTON

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	175.2000 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	1375.9000 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	122.9000 (Tons/Year)
*Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	2758.0000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	23.0000 (Tons/Year)

Process Information : MILLER BREWING COMPANY - TRENTON

*Process Name:	BOILER (2), COAL FIRED
*Process Type:	12.110
Primary Fuel:	COAL
Throughput:	238.00
Throughput Unit:	MMBTU/H
Process Notes:	TWO BOILERS, CAPABLE OF BURNING AND WITH LIMITS FOR COAL, NATURAL GAS, NUMBERS 2 AND 6 FUEL OILS. POUND PER HOUR LIMITS ARE FOR EACH BOILER; AND EXCEPT FOR VOC AND CO, ALL T/YR LIMITS ARE FOR BOTH BOILERS COMBINED. COAL USAGE FOR BOTH BOILERS TOGETHER NOT TO EXCEED 125,682 TONS/ROLLING 12 MONTHS. THESE LIMITS FOR THE COAL.

Pollutant Information: MILLER BREWING COMPANY - TRENTON - BOILER (2), COAL FIRED

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	OVERFIRE AND SIDE FIRE AIR TO REDUCE FLAME TEMERATURE
Emission Limit 1:	0.7000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1375.9000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	0.7000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	5.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	87.6000
Emission Limit 2 Unit:	T/YR

Emission Limit 2 Avg. Time/Condition:	EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:	0.0220
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.6200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	11.5000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U

*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.6000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2758.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 1.6000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: PERMIT MODIFIED FROM 1.4 LB SO2/MMBTU WHICH COULD NOT BE MET.

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM

*Control Method Code: A
*Control Method Description: BAGHOUSE
Emission Limit 1: 0.0100
Emission Limit 1 Unit: GR/ACF
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 122.9000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 0.0310
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Hydrochloric Acid
*CAS Number: 7647-01-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 21.4000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: EACH BOILER
Emission Limit 2: 187.6000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:
Standard Emission Limit Unit:

Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: LIMITS HAVE INCREASED IN THIS MODIFICATION.

*Pollutant Name: Hydrogen Fluoride
*CAS Number: 7664-39-3
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.6000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: EACH BOILER
Emission Limit 2: 17.7000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

Process Information : MILLER BREWING COMPANY - TRENTON

*Process Name: BOILER (2), NO. 6 FUEL OIL
*Process Type: 12.210
Primary Fuel: NO. 6 FUEL OIL
Throughput: 238.00
Throughput Unit: MMBTU/H
Process Notes: TWO BOILERS, CAPABLE OF BURNING AND WITH LIMITS FOR COAL, NATURAL GAS, NUMBERS 2 AND 6 FUEL OILS. POUND PER HOUR LIMITS ARE FOR EACH BOILER; AND EXCEPT FOR VOC AND CO, ALL T/YR LIMITS ARE FOR BOTH BOILERS COMBINED. THESE LIMITS FOR THE #6 FUEL OIL.

Pollutant Information: MILLER BREWING COMPANY - TRENTON - BOILER (2), NO. 6 FUEL OIL

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: BAGHOUSE
Emission Limit 1: 0.0100
Emission Limit 1 Unit: GR/ACF
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 122.9000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 0.1250
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: OVERFIRE AND SIDE FIRE AIR TO REDUCE FLAME TEMERATURE
Emission Limit 1: 0.7000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1375.9000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 0.7000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method

Description:
Emission Limit 1: 1.2000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: EACH BOILER
Emission Limit 2: 11.5000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 8.1500
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: EACH BOILER
Emission Limit 2: 87.6000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit: 0.0340
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:

*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.6000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2758.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 1.6000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: PERMIT MODIFIED FROM 1.4 LB SO2/MMBTU WHICH COULD NOT BE MET.

Process Information : MILLER BREWING COMPANY - TRENTON

*Process Name: BOILER (2), NO. 2 FUEL OIL
*Process Type: 12.220
Primary Fuel: NO. 2 FUEL OIL
Throughput: 238.00
Throughput Unit: MMBTU/H
Process Notes: TWO BOILERS, CAPABLE OF BURNING AND WITH LIMITS FOR COAL, NATURAL GAS, NUMBERS 2 AND 6 FUEL OILS. POUND PER HOUR LIMITS ARE FOR EACH BOILER; AND EXCEPT FOR VOC AND CO, ALL T/YR LIMITS ARE FOR BOTH BOILERS COMBINED. THESE LIMITS FOR THE #2 FUEL OIL.

Pollutant Information: MILLER BREWING COMPANY - TRENTON - BOILER (2), NO. 2 FUEL OIL

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: BAGHOUSE
Emission Limit 1: 0.0100
Emission Limit 1 Unit: GR/ACF
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 122.9000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 0.0200
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost

Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	OVERFIRE AND SIDE FIRE AIR TO REDUCE FLAME TEMERATURE
Emission Limit 1:	0.7000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1375.9000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	0.7000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.3800

Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	11.5000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	8.5000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH BOILER
Emission Limit 2:	87.6000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:	0.0360
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable	SIP

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.6000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2758.0000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	1.6000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005

Pollutants/Compliance Notes: PERMIT MODIFIED FROM 1.4 LB SO2/MMBTU WHICH COULD NOT BE MET.

Process Information : MILLER BREWING COMPANY - TRENTON

*Process Name:	BOILER (2), NATURAL GAS
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	238.00
Throughput Unit:	MMBTU/H
Process Notes:	TWO BOILERS, CAPABLE OF BURNING AND WITH LIMITS FOR COAL, NATURAL GAS, NUMBERS 2 AND 6 FUEL OILS. POUND PER HOUR LIMITS ARE FOR EACH BOILER; AND EXCEPT FOR VOC AND CO, ALL T/YR LIMITS ARE FOR BOTH BOILERS COMBINED. THESE LIMITS FOR THE NATURAL GAS.

Pollutant Information: MILLER BREWING COMPANY - TRENTON - BOILER (2), NATURAL GAS

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	BAGHOUSE
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	GR/ACF
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	122.9000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	0.0200
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency	No

(Y/N)?:
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: OVERFIRE AND SIDE FIRE AIR TO REDUCE FLAME TEMERATURE
Emission Limit 1: 0.7000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1375.9000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit: 0.7000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 2.6000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. EACH BOILER

Time/Condition:
Emission Limit 2: 11.5000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 20.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: EACH BOILER
Emission Limit 2: 87.6000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: EACH BOILER, ON A ROLLING 12-MO.
Standard Emission Limit: 0.0840
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air U

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.6000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2758.0000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	BOTH BOILERS TOGETHER, PER ROLLING 12-MO
Standard Emission Limit:	1.6000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: MAIDSVILLE

RBLC ID:	WV-0023
*Corporate/Company Name:	LONGVIEW POWER, LLC
*Facility Name:	MAIDSVILLE
Facility County:	MONONGAHELA
Facility State:	WV
Facility ZIP Code:	25641
Facility Country:	USA
Facility Contact Name:	TOM WHEBLE
Facility Contact Phone:	7814449980226
Facility Contact Email:	TOM_WHEBLE@GENPOWER.NET
EPA Region:	3
Agency Code:	WV001
Agency Name:	WEST VIRGINIA AIR POLLUTION CONTROL COMM
Agency Contact:	MR. JOE KESSLER
Agency Phone:	(304)926-3727
Agency Email:	jkessler@mail.dep.state.wv.us
Other Agency Contact Info:	FOR SPECIFIC INFORMATION CONCERNING THIS FACILITY, PLEASE CONTACT MR. ED ANDREWS, ENGINEER WVDEP AT 304-926-0499 X1214.
*Permit Number:	R14-0024
*SIC:	4911
NAICS:	221112
Facility Registry System Number #:	NOT FOUND
Application Accepted Received Date:	08/15/2003 ACT
Permit Issuance Date:	03/02/2004 ACT
Date determination entered in RBLC:	08/10/2005
Date determination last updated:	12/06/2005
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	PULVERIZED COAL-FIRED STEAM GENERATOR CAPABLE OF GENERATING 600MW OF ELECTRIC POWER. THIS FACILITY IS A GREEN FIELD SITE, WHICH INCLUDES A 6,114 MMBTU COAL-FIRED BOILER, 225 MMBTU NATURAL GAS-FIRED AUX BOILER, EMERGENCY GENERATOR, FIRE WATER PUMP ENGINE, COOLING TOWERS, AND MATERIAL HANDLING SYSTEMS.
Other Permitting Information:	FRS CODE NOT AVAILABLE. R14-0024 WAS MODIFIED UNDER A SETTLEMENT AGREEMENT TO DISMISS APPEAL NO. 04-03AQB FILED AGAINST THE PERMITTING AUTHORITY. THIS SETTLEMENT AGREEMENT WAS ONLY AGREED BY THE APPELLANTS AND THE INTERVENOR, WHICH WAS LONGVIEW POWER. THE WVDEP DOES NOT

VIEW ANY OF THE MODIFICATIONS MADE IN THE SETTLEMENT AGREEMENT AS BACT FOR THIS APPLICATION.

Affected Boundaries: MAIDSVILLE

*Limit (Class 1 Area or Name of the border of the U.S.):	Dolly Sods
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	91.00
Class 1 Area State:	WV
*Limit (Class 1 Area or Name of the border of the U.S.):	James River Face
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	237.00
Class 1 Area State:	VA
*Limit (Class 1 Area or Name of the border of the U.S.):	Otter Creek
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	78.00
Class 1 Area State:	WV
*Limit (Class 1 Area or Name of the border of the U.S.):	Shenandoah NP
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	173.00
Class 1 Area State:	VA

Facility-wide Emissions : MAIDSVILLE

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	2962.0000 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	2183.0000 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	528.0000 (Tons/Year)
*Pollutant Name:	Sulfur Oxides (SOx)
Facility-wide Emissions Increase:	3217.0000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)

Facility-wide Emissions Increase:	109.0000 (Tons/Year)

Process Information : MAIDSVILLE

*Process Name:	BOILER, PC
*Process Type:	11.110
Primary Fuel:	PULVERIZED COAL
Throughput:	6114.00
Throughput Unit:	mmbtu/h
Process Notes:	

Pollutant Information: MAIDSVILLE - BOILER, PC

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES
Emission Limit 1:	673.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1100
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	3 HOUR ROLLING
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance	

Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: B
*Control Method Description: LOW-NOX BURNERS IN SERIES WITH SCR
Emission Limit 1: 489.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0800
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: 24 HOUR ROLLING
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: IN SETTLEMENT AGREEMENT OF APPEAL NO. 04-03-AQB, EXHIBIT B HAS A NOX LIMIT OF 0.07 LB/MMBTU ON A 30-DAY ROLLING AVERAGE AND 0.065 LB/MMBTU BASED ON A CALENDAR YEAR. THESE LIMITS WERE NOT AGREED TO BY THE WVDEP AND ARE NOT CONSIDERED AS BACT.

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: WET LIMESTONE FORCED OXIDATION
Emission Limit 1: 917.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:

Emission Limit 2: 0.1200
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition: 24 HOUR ROLLING
Standard Emission Limit: 0.1500
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: 3 HOUR ROLLING
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS, SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%): 97.000
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: IN SETTLEMENT AGREEMENT OF APPEAL NO. 04-03-AQB, EXHIBIT B HAS A SO2 LIMIT OF 0.095 LB/MMBU, WHICH WAS NOT AGREED BY THE WVDEP AND NOT CONSIDERED AS BACT.

*Pollutant Name Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: B
*Control Method Description: DRY SOLID INJECTION W/ FABRIC FILTER AND WET SCRUBBER
Emission Limit 1: 110.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0180
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: 6 HOUR ROLLING
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS, SIP
Did factors, other then air U

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 99.000
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: COMPLIANCE WILL BE DEMONSTRATED BY PM CEMS

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: B
*Control Method Description: DRY SOLID INJECTION W/ FABRIC FILTER AND WET SCRUBBER
Emission Limit 1: 110.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0180
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: 6 HOUR ROLLING
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%): 99.000
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: PM-10 INCLUDES FILTERABLE AND CONDENSIBLES

*Pollutant Name: Visible Emissions (VE)
*CAS Number: VE
*Control Method Code: B
*Control Method Description: DRY SOLID INJECTION W/ FABRIC FILTER AND WET SCRUBBER
Emission Limit 1: 10.0000
Emission Limit 1 Unit: % OPACITY
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 10.0000
Standard Emission Limit Unit: % OPACITY
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS, SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES
Emission Limit 1: 24.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0040
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition: 3 HOUR ROLLING

Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: THE CONTINUOUS COMPLIANCE PLAN FOR VOCS FROM THE PC BOILER WAS PART OF THE SETTLEMENT AGREEMENT FOR APPEAL NO. 04-03-AQB, WHICH WAS NOT AGREED TO BY THE WVDEP.

*Pollutant Name: Lead (Pb) / Lead Compounds
*CAS Number: 7439-92-1
*Control Method Code: B
*Control Method Description: DRY SOLID INJECTION W/ FABRIC FILTER AND WET SCRUBBER
Emission Limit 1: 0.1090
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 3 HOUR ROLLING
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):

Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name: Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: B
*Control Method Description: DRY SOLID INJECTION W/ FABRIC FILTER
Emission Limit 1: 45.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0075
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition: 3 HOUR ROLLING
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: THE CONTINUOUS COMPLIANCE PLAN FOR H2SO4 FROM THE PC BOILER WAS PART OF THE SETTLEMENT AGREEEMENT FOR APPEAL NO. 04-03-AQB, WHICH WAS NOT AGREED TO BY THE WVDEP.

*Pollutant Name: Hydrogen Fluoride
*CAS Number: 7664-39-3

*Control Method Code: B
*Control Method Description: DRY SORBENT INJECTION W/ FABRIC FILTER BAGHOUSE
Emission Limit 1: 0.0001
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: 3 HOUR ROLLING
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Hydrochloric Acid
*CAS Number: 7647-01-0
*Control Method Code: B
*Control Method Description: DRY SORBENT INJECTION W/ FABRIC FILTER BAGHOUSE.00
Emission Limit 1: 0.0001
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: 3 HOUR ROLLING AVERAGE
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:

Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Mercury
*CAS Number: 7439-97-6
*Control Method Code: B
*Control Method Description: SCR, DRY SOLID INJECTION W/ FABRIC FILTER, AND WET LIMESTONE FORCED OXIDATION
Emission Limit 1: 0.0146
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: 3 HOUR ROLLING AVERAGE
Emission Limit 2: 0.0638
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: 12 MONTH ROLLING AVG.
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

Process Information : MAIDSVILLE

*Process Name:	AUXILIARY BOILER
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	225.00
Throughput Unit:	mmbtu/h
Process Notes:	LIMITED TO NATURAL GAS USE AND 3,000 HOURS OF OPERATION PER YEAR

Pollutant Information: MAIDSVILLE - AUXILIARY BOILER

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES, USE OF NATURAL GAS
Emission Limit 1:	0.0400
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3 HOUR ROLLING AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0400
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	3 HOUR ROLLING AVERAGE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	LIMITED TO USE OF NATURAL GAS AND 3,000 HOURS OF OPERATION PER YEAR

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	LOW NOX BURNERS AND GOOD COMBUSTION PRACTICES
Emission Limit 1:	0.0980
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3 HOUR ROLLING AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0980
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	3 HOUR ROLLING
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	LIMITED TO USE OF NATURAL GAS AND 3,000 HOURS OF OPERATION PER YEAR

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES AND THE USE OF CLEAN FUELS
Emission Limit 1:	0.0022
Emission Limit 1 Unit:	LB/MMBTU

Emission Limit 1 Avg. Time/Condition:	6 HOUR ROLLING AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0022
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	6 HOUR ROLLING AVERAGE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS, SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	LIMITED TO NATURAL GAS USE AND 3000 HOURS OF OPERATION

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW SULFUR NATURAL GAS FUEL
Emission Limit 1:	0.0040
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	3 HOUR ROLLING AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	1.8000
Standard Emission Limit Unit:	E-5 LB/MMBTU
Standard Limit Avg. Time/Condition:	3 HOUR ROLLING AVERAGE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS, SIP

Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	LIMITED TO USE OF NATURAL GAS AND 3,000 HOURS OF OPERATION PER YEAR

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES AND USE OF NATURAL GAS
Emission Limit 1:	0.0054
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	3 HOUR ROLLING AVERAGE
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance	LIMITED TO USE OF NATURAL GAS AND 3,000 HOURS OF OPERATION

Notes: PER YEAR

*Pollutant Name Visible Emissions (VE)
*CAS Number: VE
*Control Method Code: P
*Control Method Description: CLEAN FUELS AND GOOD COMBUSTION PRACTICES
Emission Limit 1: 10.0000
Emission Limit 1 Unit: % OPACITY
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 10.0000
Standard Emission Limit Unit: % OPACITY
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NESHAP, SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: LIMITED TO USE OF NATURAL GAS AND 3,000 HOURS OF OPERATION PER YEAR

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES AND THE USE OF CLEAN FUELS
Emission Limit 1: 0.0022
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: 6 HOUR ROLLING AVERAGE
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg.

Time/Condition:
Standard Emission Limit: 0.0022
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: 6 HOUR ROLLING AVERAGE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS, SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: LIMITED TO NATURAL GAS USE AND 3000 HOURS OF OPERATION

Process Information : MAIDSVILLE

*Process Name: COOLING TOWER
*Process Type: 99.009
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes:

Pollutant Information: MAIDSVILLE - COOLING TOWER

*Pollutant Name Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: REDUNDANT BAFFLE AND MESH DEMISTER SYSTEM
Emission Limit 1: 0.9000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 3.9000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:

Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: BACT FOR COOLING TOWER WAS DETERMINED TO BE 0.0002% DRIFT ELIMINATOR

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: REDUNDANT BAFFLE AND MESH DEMISTER SYSTEM
Emission Limit 1: 0.9000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 3.9000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: BACT FOR COOLING TOWER WAS DETERMINED TO BE 0.0002% DRIFT ELIMINATOR

Process Information : MAIDSVILLE

*Process Name: EMERGENCY GENERATOR
*Process Type: 17.110
Primary Fuel: DIESEL
Throughput: 1801.00
Throughput Unit: hp
Process Notes: LIMITED TO 500 HOURS OF OPERATION A YEAR

Pollutant Information: MAIDSVILLE - EMERGENCY GENERATOR

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES
Emission Limit 1: 8.8500
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2.2100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 2.2000
Standard Emission Limit Unit: G/BHP-H
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:

Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: LIMITED TO 500 HOURS OF OPERATION A YEAR

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES
Emission Limit 1: 20.9000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 5.2300
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 5.3000
Standard Emission Limit Unit: G/BHP-H
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: LIMITED TO 500 HOURS OF OPERATION A YEAR

*Pollutant Name: Particulate Matter < 10 μ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES

Emission Limit 1: 1.1300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.2800
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: LIMITED TO 500 HOURS OF OPERATION A YEAR

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: SULFUR CONTENT IN THE FUEL LIMITED TO 0.05% BY WEIGHT
Emission Limit 1: 6.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.6000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:	N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	LIMITED TO 500 HOURS OF OPERATION A YEAR

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES
Emission Limit 1:	1.2100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.3000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost	2005

Estimates:	
Pollutants/Compliance Notes:	LIMITED TO 500 HOURS OF OPERATION A YEAR

Process Information : MAIDSVILLE

*Process Name:	IC ENGINE, FIRE WATER PUMP
*Process Type:	17.210
Primary Fuel:	DIESEL
Throughput:	85.00
Throughput Unit:	hp
Process Notes:	LIMITED TO 500 HOURS OF OPERATION PER YEAR

Pollutant Information: MAIDSVILLE - IC ENGINE, FIRE WATER PUMP

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES
Emission Limit 1:	4.4300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.1100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	23.6000
Standard Emission Limit Unit:	G/BHP-H
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005

Pollutants/Compliance Notes:

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: COMBUSTION CONTROLS WITH OPERATIONAL LIMITATIONS
Emission Limit 1: 10.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2.6000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 56.0000
Standard Emission Limit Unit: G/BHP-H
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES
Emission Limit 1: 0.5600
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.1400
Emission Limit 2 Unit: T/YR

Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES
Emission Limit 1: 0.5600
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.1400
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U

*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: SULFUR CONTENT LIMITED TO 0.05% BY WEIGHT
Emission Limit 1: 3.3000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.8250
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC

*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES
Emission Limit 1: 0.6400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.1600
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: UWGP - FUEL GRADE ETHANOL PLANT

RBLC ID: WI-0204
*Corporate/Company Name: UNITED WISCONSIN GRAIN PRODUCERS
*Facility Name: UWGP - FUEL GRADE ETHANOL PLANT
Facility County: COLUMBIA
Facility State: WI
Facility ZIP Code: 53935
Facility Country: USA
Facility Contact Name: CARL T. BENEK

Facility Contact Phone: (920) 484-3943
Facility Contact Email:
EPA Region: 5
Agency Code: WI001
Agency Name: WISCONSIN DEPT OF NATURAL RESOURCES
Agency Contact: MR. JEFFREY C. HANSON
Agency Phone: (608)266-6876
Agency Email: JEFFREY.HANSON@DNR.STATE.WI.US
Other Agency Contact Info: DON C. FAITH III
WI
(608) 267-3135
*Permit Number: 03-DCF-048
*SIC: 2869
NAICS: 325193
Facility Registry System Number #: 110016896705
Application Accepted Received Date: 02/12/2003 ACT
Permit Issuance Date: 08/14/2003 ACT
Date determination entered in RBLC: 08/18/2003
Date determination last updated: 12/09/2003
Permit Type: A: NEW/GREENFIELD FACILITY
Facility Description: FERMENTATION BASED PROCESS WITH DISTILLATION, MOLECULAR SIEVES FOR FINAL WATER REMOVAL. ETHANOL DENATURED USING GASOLINE.
Other Permitting Information: 50 MILLION GALLON PER YEAR FUEL GRADE ETHANOL FACILITY; SYNTHETIC MINOR SOURCE (NOT SUBJECT TO PSD). APPLICATION COMPLETE ON 6/9/03.

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name: BOILER /OXIDIZER (DRYER / DISTILLATION), P10
*Process Type: 12.310
Primary Fuel: NATURAL GAS
Throughput: 140.00
Throughput Unit: MMBTU/H
Process Notes: Boiler works as control device. RECEIVES VOC'S FROM DISTILLATION AND RELATED PROCESSES AND FROM Distillers dried grain with solubles (DDGS) DRYER (85 MMBTU/HR.). SUBJECT TO DB

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - BOILER /OXIDIZER (DRYER / DISTILLATION), P10

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method PROCESS IS THE CONTROL FOR OTHER SOURCES LISTED IN PROCESS

Description: ENTRY.
Emission Limit 1: 6.7000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.3650
Emission Limit 2 Unit: LB /T
Emission Limit 2 Avg. Time/Condition: TON DDGS AT 11% MOISTURE
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 98.000
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: SYNTHETIC MINOR SOURCE. PROPOSED TO AVOID PSD / TITLE V MAJOR SOURCE STATUS. BOILER / OXIDIZER GENERATES STEAM AND CONSUMES VOC'S FROM DISTILLATION, DDGS DRYING AND OTHER OPERATIONS; EST. 99% DEST.; 98% OVERALL CONTROL.

*Pollutant Name Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 5.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.3000
Emission Limit 2 Unit: LB/T
Emission Limit 2 Avg. Time/Condition: TON DDGS AT 11% MOISTURE
Standard Emission Limit: 0.0400
Standard Emission Limit Unit: LB/MMBTU

Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	90.000
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	SYNTHETIC MINOR SOURCE. BOILER / OXIDIZER CONSUMES COMBUSTABLE PARTICULATE MATTER WHICH ESCAPES DDGS DRYER.

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	18.4000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1300
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	90.000
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost	

Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	SYNTHETIC MINOR SOURCE. BOILER / OXIDIZER CONSUMES CO PRODUCED BY DDGS DRYER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	BOILER / BURNER DESIGN
Emission Limit 1:	0.0950
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0950
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	SYNTHETIC MINOR SOURCE: LIMIT (SLIGHTLY) MORE STRINGENT THAN NSPS

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	BYPASS FLARE, BIOMETHANATOR - P11
*Process Type:	19.320
Primary Fuel:	NATURAL GAS

Throughput: 6.40
Throughput Unit: MMBTU/H
Process Notes: FLARE USED TO CONSUME ANEROBIC DIGESTION BYPRODUCTS WHEN DDGS DRYER IS NOT IN OPERATION.

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - BYPASS FLARE, BIOMETHANATOR - P11

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: OPERATION LIMIT: NO MORE THAN 5040 H/YR
Emission Limit 1: 0.3000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 94.000
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: FLARE USED TO CONSUME ANAEROBIC DIGESTION BYPRODUCTS WHEN DDGS DRYER IS NOT IN OPERATION.

*Pollutant Name: Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:

Emission Limit 1: 0.0600
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0090
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: OPERATION LIMIT: NO MORE THAN 5040 H/YR
Emission Limit 1: 2.4000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.3750
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: Other Case-by-Case

Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	GRAIN RECEIVING / TRANSPORT / STORAGE, P20
*Process Type:	70.290
Primary Fuel:	
Throughput:	18000000.00
Throughput Unit:	BU/YR
Process Notes:	throughput is annual maximum

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - GRAIN RECEIVING / TRANSPORT / STORAGE, P20

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	ENCLOSURE; BAGHOUSE (10:1 A/C); FUGITIVE DUST CONTROL
Emission Limit 1:	2.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	see note
*Case-by-Case Basis:	Other Case-by-Case

Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 97.000
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: LB/H limit is set by State Reg. in permit, emission limit in gr/dscf is not available

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	CORN MILLING / MILLED CORN TRANSPORT, P30
*Process Type:	70.290
Primary Fuel:	
Throughput:	18000000.00
Throughput Unit:	BU/YR
Process Notes:	

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - CORN MILLING / MILLED CORN TRANSPORT, P30

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	ENCLOSURE; BAGHOUSE (10:1 A/C)
Emission Limit 1:	0.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	see note
*Case-by-Case Basis:	Other Case-by-Case

Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 97.000
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: LB/H limit is set by State Reg. in permit, emission limit in gr/dscf is not available

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	FERMENTATION PROCESS, P40
*Process Type:	70.120
Primary Fuel:	
Throughput:	1091000.00
Throughput Unit:	GAL/D
Process Notes:	Throughput is GAL/D FERM. SLURRY

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - FERMENTATION PROCESS, P40

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	A
*Control Method Description:	WET SCRUBBER (PACKED TOWER); WATER RECYCLED TO PROCESS
Emission Limit 1:	7.4000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case

Other Applicable

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 98.700
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: SYNTHETIC MINOR SOURCE.

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	LOADING RACK WITH FLARE, P50
*Process Type:	19.310
Primary Fuel:	
Throughput:	50000000.00
Throughput Unit:	GAL/YR
Process Notes:	

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - LOADING RACK WITH FLARE, P50

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	A
*Control Method Description:	FLARE / VAPOR COLLECTION
Emission Limit 1:	1.4000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 94.000
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	LARGE STORAGE TANKS, T61, T62, T63, T64, T65
*Process Type:	42.009
Primary Fuel:	
Throughput:	50000000.00
Throughput Unit:	GAL/YR
Process Notes:	

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - LARGE STORAGE TANKS, T61, T62, T63, T64, T65

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	INTERNAL FLOATING ROOF (NSPS) STORAGE TANKS, GOOD OPERATING PRACTICE
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	see note
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS

Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: Permit limit is internal floating roof and good operation practices. ALL NOTED TANKS > 40,000 GAL W/ MAX. TRUE VAPOR PRESSURES OF 0.91 PSIA.

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	STORAGE TANK, 2000 GAL, CORROSION INHIBITOR, T66
*Process Type:	42.009
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	2000 GAL. STORAGE TANK USED FOR GASOLINE ADDITIVE (CORROSION INHIBITOR). FIXED ROOF TANK.

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - STORAGE TANK, 2000 GAL, CORROSION INHIBITOR, T66

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	2000 GAL. FIXED ROOF TANK, PRESSURE/VACUUM CONSERVATION VENT, SUBMERGED FILL PIPE. (NSPS BUT ONLY RECORDKEEPING)
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	see note
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable	NSPS

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: Permit limit is controls and recordkeeping

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	DDGS COOLER / TRANSPORT, P70
*Process Type:	70.120
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - DDGS COOLER / TRANSPORT, P70

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	4.6100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: NO ADD ON VOC CONTROL; DDGS DRYER OPERATION NEEDS TO ASSURE COMPLIANCE WITH LIMIT.

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	CYCLONE WITH INTEGRATED BAGHOUSE (10:1 A/C); EST. 97% + EFF. COLLECTION.
Emission Limit 1:	3.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	97.000
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance

Notes:

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	COOLING TOWERS, P80
*Process Type:	99.009
Primary Fuel:	
Throughput:	22000.00
Throughput Unit:	GAL/MIN
Process Notes:	0.005% DRIFT MAX.

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - COOLING TOWERS, P80

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	0.005% MAX. DRIFT RATE; 2000 PPM SOLIDS; MAX FLOW OF 22,000 GPM
Emission Limit 1:	1.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	0.005% MAX. DRIFT RATE; 124 PPM VOCS; MAX FLOW OF 22,000 GPM
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	FUGITIVE VOC, FROM EQUIPMENT, F01
*Process Type:	64.002
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	Subject to NSPS

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - FUGITIVE VOC, FROM EQUIPMENT, F01

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	SOCMI LEAK DETECTION AND REPAIR
Emission Limit 1:	
Emission Limit 1 Unit:	
Emission Limit 1 Avg. Time/Condition:	see note
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	permit limit is SOCMI control, no detectable emissions

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	DDGS LOADOUT, P90
*Process Type:	70.120
Primary Fuel:	
Throughput:	13470.00
Throughput Unit:	T/MO
Process Notes:	DDGS - DISTILLERS DRIED GRAIN W/ SOLUBLES; TONNAGE BASED ON 11% MOISTURE CONTENT.

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - DDGS LOADOUT, P90

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	ENCLOSURE, BAGHOUSE (10:1 A/C); FUGITIVE DUST CONTROL
Emission Limit 1:	0.4100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : UWGP - FUEL GRADE ETHANOL PLANT

*Process Name:	FUGITIVE DUST, F02
*Process Type:	99.999
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	Paved roads and misc. activities

Pollutant Information: UWGP - FUEL GRADE ETHANOL PLANT - FUGITIVE DUST, F02

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	FUGITIVE DUST CONTROL (PAVING, CLEANING, TRANSPORTATION AND STORAGE). CLEAN AND SWEEP ROADS, WATER AND CHEMICAL CONTROLS FOR DUST, PLASTIC COVERINGS, ENCLOSURES, AND TRUCK SPEED AND WEIGHT LIMITS
Emission Limit 1:	30.0000
Emission Limit 1 Unit:	% REDUCTION
Emission Limit 1 Avg. Time/Condition:	see note
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	30.000
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	permit limit is controls

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: VCU EAST PLANT

RBLC ID:	VA-0270
*Corporate/Company Name:	VIRGINIA COMMONWEALTH UNIVERSITY
*Facility Name:	VCU EAST PLANT
Facility County:	RICHMOND CITY

Facility State:	VA
Facility ZIP Code:	23298
Facility Country:	USA
Facility Contact Name:	DAVID MITCHELL
Facility Contact Phone:	(804)828-3766
Facility Contact Email:	
EPA Region:	3
Agency Code:	VA001
Agency Name:	VIRGINIA ENVIRONMENTAL QUALITY AIR DIV.
Agency Contact:	MS. MONICA A. HARVEY
Agency Phone:	(804)698-4300
Agency Email:	MAHARVEY@DEQ.VIRGINIA.GOV
Other Agency Contact Info:	STANLEY FAGGERT VA (804)527-5078
*Permit Number:	50126
*SIC:	8062
NAICS:	622110
Facility Registry System Number #:	110006176823
Application Accepted Received Date:	07/09/2001 EST
Permit Issuance Date:	03/31/2003 EST
Date determination entered in RBLC:	04/21/2003
Date determination last updated:	07/15/2003
Permit Type:	B: ADD NEW PROCESS TO EXISTING FACILITY C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description:	
Other Permitting Information:	Three natural gas, #2 fuel oil, and #6 fuel oil boilers each with a maximum rated heat input capacity of 150.6 MMBtu/hr.

Process Information : VCU EAST PLANT

*Process Name:	BOILER - NO 6 FUEL OIL
*Process Type:	12.210
Primary Fuel:	FUEL OIL #6
Throughput:	150.00
Throughput Unit:	MMBTU/H
Process Notes:	This is one of 3 boilers.

Pollutant Information: VCU EAST PLANT - BOILER - NO 6 FUEL OIL

*Pollutant Name	Particulate Matter (PM), Filterable
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.

Emission Limit 1: 9.3000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0630
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 8.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0500
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW SULFUR FUELS.
Emission Limit 1: 78.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit 3hr rolling avg
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.5200
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost

Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Nitrogen Dioxide (NO2)
*CAS Number:	10102-44-0
*Control Method Code:	B
*Control Method Description:	GOOD COMBUSTION PRACTICES. LOW NOX COMBUSTION AND FGR. CEM SYSTEM.
Emission Limit 1:	0.4000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	57.5000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	each unit
Standard Emission Limit:	0.4000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	15.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	

Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1050
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the	

BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VCU EAST PLANT

*Process Name:	BOILER NATUAL GAS
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	150.00
Throughput Unit:	MMBTU/H
Process Notes:	This is one of 3 boilers

Pollutant Information: VCU EAST PLANT - BOILER NATUAL GAS

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	1.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0100
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	

*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	1.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0100
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5

*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW SULFUR FUELS.
Emission Limit 1: 0.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit 3hr rolling avg
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0010
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Dioxide (NO2)
*CAS Number: 10102-44-0
*Control Method Code: B
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW NOX COMBUSTION AND FGR. CEM SYSTEM.
Emission Limit 1: 0.1000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2: 15.6000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition: each unit
Standard Emission Limit: 0.1000
Standard Emission Limit Unit: LB/MMBTU

Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 14.9000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB\H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : VCU EAST PLANT

*Process Name:	BOILER - DISTILLATE
*Process Type:	12.220
Primary Fuel:	FUEL OIL #2
Throughput:	150.00

Throughput Unit:	MMBTU
Process Notes:	This is one of 3 units.

Pollutant Information: VCU EAST PLANT - BOILER - DISTILLATE

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	3.3000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0220
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	1.7000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg.	each unit

Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW SULFUR FUELS.
Emission Limit 1: 78.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: each unit 3hr rolling avg
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.5300
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Nitrogen Dioxide (NO2)
*CAS Number: 10102-44-0
*Control Method Code: B
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW NOX COMBUSTION AND FGR. CEM SYSTEM.
Emission Limit 1: 0.2000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition: each unit
Emission Limit 2: 30.1000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition: each unit
Standard Emission Limit: 0.2000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	15.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1050
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	each unit
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	

Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : VCU EAST PLANT

*Process Name:	BOILER - OIL OR GAS
*Process Type:	12.290
Primary Fuel:	GAS OR OIL
Throughput:	150.00
Throughput Unit:	MMBTU
Process Notes:	Throughput for is for one of 3 units.

Pollutant Information: VCU EAST PLANT - BOILER - OIL OR GAS

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES.
Emission Limit 1:	23.3000
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	combined units
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	

Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 20.0000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:

Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW SULFUR FUELS.
Emission Limit 1: 196.3000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Dioxide (NO2)
*CAS Number: 10102-44-0
*Control Method Code: B
*Control Method Description: GOOD COMBUSTION PRACTICES. LOW NOX COMBUSTION AND FGR. CEM SYSTEM.

Emission Limit 1: 145.6000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 172.9000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES.
Emission Limit 1: 23.7000
Emission Limit 1 Unit: T/YR
Emission Limit 1 Avg. Time/Condition: combined units
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost

Estimates:
Pollutants/Compliance Notes:

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: VCU EAST PLANT

RBLC ID:	VA-0278
*Corporate/Company Name:	Virginia Commonwealth University
*Facility Name:	VCU EAST PLANT
Facility County:	RICHMOND
Facility State:	VA
Facility ZIP Code:	23298
Facility Country:	USA
Facility Contact Name:	
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	3
Agency Code:	VA001
Agency Name:	VIRGINIA ENVIRONMENTAL QUALITY AIR DIV.
Agency Contact:	MR. YOGESH DOSHI
Agency Phone:	(804)698-4017
Agency Email:	YNDOSHI@DEQ.VIRGINIA.GOV
Other Agency Contact Info:	JOHN REINHARDT VA (804) 527-5012
*Permit Number:	VA-50126
*SIC:	8221
NAICS:	611310
Facility Registry System Number #:	110017420897
Application Accepted Received Date:	12/11/2002 ACT
Permit Issuance Date:	03/31/2003 ACT
Date determination entered in RBLC:	03/04/2004
Date determination last updated:	06/21/2004
Permit Type:	B: ADD NEW PROCESS TO EXISTING FACILITY C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description:	STEAM GENERATING PLANT AT UNIVERSITY
Other Permitting Information:	Steam generating plant consisting of 3 natural gas/No. 2 fuel oil/No. 6 fuel oil-fired boilers, each with a max rated heat capacity of 150.6 mmbtu/h

Process Information : VCU EAST PLANT

*Process Name:	BOILER, NATURAL GAS, (3)
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	150.60
Throughput Unit:	MMBTU/H
Process Notes:	Throughput for each. The 3 boilers shall consume no more than 3,500 million cf of natural gas per year

Pollutant Information: VCU EAST PLANT - BOILER, NATURAL GAS, (3)

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0080
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P

*Control Method Description:	LOW SULFUR FUEL
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0007
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	LOW NOX BURNERS, FLUE GAS RECIRCULATION, AND GOOD OPERATING PROCEDURES
Emission Limit 1:	15.6000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1000
Emission Limit 2 Unit:	LB/MMBTU
Emission Limit 2 Avg. Time/Condition:	30-day rolling avg
Standard Emission Limit:	0.0800
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg.	annual avg

Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	14.9000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency	No

(Y/N)?:	
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	10.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg.	

Time/Condition:	
Emission Limit 2:	20.0000
Emission Limit 2 Unit:	% OPACITY
Emission Limit 2 Avg. Time/Condition:	6-min period per hour
Standard Emission Limit:	10.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : VCU EAST PLANT

*Process Name:	BOILER, #6 FUEL OIL, (3)
*Process Type:	12.210
Primary Fuel:	# 6 FUEL OIL
Throughput:	150.60
Throughput Unit:	MMBTU/H
Process Notes:	Throughput for each. The 3 boilers shall consume no more than a total of 5,000,000 gal of fuel oil (#2 and #6 combined) per year.

Pollutant Information: VCU EAST PLANT - BOILER, #6 FUEL OIL, (3)

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	9.3000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg.	

Time/Condition:
Emission Limit 2: 23.3000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: combined operation, all fuels
Standard Emission Limit: 0.0600
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 8.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 20.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: combined operation, all fuels
Standard Emission Limit: 0.0500
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO_2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: FUEL SULFUR LIMIT: < 0.5% S BY WT
Emission Limit 1: 78.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 196.3000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: combined operation, all fuels
Standard Emission Limit: 0.5200
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: LOW NOX BURNERS, FLUE GAS RECIRCULATION, AND GOOD OPERATING PROCEDURES.
Emission Limit 1: 57.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 145.6000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: combined operation, all fuels
Standard Emission Limit: 0.4000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICE
Emission Limit 1: 15.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:

Standard Emission Limit: 0.1000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION
Emission Limit 1: 2.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : VCU EAST PLANT

*Process Name:	BOILER, #2 FUEL OIL, (3)
*Process Type:	12.220
Primary Fuel:	NO. 2 FUEL OIL
Throughput:	150.60
Throughput Unit:	MMBTU/H
Process Notes:	Throughput for each. The 3 boilers shall consume no more than a total of 5,000,000 gal of fuel oil (#2 and #6 combined) per year.

Pollutant Information: VCU EAST PLANT - BOILER, #2 FUEL OIL, (3)

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	3.3000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0200
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	calculated
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	1.7000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0100
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method	FUEL SULFUR LIMITS: <0.5% S BY WT.

Description:
Emission Limit 1: 78.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.5000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: P
*Control Method Description: LOW NOX BURNERS, FLUE GAS RECIRCULATION, AND GOOD OPERATING PROCEDURES.
Emission Limit 1: 30.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.2000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:

*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICE
Emission Limit 1: 15.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: calculated
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	2.1000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: GENOVA ARKANSAS I, LLC

RBLC ID:	AR-0070
*Corporate/Company Name:	GENOVA ARKANSAS I, LLC

*Facility Name:	GENOVA ARKANSAS I, LLC
Facility County:	WASHINGTON
Facility State:	AR
Facility ZIP Code:	
Facility Country:	USA
Facility Contact Name:	JEFFERY SCHROETER
Facility Contact Phone:	972-307-8186
Facility Contact Email:	
EPA Region:	6
Agency Code:	AR001
Agency Name:	ARKANSAS DEPT OF ENVIRONMENTAL QUALITY
Agency Contact:	MR. TOM RHEAUME
Agency Phone:	(501)682-0762
Agency Email:	rheaume@adeq.state.ar.us
Other Agency Contact Info:	PAUL OSMON 8001 NATIONAL DRIVE LITTLE ROCK, AR 72209 479-927-3257 x 12
*Permit Number:	2009-AOP-R0
*SIC:	4911
NAICS:	221112
Facility Registry System Number #:	110017421217
Application Accepted Received Date:	11/14/2001 ACT
Permit Issuance Date:	08/23/2002 ACT
Date determination entered in RBLC:	08/07/2003
Date determination last updated:	10/28/2003
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	COMBINED CYCLE POWER PLANT
Other Permitting Information:	FACILITY PERMITTED FOR 3 DIFFERENT SCENARIOS FOR DIFFERENT ENGINE MANUFACTURERS. ONLY 2 TURBINES CAN BE INSTALLED.

Affected Boundaries: GENOVA ARKANSAS I, LLC

*Limit (Class 1 Area or Name of the border of the U.S.):	Caney Creek
Boundary Type (Class 1 or Intl Border):	CLASS1
Distance:	80.00
Class 1 Area State:	AR
*Limit (Class 1 Area or Name of the border of the U.S.):	Upper Buffalo
Boundary Type (Class 1 or Intl Border):	CLASS1

Distance:	230.00
Class 1 Area State:	AR

Facility-wide Emissions : GENOVA ARKANSAS I, LLC

*Pollutant Name:	Carbon Monoxide
Facility-wide Emissions Increase:	458.6000 (Tons/Year)
*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	234.5000 (Tons/Year)
*Pollutant Name:	Particulate Matter (PM)
Facility-wide Emissions Increase:	204.0000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	55.2000 (Tons/Year)

Process Information : GENOVA ARKANSAS I, LLC

*Process Name:	TURBINE, COMBINED CYCLE, (2), (GE)
*Process Type:	15.210
Primary Fuel:	NATURAL GAS
Throughput:	170.00
Throughput Unit:	MW
Process Notes:	THIS SCENARIO IS FOR THE INSTALLATION OF TWO GENERAL ELECTRIC TURBINES. INFORMATION PROVIDED IS FOR ONE UNIT.

Pollutant Information: GENOVA ARKANSAS I, LLC - TURBINE, COMBINED CYCLE, (2), (GE)

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	B
*Control Method Description:	DRY LOW NOX COMBUSTOR/SCR
Emission Limit 1:	3.5000
Emission Limit 1 Unit:	PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	3.5000
Standard Emission Limit Unit:	PPM @ 15% O2
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD

Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	6,664 ($/ton)
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2002
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	8.2000
Emission Limit 1 Unit:	PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	8.2000
Standard Emission Limit Unit:	PPM @ 15% O2
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost	

Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	1.4000
Emission Limit 1 Unit:	PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICES/CLEAN FUEL
Emission Limit 1:	19.5000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	

Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : GENOVA ARKANSAS I, LLC

*Process Name:	TURBINE, COMBINED CYCLE, (2), (SWH)
*Process Type:	15.210
Primary Fuel:	NATURAL GAS
Throughput:	170.00
Throughput Unit:	MW
Process Notes:	THIS SCENARIO IS FOR THE INSTALLATION OF TWO SIEMANS WESTINGHOUSE TURBINES. INFORMATION IS FOR ONE UNIT.

Pollutant Information: GENOVA ARKANSAS I, LLC - TURBINE, COMBINED CYCLE, (2), (SWH)

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	B
*Control Method Description:	DRY LOW NOX COMBUSTOR/SCR
Emission Limit 1:	3.5000
Emission Limit 1 Unit:	PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	

Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	3.5000
Standard Emission Limit Unit:	PPM @ 15% O2
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	2,673 ($/ton)
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2002
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	30.0000
Emission Limit 1 Unit:	PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	30.0000
Standard Emission Limit Unit:	PPM @ 15% O2
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the	

BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	3.0000
Emission Limit 1 Unit:	PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)

*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICE/CLEAN FUEL
Emission Limit 1: 17.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : GENOVA ARKANSAS I, LLC

*Process Name: TURBINE, COMBINED CYCLE, (2), (MHI)
*Process Type: 15.210
Primary Fuel: NATURAL GAS
Throughput: 170.00
Throughput Unit: MW
Process Notes: THIS SCENARIO IS FOR THE INSTALLATION OF TWO MITSUBISHI HEAVY INDUSTRIAL TURBINES. INFORMATION IS FOR ONE UNIT.

Pollutant Information: GENOVA ARKANSAS I, LLC - TURBINE, COMBINED CYCLE, (2), (MHI)

*Pollutant Name Nitrogen Oxides (NOx)

*CAS Number: 10102
*Control Method Code: B
*Control Method Description: DRY LOW NOX COMBUSTOR/SCR
Emission Limit 1: 3.5000
Emission Limit 1 Unit: PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 3.5000
Standard Emission Limit Unit: PPM @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness: 1,980 ($/ton)
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2002
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: B
*Control Method Description: GOOD COMBUSTION PRACTICE/CO OXIDATION CATALYST
Emission Limit 1: 10.2000
Emission Limit 1 Unit: PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 10.2000
Standard Emission Limit PPM @ 15% O2

Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness: 1,930 ($/ton)
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2002
Pollutants/Compliance Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: B
*Control Method Description: GOOD COMBUSTION PRACTICE/CO OXIDATION CATALYST
Emission Limit 1: 8.4000
Emission Limit 1 Unit: PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter < 10 μ (PM10)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICE
Emission Limit 1: 18.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : GENOVA ARKANSAS I, LLC

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*Process Name: DUCT BURNERS
*Process Type: 12.310
Primary Fuel: NATURAL GAS

Throughput: 200.00
Throughput Unit: MMBTU/H
Process Notes: 2 DUCT BURNERS UNDER ANY SCENARIO. INFORMATION PROVIDED IS FOR EACH UNIT.

Pollutant Information: GENOVA ARKANSAS I, LLC - DUCT BURNERS

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*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: B
*Control Method Description: LOW NOX BURNER/SCR
Emission Limit 1: 0.0800
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0800
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICES
Emission Limit 1: 0.2500

Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.2500
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: P
*Control Method Description: GOOD COMBUSTION PRACTICE
Emission Limit 1: 0.0600
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0200
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance Notes:

Process Information : GENOVA ARKANSAS I, LLC

*Process Name:	AUXILIARY BOILER
*Process Type:	13.310
Primary Fuel:	NATURAL GAS
Throughput:	33.00
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: GENOVA ARKANSAS I, LLC - AUXILIARY BOILER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	P
*Control Method Description:	LOW NOX OPTION (LOW NOX BURNER AND/OR FLUE GAS RECIRCULATION)
Emission Limit 1:	0.0400
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0400
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance

Notes:

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	0.0400
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0400
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	0.0180
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg.	

Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	GOOD COMBUSTION PRACTICE
Emission Limit 1:	0.0120
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0120
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	

Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : GENOVA ARKANSAS I, LLC

*Process Name:	COOLING TOWER
*Process Type:	99.009
Primary Fuel:	
Throughput:	11.40
Throughput Unit:	MMGAL/H
Process Notes:	

Pollutant Information: GENOVA ARKANSAS I, LLC - COOLING TOWER

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	A
*Control Method Description:	DRIFT ELIMINATORS
Emission Limit 1:	0.0010
Emission Limit 1 Unit:	% DRIFT LOSS
Emission Limit 1 Avg. Time/Condition:	of cooling water flow
Emission Limit 2:	3.8000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BACT IS 0.001 % DRIFT LOSS

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: AES HUNTINGTON BEACH

RBLC ID:	CA-1024
*Corporate/Company Name:	AES HUNTINGTON BEACH
*Facility Name:	AES HUNTINGTON BEACH
Facility County:	ORANGE
Facility State:	CA
Facility ZIP Code:	92646
Facility Country:	USA
Facility Contact Name:	
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	9
Agency Code:	CA036
Agency Name:	SOUTH COAST AQMD, CA
Agency Contact:	MR. MARTIN KAY
Agency Phone:	(909)396-3115
Agency Email:	mkay@aqmd.gov
Other Agency Contact Info:	SOUTH COAST AQMD, MARTY KAY, 909-396-3115, MKAY@AQMD.GOV
*Permit Number:	394419
*SIC:	4911
NAICS:	221112
Facility Registry System Number #:	110002921713
Application Accepted Received Date:	
Permit Issuance Date:	08/01/2002 ACT
Date determination entered in RBLC:	06/09/2005
Date determination last updated:	02/02/2006
Permit Type:	C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description:	
Other Permitting Information:	CARB ID: 830.0, OPERATING PERMIT DATE: , STARTUP DATE: 01-01-2003 NEW CONSTR MODIFICATION: MODIFICATION TECH STATUS: BACT

DETERMINATION YES SOURCE TEST AVAILABLE

Process Information : AES HUNTINGTON BEACH

*Process Name:	BOILER: >= 50 MMBTU/HR
*Process Type:	12.310
Primary Fuel:	NATURAL GAS
Throughput:	225.00
Throughput Unit:	MW
Process Notes:	EQUIP: ELECTRIC UTILITY BOILER, MFR: BABCOCK & WILCOX, TYPE: MULTI-WALL FIRED, MODEL: , FUNC EQUIP: USE IS CURRENTLY FOR PEAK POWER DEMAND PERIODS, FUEL_TYPE: , SCHEDULE: VARIABLE, H/D: 24, D/W: 5, W/Y: 20, NOTES: FACILITY APPLIED TO BRING THIS RETIRED BOILER BACK INTO SERVICE. FACILITY IS EXPERIENCING DIFFICULTY MEETING NOX AND AMMONIA LIMITS ON ONE- HOUR AVERAGING BASIS, AND DISTRICT IS CONSIDERING REQUEST FOR LONGER AVERAGING TIME. SOURCE TEST RESULTS: PPM@3%O2, GR/DSCF: 225 MW: NOX-3.5, CO-0.0, VOC- 4.2, NH3-3.1, PM-.001. 169 MW: NOX-4.2, NH3-1.6, PM-.002. 115MW: NOX-3.8, NH3-0.5. 90 MW: NOX-4.5, NH3-0.7, PM-.004

Pollutant Information: AES HUNTINGTON BEACH - BOILER: >= 50 MMBTU/HR

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	LOW-NOX BURNERS, FLUE GAS RECIRC., SELECTIVE CAT. RED.
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	PPMVD @3% O2
Emission Limit 1 Avg. Time/Condition:	1-H AV
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	

Compliance Verified:	YES
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	A
*Control Method Description:	OXIDATION CATALYST
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	PPMVD @3% O2
Emission Limit 1 Avg. Time/Condition:	1-H AV
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	YES
Cost Effectiveness:	
Incremental Cost Effectiveness:	0
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2005
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	N

*Control Method Description:
Emission Limit 1: 0.0100
Emission Limit 1 Unit: GR/DSCF
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: NOT AVAILABLE
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: YES
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Oxides (SOx)
*CAS Number: 7446
*Control Method Code: N
*Control Method Description: SULFUR IN FUEL
Emission Limit 1: 0.2000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.2000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg.

Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: YES
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes:

*Pollutant Name Ammonia (NH_3)
*CAS Number: 7664-41-7
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 5.0000
Emission Limit 1 Unit: PPMVD @3% O_2
Emission Limit 1 Avg. Time/Condition: 1-H
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: YES
Cost Effectiveness:
Incremental Cost Effectiveness: 0
Cost Verified By Agency No

(Y/N)?:
Dollar Year Used In Cost Estimates: 2005
Pollutants/Compliance Notes: POLLUTANT EMITTED IS NH3.

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: WILLIAMS REFINING & MARKETING, L.L.C.

RBLC ID:	TN-0153
*Corporate/Company Name:	WILLIAMS REFINING & MARKETING, L.L.C.
*Facility Name:	WILLIAMS REFINING & MARKETING, L.L.C.
Facility County:	SHELBY
Facility State:	TN
Facility ZIP Code:	
Facility Country:	USA
Facility Contact Name:	
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	4
Agency Code:	TN004
Agency Name:	MEMPHIS AND SHELBY CO HEALTH DEPT, TN
Agency Contact:	MS. DEBORAH PARRISH
Agency Phone:	(901)544-7456
Agency Email:	DPARRISH@CO.SHELBY.TN.US
Other Agency Contact Info:	DEBORAH PARISH TN 901-544-7656
*Permit Number:	0101-08PC AND 1010-05PCR
*SIC:	2911
NAICS:	324110
Facility Registry System Number #:	110017421592
Application Accepted Received Date:	
Permit Issuance Date:	04/03/2002 ACT
Date determination entered in RBLC:	11/03/2003
Date determination last updated:	02/05/2004
Permit Type:	B: ADD NEW PROCESS TO EXISTING FACILITY C: MODIFY EXISTING PROCESS AT EXISTING FACILITY
Facility Description:	PETROLEUM REFINERY
Other Permitting Information:	Issue dates are Williams 0101-08pc (7/12/02) and Williams Refinery 0101-05pcr (4/25/02).

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name:	HEATERS, (5)
*Process Type:	19.600
Primary Fuel:	NATURAL GAS
Throughput:	50.00
Throughput Unit:	MMBTU/H
Process Notes:	one 200 mmbtu/h heater, four 50 mmbtu/h heaters.

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - HEATERS, (5)

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0300
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0300
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name Carbon Monoxide

*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0700
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0700
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0050
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0050
Standard Emission Limit LB/MMBTU

Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO_2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: FUEL SULFUR LIMITS
Emission Limit 1:
Emission Limit 1 Unit:
Emission Limit 1 Avg. Time/Condition: see note
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: no emission rate limits. Natural gas: 50 ppm H2S in fuel - annual; fuel gas: 100 ppm H2S in fuel - 24 h avg.

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name: COOLING TOWER
*Process Type: 99.003
Primary Fuel:
Throughput: 56.00
Throughput Unit: MMGAL/D
Process Notes: 1 cooling tower no. 9

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - COOLING TOWER

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0050
Emission Limit 1 Unit: % OF FLOW
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: Limit is 0.005% of cooling water flow emitted to the atmosphere from entrainment.

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name: FLUIDIZED CATALYTIC CRACKING UNIT
*Process Type: 50.003
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes:

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - FLUIDIZED CATALYTIC CRACKING UNIT

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 50.0000
Emission Limit 1 Unit: PPM
Emission Limit 1 Avg. Time/Condition: 3 hr avg
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: permit 0101-05PCR has additional limit: 200 ppmvd dry basis, 24 hr avg.

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 50.0000
Emission Limit 1 Unit: PPM
Emission Limit 1 Avg. Time/Condition: annual avg
Emission Limit 2: 100.0000
Emission Limit 2 Unit: PPM
Emission Limit 2 Avg. Time/Condition: 24 hr avg
Standard Emission Limit: 300.0000
Standard Emission Limit Unit: PPMV
Standard Limit Avg. Time/Condition: dry basis, 3 hr avg
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: WET GAS SCRUBBER
Emission Limit 1: 50.0000
Emission Limit 1 Unit: PPM

Emission Limit 1 Avg. Time/Condition: 24 hr avg
Emission Limit 2: 25.0000
Emission Limit 2 Unit: PPM
Emission Limit 2 Avg. Time/Condition: annual avg
Standard Emission Limit: 0.8200
Standard Emission Limit Unit: LB/1000 LB
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: permit 0101-08PC limit: 0.65 lb/1000 lb (3 hr avg)

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name: SULFUR RECOVERY UNIT
*Process Type: 50.006
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: fuel is natural gas/ fuel gas

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - SULFUR RECOVERY UNIT

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 150.0000
Emission Limit 1 Unit: PPM
Emission Limit 1 Avg. 24 h avg

Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 75.0000
Standard Emission Limit Unit: PPMV @ 0% EXCESS AIR
Standard Limit Avg. Time/Condition: annual avg.
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name:	WCR HEATER
*Process Type:	19.600
Primary Fuel:	
Throughput:	209.00
Throughput Unit:	MMBTU/H
Process Notes:	fuels: natural gas, coal or oil.

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - WCR HEATER

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0300
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:

Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0300
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0700
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0700
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology

considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0050
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0050
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name:	HEATER, ISOM ADSORBER
*Process Type:	19.600
Primary Fuel:	NATURAL GAS
Throughput:	9.10
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - HEATER, ISOM ADSORBER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.1400
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1400
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide

*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0350
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0350
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 μ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0140
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0140
Standard Emission Limit	LB/MMBTU

Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name:	HEATER, CCR REACTOR
*Process Type:	19.600
Primary Fuel:	NATURAL GAS
Throughput:	500.00
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - HEATER, CCR REACTOR

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.6000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.6000
Standard Emission Limit Unit:	LB/MMBTU

Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0100
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0050
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0050
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name:	HEATERS, ECU, NO. 2 NORTH & SOUTH
*Process Type:	19.600
Primary Fuel:	NATURAL GAS
Throughput:	166.50

Throughput Unit:	MMBTU/H
Process Notes:	throughput for each

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - HEATERS, ECU, NO. 2 NORTH & SOUTH

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0500
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0500
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/MMBTU

Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0100
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0050
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0050
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name:	NHDS NO. 1 CHARGE HEATER
*Process Type:	19.600
Primary Fuel:	NATURAL GAS
Throughput:	42.20
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - NHDS NO. 1 CHARGE HEATER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0730
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0730
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	

Did factors, other then air

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0100
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0140
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0140
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name:	HEATER, ALKY UNIT ISO-STRIPPER REBOILER
*Process Type:	19.600
Primary Fuel:	NATURAL GAS
Throughput:	166.50
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - HEATER, ALKY UNIT ISO-STRIPPER REBOILER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0500
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0500
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	

Standard Emission Limit:	0.0100
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 μ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0050
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0050
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	

Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name:	BOILER, NO. 9
*Process Type:	13.310
Primary Fuel:	NATURAL GAS
Throughput:	95.00
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - BOILER, NO. 9

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0840
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0840
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	

Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0900
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0900
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:

Emission Limit 1: 0.0075
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0075
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

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*Process Name: BOILER, NO. 10
*Process Type: 12.310
Primary Fuel: NATURAL GAS
Throughput: 180.00
Throughput Unit: MMBTU/H
Process Notes: annual capacity factor (ACF) for natural gas, coal or oil shall not exceed 10%

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - BOILER, NO. 10

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*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0600

Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0600
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.1800
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.1800
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0075
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0075
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:

Pollutants/Compliance Notes:

Process Information : WILLIAMS REFINING & MARKETING, L.L.C.

*Process Name:	CCR STABILIZATION REBOILER
*Process Type:	13.310
Primary Fuel:	NATURAL GAS
Throughput:	54.00
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: WILLIAMS REFINING & MARKETING, L.L.C. - CCR STABILIZATION REBOILER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0600
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0600
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance Notes:

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.0050
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0050
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.1000
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	

Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.1000
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: LIBERTY GENERATING STATION

RBLC ID:	NJ-0043
*Corporate/Company Name:	LIBERTY GENERATING STATION
*Facility Name:	LIBERTY GENERATING STATION
Facility County:	UNION
Facility State:	NJ
Facility ZIP Code:	07036
Facility Country:	USA
Facility Contact Name:	STEPHEN LEMONT
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	2
Agency Code:	NJ001
Agency Name:	NEW JERSEY DEPT OF ENV PROTECTION
Agency Contact:	VIORICA PETRIMAN
Agency Phone:	(609) 292-1638
Agency Email:	VIORICA.PETRIMAN@DEP.STATE.NJ.US
Other Agency Contact Info:	DR I. ATAY

	NJ (609) 984-0491
*Permit Number:	BOP990001
*SIC:	4911
NAICS:	221111
Facility Registry System Number #:	110015134861
Application Accepted Received Date:	
Permit Issuance Date:	03/28/2002 ACT
Date determination entered in RBLC:	03/28/2002
Date determination last updated:	08/31/2006
Permit Type:	A: NEW/GREENFIELD FACILITY
Facility Description:	ELECTRICITY GENERATION
Other Permitting Information:	ADDITIONAL AGENCY CONTACT: ALIYA M. KHAN, PH: 609-292-2169, FX: 609-984-6369, E-MAIL: AKHAN@DEP.STATE.NJ.US, AD: AIR QUALITY ENGINEERING, PO BOX 027, 401 E. STATE STREET, SECOND FLOOR, TRENTON, NJ 08625 1- FACILITY MUT OFFSET 464 TONS NOX AND 142 TONS VOC THAT MEET CRITERIA ESTABLISHED IN NJAC 7:27- 18.12- FACILITY MUST OFFSET AT LEAST 400 TONS CO PER YEAR ACCORDING TO NJAC 7:27-18.3(C)1. ADDITIONAL PLANTWIDE EMISSION LIMITS (T/YR): NH3, 505.8; TSP, 162.7; PM10, 446.6; SO2, 139; H2SO4 MIST, 84.6; FORMALDEHYDE, 65.6.

Facility-wide Emissions : LIBERTY GENERATING STATION

*Pollutant Name:	Nitrogen Oxides (NOx)
Facility-wide Emissions Increase:	356.6000 (Tons/Year)
*Pollutant Name:	Volatile Organic Compounds (VOC)
Facility-wide Emissions Increase:	109.6000 (Tons/Year)

Process Information : LIBERTY GENERATING STATION

*Process Name:	COMBINED CYCLE TURBINE (3)
*Process Type:	15.210
Primary Fuel:	NATURAL GAS
Throughput:	2964.00
Throughput Unit:	MMBTU/H
Process Notes:	ONLY USE NATURAL GAS WITH SULFUR CONTENT 0.8%. THROUGHPUT IS FOR EACH TURBINE, WITHOUT DUCT BURNER.

Pollutant Information: LIBERTY GENERATING STATION - COMBINED CYCLE TURBINE (3)

*Pollutant Name	Ammonia (NH3)
*CAS Number:	7664-41-7

*Control Method Code: N
*Control Method Description: NONE LISTED- SCR CONJUNCTION
Emission Limit 1: 10.0000
Emission Limit 1 Unit: PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 43.0000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method Description: SCR- AMMONIA FLOW RTE AT 11.46 GAL/H
Emission Limit 1: 2.5000
Emission Limit 1 Unit: PPMVD @ 15 % O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0110
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 2.5000
Standard Emission Limit Unit: PPMVD @ 15% O2

Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE. ADDITIONAL EMISSION LIMIT IS 29.2 LB/H.

*Pollutant Name Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: A
*Control Method Description: NONE LISTED
Emission Limit 1: 35.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0150
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: ONLY USE NATURAL GAS WITH SULFUR CONTENT 0.8%
Emission Limit 1: 0.0040
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 11.7000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.8000
Standard Emission Limit Unit: PPM @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE

*Pollutant Name Total Suspended Particulates
*CAS Number: PM
*Control Method Code: N
*Control Method Description: NONE LISTED
Emission Limit 1: 8.6000
Emission Limit 1 Unit: LB/H

Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0030
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: A
*Control Method Description: CO CATALYST
Emission Limit 1: 1.0000
Emission Limit 1 Unit: PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 4.1000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 1.0000
Standard Emission Limit Unit: PPMVD @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:

Did factors, other then air pollution technology considerations influence the BACT decisions?:

*Estimated Efficiency(%): 80.000
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: A
*Control Method Description: CO CATALYST
Emission Limit 1: 2.0000
Emission Limit 1 Unit: PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 14.2000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 2.0000
Standard Emission Limit Unit: PPMVD @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 80.000
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance BASIS OF LIMIT IS STATE

Notes:

*Pollutant Name Formaldehyde
*CAS Number: 50-00-0
*Control Method Code: N
*Control Method Description: NONE LISTED
Emission Limit 1: 4.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfuric Acid (mist, vapors, etc)
*CAS Number: 7664-93-9
*Control Method Code: N
*Control Method Description: NONE LISTED
Emission Limit 1: 7.2000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SULFURIC ACID MIST
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg.

Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?: U
*Estimated Efficiency(%):
Compliance Verified: UNKNOWN
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LIBERTY GENERATING STATION

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*Process Name: COMBINED CYCLE TURBINE WITH DUCT BURNER
*Process Type: 15.210
Primary Fuel: NATURAL GAS
Throughput: 3202.00
Throughput Unit: MMBTU/H
Process Notes:

Pollutant Information: LIBERTY GENERATING STATION - COMBINED CYCLE TURBINE WITH DUCT BURNER

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*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: A
*Control Method Description: CO CATALYST
Emission Limit 1: 15.4000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2.0000
Emission Limit 2 Unit: PPMVD @ 15% O2
Emission Limit 2 Avg.

Time/Condition:
Standard Emission Limit: 2.0000
Standard Emission Limit Unit: PPMVD @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 80.000
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE. ADDITIONAL EMISSION LIMIT IS 0.0053 LB/MMBTU.

*Pollutant Name Formaldehyde
*CAS Number: 50-00-0
*Control Method Code: N
*Control Method Description: NONE
Emission Limit 1: 7.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):

Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfuric Acid (mist, vapors, etc)
*CAS Number:	7664-93-9
*Control Method Code:	N
*Control Method Description:	NONE
Emission Limit 1:	7.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SULFURIC ACID MIST
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	BASIS OF LIMIT IS STATE.

*Pollutant Name	Ammonia (NH3)
*CAS Number:	7664-41-7
*Control Method Code:	N

*Control Method Description:	NONE- SCR RELATED
Emission Limit 1:	10.0000
Emission Limit 1 Unit:	PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	46.8000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	BASIS OF LIMIT IS STATE.

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	SCR
Emission Limit 1:	0.0110
Emission Limit 1 Unit:	LB/MMBTU
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2.5000
Emission Limit 2 Unit:	PPMVD @ 15% O2
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	2.5000
Standard Emission Limit Unit:	PPMVD @ 15% O2
Standard Limit Avg.	

Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE. ADDITIONAL EMISSION LIMIT IS 31.7 LB/H.

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: A
*Control Method Description: CO CATALYST
Emission Limit 1: 1.7000
Emission Limit 1 Unit: PPMVD @ 15% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 7.5000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 1.7000
Standard Emission Limit Unit: PPMVD @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 80.000
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency No

(Y/N)?:
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name Particulate Matter < 10 μ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description: NONE LISTED
Emission Limit 1: 38.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0170
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description: NONE LISTED
Emission Limit 1: 0.0040
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg.

Time/Condition:
Emission Limit 2: 12.7000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.8000
Standard Emission Limit Unit: PPM @ 15% O2
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Total Suspended Particulates
*CAS Number: PM
*Control Method Code: N
*Control Method Description: NONE LISTED
Emission Limit 1: 14.6000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0050
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

Process Information : LIBERTY GENERATING STATION

*Process Name: EMERGENCY GENERATOR
*Process Type: 17.210
Primary Fuel: DISTILLATE OIL
Throughput: 14.10
Throughput Unit: MMBTU/H
Process Notes: MAX HOURS OF OPERATION= 55 H/YR, SULFUR IN OIL <= 0.05% BY WEIGHT, OPACITY <=20%

Pollutant Information: LIBERTY GENERATING STATION - EMERGENCY GENERATOR

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description: NONE
Emission Limit 1: 11.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: Not Available
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	N
*Control Method Description:	NONE
Emission Limit 1:	26.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	Not Available
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	20.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	20.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	NONE
Emission Limit 1:	1.4000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	

Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: SULFUR IN OIL LIMITED TO 0.05% BY WEIGHT.
Emission Limit 1: 0.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Total Suspended Particulates
*CAS Number: PM
*Control Method Code: N
*Control Method Description: NONE
Emission Limit 1: 1.4000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method NONE

Description:
Emission Limit 1: 1.4000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LIBERTY GENERATING STATION

*Process Name:	DIESEL FIRE PUMP
*Process Type:	17.210
Primary Fuel:	DISTILLATE OIL
Throughput:	3.50
Throughput Unit:	MMBTU/H
Process Notes:	OIL MUST HAVE <= 0.05% SULFUR BY WEIGHT, OPACITY <=20%, HOURS OF OPERATION <= 500 H/YR

Pollutant Information: LIBERTY GENERATING STATION - DIESEL FIRE PUMP

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method NONE

Description:
Emission Limit 1: 3.3000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: Not Available
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description: NONE
Emission Limit 1: 15.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition: Not Available

*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name Particulate Matter < 10 μ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description: NONE
Emission Limit 1: 1.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name Sulfur Dioxide (SO_2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description: NONE
Emission Limit 1: 1.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Total Suspended Particulates
*CAS Number: PM
*Control Method Code: N
*Control Method Description: NONE
Emission Limit 1: 1.1000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:

Emission Limit 2: 0.3100
Emission Limit 2 Unit: LB/MMBTU
Emission Limit 2 Avg. Time/Condition: Calculated
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description: NONE
Emission Limit 1: 1.2000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology

considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

Process Information : LIBERTY GENERATING STATION

*Process Name: AUXILIARY BOILER
*Process Type: 12.310
Primary Fuel: NATURAL GAS
Throughput: 200.00
Throughput Unit: MMBTU/H
Process Notes: NATURAL GAS USAGE RESTRICTED TO 181.0 MILLION SCF/YR (EQUIVALENT TO A 10% ANNUAL CAPACITY FACTOR)

Pollutant Information: LIBERTY GENERATING STATION - AUXILIARY BOILER

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: A
*Control Method Description: CO CATALYST
Emission Limit 1: 100.0000
Emission Limit 1 Unit: PPMVD @7% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 17.4000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0870
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology

considerations influence the BACT decisions?:
*Estimated Efficiency(%): 80.000
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method Description: SCR
Emission Limit 1: 0.2000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 7.2000
Emission Limit 2 Unit: LB/H
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0360
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name: Particulate Matter < 10 µ (PM10)
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.6000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0080
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name: Total Suspended Particulates
*CAS Number: PM
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 1.6000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0080

Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	BASIS OF LIMIT IS STATE.

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	A
*Control Method Description:	CO CATALYST
Emission Limit 1:	50.0000
Emission Limit 1 Unit:	PPMVD @ 7% O2
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.6000
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	80.000
Compliance Verified:	Y
Cost Effectiveness:	

Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	BASIS OF LIMIT IS STATE. Calculated emission rate 0.008 LB/MMBTU

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	N
*Control Method Description:	NONE
Emission Limit 1:	0.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0040
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	BASIS OF LIMIT IS STATE.

Process Information : LIBERTY GENERATING STATION

*Process Name:	DUCT BURNER (3)
*Process Type:	11.310

Primary Fuel: NATURAL GAS
Throughput: 256.00
Throughput Unit: MMBTU/H
Process Notes:

Pollutant Information: LIBERTY GENERATING STATION - DUCT BURNER (3)

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: A
*Control Method Description: CO CATALYST
Emission Limit 1: 100.0000
Emission Limit 1 Unit: PPMVD @ 7% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0956
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%): 80.000
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method Description: SCR
Emission Limit 1: 0.2000

Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.2000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE.

*Pollutant Name Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: N
*Control Method Description: NONE LISTED
Emission Limit 1: 0.2000
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.2000
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: A
*Control Method Description: CO CATALYST
Emission Limit 1: 50.0000
Emission Limit 1 Unit: PPMVD @ 7% O2
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:

Pollutants/Compliance Notes: BASIS OF LIMIT IS STATE

*Pollutant Name: Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: N
*Control Method Description: NONE LISTED
Emission Limit 1: 0.0300
Emission Limit 1 Unit: LB/MMBTU
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0300
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified: Y
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LIBERTY GENERATING STATION

*Process Name: COOLING TOWER (3)- MECHANICAL DRAFT
*Process Type: 99.009
Primary Fuel: N/A
Throughput:
Throughput Unit:
Process Notes: 1- TOTAL SOLIDS IN COOLING TOWER <= 7500 PPMV 2- WATER TREATMENT CHEMICALS CONTAINING HEXAVALENT CHROMIUM SHALL NOT BE ADDED TO WATER

Pollutant Information: LIBERTY GENERATING STATION - COOLING TOWER (3)- MECHANICAL DRAFT

*Pollutant Name	Particulate Matter < 10 µ (PM10)
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	NONE
Emission Limit 1:	7.9300
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.8100
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	BASIS OF LIMIT IS STATE.

*Pollutant Name	Total Suspended Particulates
*CAS Number:	PM
*Control Method Code:	N
*Control Method Description:	NONE
Emission Limit 1:	7.9300
Emission Limit 1 Unit:	T/YR
Emission Limit 1 Avg. Time/Condition:	

Emission Limit 2:	1.8100
Emission Limit 2 Unit:	LB/H
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	Y
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	BASIS OF LIMIT IS STATE.

NOTE: Draft determinations are marked with a " * " beside the RBLC ID.

Report Date: 03/26/2008 Control Technology Determinations (Freeform)

Facility Information: AMELLA ENERGY CENTER

RBLC ID:	TX-0386
*Corporate/Company Name:	CALPINE CONSTRUCTION FINANCE CO. LP
*Facility Name:	AMELLA ENERGY CENTER
Facility County:	JEFFERSON
Facility State:	TX
Facility ZIP Code:	
Facility Country:	USA
Facility Contact Name:	
Facility Contact Phone:	
Facility Contact Email:	
EPA Region:	6
Agency Code:	TX003
Agency Name:	CITY OF HOUSTON BUREAU AIR QUAL CTRL, TX
Agency Contact:	MR. RAMON PEREZ
Agency Phone:	(713)640-4225

Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: BTU-NO.4 REACTOR FEED HEATER
*Process Type: 13.390
Primary Fuel:
Throughput: 49.00
Throughput Unit: MMBTU/H
Process Notes:

Pollutant Information: LYONDELL - CITGO REFINING, LP - BTU-NO.4 REACTOR FEED HEATER

*Pollutant Name: Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method Description: SCR
Emission Limit 1: 1.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 7.7000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES
Standard Emission Limit: 0.0400
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:

Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 3.40 LB/H AND 15.00 T/YR,

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 4.0000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 17.7000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0800
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method: LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1

Description: GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1: 1.3000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 5.5000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0270
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1: 0.6300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 2.7400
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES
Standard Emission Limit: 0.0130

Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 0.37 LB/H AND 1.60 T/YR.

*Pollutant Name Benzene
*CAS Number: 71-43-2
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 0.0200
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.1100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NESHAP
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:

Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 0.2600
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.1600
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Ammonia (NH3)
*CAS Number: 7664-41-7
*Control Method Code: P
*Control Method Description: LEAK DETECTION AND REPAIR PROGRAM

Emission Limit 1: 0.2000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 0.8700
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: EMISSION LIMITS ARE APPLICABLE POST INSTALLATION OF SCR.

*Pollutant Name Visible Emissions (VE)
*CAS Number: VE
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 5.0000
Emission Limit 1 Unit: % OPACITY
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 5.0000
Standard Emission Limit Unit: % OPACITY
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A

Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	BTU-REFORMATE STABILIZER REBOILER
*Process Type:	13.390
Primary Fuel:	
Throughput:	54.77
Throughput Unit:	MMBTU/H
Process Notes:	EMISSION POINT NO. BTU-HF107.

Pollutant Information: LYONDELL - CITGO REFINING, LP - BTU-REFORMATE STABILIZER REBOILER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	SCR
Emission Limit 1:	2.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	8.6000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	0.0370
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD

Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 3.80 LB/H AND 16.80 T/YR.

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	4.5000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	19.8000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0800
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD

Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost

Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1: 1.4000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 6.2000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0260
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1: 0.7000

Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 3.0600
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES
Standard Emission Limit: 0.0130
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 0.41 LB/H AND 1.79 T/YR.

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 0.3000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.2900
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable: NSPS

Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Benzene
*CAS Number:	71-43-2
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	0.0300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1200
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NESHAP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance Notes:

*Pollutant Name	Ammonia (NH3)
*CAS Number:	7664-41-7
*Control Method Code:	P
*Control Method Description:	LEAK DETECTION AND REPAIR PROGRAM.
Emission Limit 1:	0.2200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.9800
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	ADDITIONAL EMISSION LIMIT: 10 PPMVD @ 3% O2. EMISSION LIMITS ARE APPLICABLE POST INSTALLATION OF SCR.

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	

Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	ISOM II WEST REACTOR FEED HEATER
*Process Type:	12.390
Primary Fuel:	
Throughput:	104.25
Throughput Unit:	MMBTU/H
Process Notes:	EMISSION POINT NO. BTU-HF106.

Pollutant Information: LYONDELL - CITGO REFINING, LP - ISOM II WEST REACTOR FEED HEATER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	SCR
Emission Limit 1:	3.8000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	16.4000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg.	SEE NOTES

Time/Condition:	
Standard Emission Limit:	0.0360
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 7.30 LB/H AND 32.00 T/YR.

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	8.6000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	37.6000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0820
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	

Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P
*Control Method Description: LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1: 2.7000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 11.7000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0260
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter (PM)

*CAS Number: PM
*Control Method Code: P
*Control Method Description: LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1: 1.3300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 5.8200
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES
Standard Emission Limit: 0.0130
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 0.78 LB/H AND 3.40 T/YR.

*Pollutant Name: Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 0.5600
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2.4600
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:

Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Benzene
*CAS Number:	71-43-2
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	0.0500
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.2200
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NESHAP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	

Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Ammonia (NH3)
*CAS Number:	7664-41-7
*Control Method Code:	P
*Control Method Description:	LEAK DETECTION AND REPAIR PROGRAM
Emission Limit 1:	0.4200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.8600
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method	NONE INDICATED

Description:
Emission Limit 1: 5.0000
Emission Limit 1 Unit: % OPACITY
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 5.0000
Standard Emission Limit Unit: % OPACITY
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

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*Process Name: ISOM II COMBINATION SPLITTER HEATER
*Process Type: 13.390
Primary Fuel:
Throughput: 77.62
Throughput Unit: MMBTU/H
Process Notes:

Pollutant Information: LYONDELL - CITGO REFINING, LP - ISOM II COMBINATION SPLITTER HEATER

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*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method SCR

Description:
Emission Limit 1: 2.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 12.2000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES
Standard Emission Limit: 0.0360
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 5.40 LB/H AND 23.80 T/YR.

*Pollutant Name Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 6.4000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 28.0000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0820
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED

*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1:	2.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	8.7000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0260
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1:	0.9900
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	4.3300
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	0.0130
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 0.58 LB/H AND 2.53 T/YR.

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	NONE INDICATED

Emission Limit 1: 0.4200
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.8300
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Benzene
*CAS Number: 71-43-2
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 0.0400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.1700
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A

Other Applicable Requirements: NESHAP
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Ammonia (NH_3)
*CAS Number: 7664-41-7
*Control Method Code: P
*Control Method Description: LEAK DETECTION AND REPAIR PROGRAM
Emission Limit 1: 0.3200
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.3800
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost

Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	ISOM II XYLENE RERUN TOWER HEATER
*Process Type:	13.390
Primary Fuel:	
Throughput:	83.70
Throughput Unit:	MMBTU/H
Process Notes:	

Pollutant Information: LYONDELL - CITGO REFINING, LP - ISOM II XYLENE RERUN TOWER HEATER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	SCR
Emission Limit 1:	3.0000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	13.2000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	0.0360
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 5.90 LB/H AND 25.70 T/YR.

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	6.9000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	30.2000

Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0800
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1:	2.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	9.4000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0260
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air	

pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1:	1.0600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	4.6700
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	0.0130
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance Notes: EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 0.62 LB/H AND 2.73 T/YR.

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 0.4500
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.9800
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Benzene
*CAS Number: 71-43-2
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 0.0400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.1800
Emission Limit 2 Unit: T/YR

Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NESHAP
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Ammonia (NH3)
*CAS Number: 7664-41-7
*Control Method Code: P
*Control Method Description: LEAK DETECTION AND REPAIR PROGRAM
Emission Limit 1: 0.3400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 1.4900
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:

*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	EMISSION LIMITS ARE APPLICABLE POST INSTALLATION OF SCR. ADDITIONAL EMISSION LIMIT: 10 PPMVD @ 3% O2.

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	ISOM II EAST REACTOR FEED HEATER
*Process Type:	13.390
Primary Fuel:	
Throughput:	75.00
Throughput Unit:	MMBTU/H
Process Notes:	EMISSION POINT NO. ISOMII-F5.

Pollutant Information: LYONDELL - CITGO REFINING, LP - ISOM II EAST REACTOR FEED HEATER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	SCR
Emission Limit 1:	2.7000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	11.8000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	0.0360
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 5.30 LB/H AND 23.00 T/YR.

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N

*Control Method Description:	NONE INDICATED
Emission Limit 1:	6.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	27.1000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0830
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1:	1.9000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	4.2000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0250
Standard Emission Limit	LB/MMBTU

Unit:	
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.
Emission Limit 1:	0.9600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	3.3200
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	0.0130
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	

Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 0.56 LB/H AND 2.45 T/YR.

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	0.4000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.7700
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Benzene
*CAS Number:	71-43-2
*Control Method Code:	N
*Control Method Description:	NONE INDICATED

Emission Limit 1:	0.0400
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1600
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NESHAP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Ammonia (NH3)
*CAS Number:	7664-41-7
*Control Method Code:	P
*Control Method Description:	LEAK DETECTION AND REPAIR PROGRAM
Emission Limit 1:	0.3100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	1.3400
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	

*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: EMISSION LIMITS ARE APPLICABLE POST INSTALLATION OF SCR. ADDITIONAL EMISSION LIMIT: 10 PPMDV @ 3% O2.

*Pollutant Name Visible Emissions (VE)
*CAS Number: VE
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 5.0000
Emission Limit 1 Unit: % OPACITY
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 5.0000
Standard Emission Limit Unit: % OPACITY
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: ORTHOXYLENE I HEATER
*Process Type: 13.390
Primary Fuel:
Throughput: 96.23
Throughput Unit: MMBTU/H
Process Notes: EMISSION POINT NO. ORTHOI-H1.

Pollutant Information: LYONDELL - CITGO REFINING, LP - ORTHOXYLENE I HEATER

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: A
*Control Method Description: SCR
Emission Limit 1: 3.5000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 15.2000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES
Standard Emission Limit: 0.0360
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost

Estimates:
Pollutants/Compliance Notes: ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 6.70 LB/H AND 29.50 T/YR.

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	7.9000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	34.7000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0820
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.
Emission Limit 1:	2.5000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	

Emission Limit 2:	10.8000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	0.0260
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM
*Control Method Code:	P
*Control Method Description:	LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.
Emission Limit 1:	1.2300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	5.3700
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	0.0130
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable	

Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 0.72 LB/H AND 3.14 T/YR.

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	0.5200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2.2700
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance Notes:	

*Pollutant Name	Benzene
*CAS Number:	71-43-2
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	0.0500
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.2100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NESHAP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Ammonia (NH3)
*CAS Number:	7664-41-7
*Control Method Code:	P
*Control Method Description:	LEAK DETECTION AND REPAIR PROGRAM.
Emission Limit 1:	0.3900
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	1.7200
Emission Limit 2 Unit:	T/YR

Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	EMISSION LIMITS ARE APPLICABLE POST INSTALLATION OF SCR. ADDITIONAL EMISSION LIMIT: 10 PPMDV @ 3% O2.

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	

*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	ORTHOXYLENE II HEATER
*Process Type:	12.390
Primary Fuel:	
Throughput:	226.42
Throughput Unit:	MMBTU/H
Process Notes:	EMISSION POINT NO.: ORTHOII-H2.

Pollutant Information: LYONDELL - CITGO REFINING, LP - ORTHOXYLENE II HEATER

*Pollutant Name	Nitrogen Oxides (NOx)
*CAS Number:	10102
*Control Method Code:	A
*Control Method Description:	SCR
Emission Limit 1:	8.2000
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	SEE NOTES
Emission Limit 2:	35.7000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	SEE NOTES
Standard Emission Limit:	0.0360
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	

Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO INSTALLATION OF SCR: 15.80 LB/H AND 69.40 T/YR.

*Pollutant Name: Carbon Monoxide
*CAS Number: 630-08-0
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 18.6000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 81.7000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0820
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Sulfur Dioxide (SO2)
*CAS Number: 7446-09-5
*Control Method Code: P

*Control Method Description: LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.
Emission Limit 1: 5.8000
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 25.5000
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 0.0260
Standard Emission Limit Unit: LB/MMBTU
Standard Limit Avg. Time/Condition: CALCULATED
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name: Particulate Matter (PM)
*CAS Number: PM
*Control Method Code: P
*Control Method Description: LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.
Emission Limit 1: 2.8900
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 12.6500
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES

Standard Emission Limit:	0.0130
Standard Emission Limit Unit:	LB/MMBTU
Standard Limit Avg. Time/Condition:	CALCULATED
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	ADDITIONAL EMISSION LIMITS APPLICABLE PRIOR TO THE INSTALLATION OF SCR: 1.69 LB/H AND 7.39 T/YR.

*Pollutant Name	Volatile Organic Compounds (VOC)
*CAS Number:	VOC
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	1.2200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	5.3500
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	

Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Benzene
*CAS Number:	71-43-2
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	0.1100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.4900
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NESHAP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Ammonia (NH_3)
*CAS Number:	7664-41-7
*Control Method Code:	P
*Control Method	LEAK DETECTION AND REPAIR PROGRAM.

Description:
Emission Limit 1: 0.9200
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: SEE NOTES
Emission Limit 2: 4.0400
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: SEE NOTES
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes: ADDITIONAL LIMIT OF 10 PPMVD @3% O2. EMISSION LIMITS ARE APPLICABLE POST INSTALLATION OF SCR.

*Pollutant Name Visible Emissions (VE)
*CAS Number: VE
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 5.0000
Emission Limit 1 Unit: % OPACITY
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2:
Emission Limit 2 Unit:
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit: 5.0000
Standard Emission Limit Unit: % OPACITY
Standard Limit Avg. Time/Condition:

*Case-by-Case Basis: N/A
Other Applicable Requirements: SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: BACKUP AIR COMPRESSOR ENGINES (1-5)
*Process Type: 19.800
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: COMBINED EMISSION LIMITS FOR 5 ENGINES WITH EMISSION POINT NO. ENG-AIR1 THROUGH ENG-AIR5. THESE ENGINES WILL BE SHUT DOWN. TOTAL OPERATING TIME FOR ALL 5 ENGINES SHALL NOT EXCEED 20,000 H/ROLLING 12-MO. THROUGHPUT AND FUEL TYPE NOT PROVIDED, BUT ASSUMED FUEL TO BE NATURAL GAS FOR THE PURPOSE OF ASSIGNING AN SCC CODE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - BACKUP AIR COMPRESSOR ENGINES (1-5)

*Pollutant Name Nitrogen Oxides (NOx)
*CAS Number: 10102
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 33.9400
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 67.8900
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:

Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance Notes:	

*Pollutant Name	Carbon Monoxide
*CAS Number:	630-08-0
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	4.2600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	8.5100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN

Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance Notes:	

*Pollutant Name	Sulfur Dioxide (SO2)
*CAS Number:	7446-09-5
*Control Method Code:	P
*Control Method Description:	LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.
Emission Limit 1:	4.7200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	9.4300
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Particulate Matter (PM)
*CAS Number:	PM

*Control Method Code: P
*Control Method Description: LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.
Emission Limit 1: 0.5600
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 1.1100
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name Volatile Organic Compounds (VOC)
*CAS Number: VOC
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 1.0600
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 2.1300
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:

Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: 633 DHT FUGITIVES
*Process Type: 50.007
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: EMISSION PT NO: 633-FUG. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - 633 DHT FUGITIVES

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: N
*Control Method Description:
Emission Limit 1: 0.0100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0300
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:

Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	TAIL GAS THERMAL OXIDIZERS (2)
*Process Type:	50.006
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	THE TWO TAIL GAS THERMAL OXIDIZERS (TGU-ICN AND TGU-ICN2) ARE PART OF THE SULFUR RECOVERY UNIT (SRU) COMPLEX.

Pollutant Information: LYONDELL - CITGO REFINING, LP - TAIL GAS THERMAL OXIDIZERS (2)

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	P
*Control Method Description:	LEAK DETECTION AND REPAIR PROGRAM.
Emission Limit 1:	0.0600
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH
Emission Limit 2:	0.2800
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	COMBINED

Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	NOT AVAILABLE
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	U
*Estimated Efficiency(%):	
Compliance Verified:	UNKNOWN
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	2004
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	BARGE LOADING
*Process Type:	50.004
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. LL19DOCKD

Pollutant Information: LYONDELL - CITGO REFINING, LP - BARGE LOADING

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	P
*Control Method Description:	LEAK DETECTION AND REPAIR.
Emission Limit 1:	7.7900
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	3.2600
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	

Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	TANK TRUCK LOADING
*Process Type:	50.004
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	

Pollutant Information: LYONDELL - CITGO REFINING, LP - TANK TRUCK LOADING

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	P
*Control Method Description:	LEAK DETECTION AND REPAIR
Emission Limit 1:	3.1900
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2.5000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit	

Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	(2) SOUR WATER TANKS
*Process Type:	50.009
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	COMBINED ENTRY FOR EMISSION POINT NOS. TK921 AND TK922

Pollutant Information: LYONDELL - CITGO REFINING, LP - (2) SOUR WATER TANKS

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	B
*Control Method Description:	SPECIFIC GUIDELINES IN PERMIT FOR PROPER COVER, MAINTENANCE, LDAR OF TANK. EMISSIONS WILL BE COLLECTED BY A VAPOR COLLECTION SYSTEM AND ROUTED TO A CONTROL DEVICE WITH A DESTRUCTION EFFICIENCY OF 98%.
Emission Limit 1:	0.0400
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	EACH
Emission Limit 2:	0.1100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	EACH
Standard Emission Limit:	

Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: (2) MOLTEN SULFUR STORAGE TANKS
*Process Type: 62.020
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes:

Pollutant Information: LYONDELL - CITGO REFINING, LP - (2) MOLTEN SULFUR STORAGE TANKS

*Pollutant Name: Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: B
*Control Method Description: SPECIFIC GUIDELINES IN PERMIT FOR PROPER COVER, MAINTENANCE, LDAR OF TANK. EMISSIONS WILL BE COLLECTED BY A VAPOR COLLECTION SYSTEM AND ROUTED TO A CONTROL DEVICE WITH A DESTRUCTION EFFICIENCY OF 98%.
Emission Limit 1: 0.0010
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: LESS THAN, EACH
Emission Limit 2: 0.0010
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: LESS THAN, EACH

Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: (2) SULFURIC ACID STORAGE TANKS
*Process Type: 62.020
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: COMBINED ENTRY FOR EMISSION PTS VES202 AND VES203

Pollutant Information: LYONDELL - CITGO REFINING, LP - (2) SULFURIC ACID STORAGE TANKS

*Pollutant Name: Sulfuric Acid (mist, vapors, etc).
*CAS Number: 7664-93-9
*Control Method Code: P
*Control Method Description: FOLLOW SPECIFIC PROCEDURES IN PERMIT FOR PROPER COVER, MAINTENANCE, LEAK DETECTION AND REPAIR ACCORDING TO THE VAPOR PRESSURE OF THE TANK CONTENTS.
Emission Limit 1: 0.0010
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: LESS THAN, EACH
Emission Limit 2: 0.0010
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: LESS THAN, EACH

Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	SULFUR PLANT FUGITIVES
*Process Type:	50.007
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. SRU-FE. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - SULFUR PLANT FUGITIVES

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	A
*Control Method Description:	EMISSIONS FROM S PITS, SEAL LEGS, AND SULFUR STORAGE TANKS WILL BE COLLECTED BY A VAPOR COLLECTION SYSTEM AND ROUTED TO A CONTROL DEVICE WITH AN EFFICIENCY OF 98% FOR THE H2S VAPORS ROUTED TO IT.
Emission Limit 1:	0.5100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	2.2200

Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Carbonyl Sulfide
*CAS Number:	463-58-1
*Control Method Code:	P
*Control Method Description:	ACID GAS OR OTHER WASTE GAS SHALL BE BURNED IN THE TGTOS AND/OR FLARE (EMERGENCY USE).
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	LESS THAN
Emission Limit 2:	0.0100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	LESS THAN
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the	

BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Carbon Disulfide
*CAS Number:	75-15-0
*Control Method Code:	P
*Control Method Description:	ACID GAS AND OTHER WASTE GAS SHALL BE BURNED IN THE TGTOS AND/OR FLARE (EMERGENCY USE)
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	LESS THAN
Emission Limit 2:	0.0100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	LESS THAN
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	SOUR WATER SYSTEM FUGITIVES
*Process Type:	50.007
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. SWS-FE. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDRED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - SOUR WATER SYSTEM FUGITIVES

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	A
*Control Method Description:	EMISSIONS WILL BE COLLECTED BY A VAPOR COLLECTION SYSTEM AND ROUTED TO A CONTROL DEVICE WITH A DESTRUCTION EFFICIENCY OF 98%.
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	LESS THAN
Emission Limit 2:	0.0100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	LESS THAN
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: AMINE TREATING UNITS NOS. 14 & 15 FUGITIVES
*Process Type: 50.007
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: EMISSION POINT NO. 1415-FE. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - AMINE TREATING UNITS NOS. 14 & 15 FUGITIVES

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: A
*Control Method Description: ALL WASTE GAS STREAMS FROM THE AMINE REGENERATION UNITS CONTAINING H2S &/OR VOC SHALL BE ROUTED TO THE SRUS. ONLY UNDER SSEM CONDITIONS SHALL THE STREAMS BE SENT TO THE FLARE.
Emission Limit 1: 0.2300
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.9900
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No

Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: NEW AMINE TREATING UNIT FUGITIVES
*Process Type: 50.007
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: EMISSION POINT NO. AMINE-FE. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - NEW AMINE TREATING UNIT FUGITIVES

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: A
*Control Method Description: ALL WASTE GAS STREAMS FROM THE AMINE REGENERATION UNITS CONTAINING H2S AND/OR VOC SHALL BE ROUTED TO THE SRUS. ONLY UNDER SSEM CONDITIONS SHALL THE STREAMS BE SENT TO THE FLARE.
Emission Limit 1: 0.1100
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.4900
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost

Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	50-TON AMINE TREATING UNIT FUGITIVES
*Process Type:	50.007
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. 50TN-FE. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - 50-TON AMINE TREATING UNIT FUGITIVES

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	A
*Control Method Description:	ALL WASTE GAS STREAMS FROM THE AMINE REGENERATION UNITS CONTAINING H2S AND/OR VOC SHALL BE ROUTED TO THE SRUS. ONLY UNDER START- UP, SHUT-DOWN, OR EMERGENCY CONDITIONS SHALL THE STREAMS BE SENT TO THE FLARE.
Emission Limit 1:	0.1500
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.6600
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	

*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	100-TON AMINE TREATING UNIT FUGITIVES
*Process Type:	50.007
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. 100TN-FE. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - 100-TON AMINE TREATING UNIT FUGITIVES

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	A
*Control Method Description:	ALL WASTE GAS STREAMS FROM THE AMINE REGENERATION UNITS CONTAINING H2S AND/OR VOC SHALL BE ROUTED TO THE SRUS. ONLY UNDER START- UP, SHUT-DOWN, OR EMERGENCY CONDITIONS SHALL THE STREAMS BE SENT TO THE FLARE.
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	LESS THAN
Emission Limit 2:	0.0100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	LESS THAN
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS

Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	FCCU CO BOILER WET GAS SCRUBBER
*Process Type:	50.003
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	

Pollutant Information: LYONDELL - CITGO REFINING, LP - FCCU CO BOILER WET GAS SCRUBBER

*Pollutant Name	Antimony / Antimony Compounds
*CAS Number:	7440-36-0
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.1000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	
Did factors, other then air	

pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	15.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	15.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	737 FUGITIVES
*Process Type:	50.007
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. 737-FUG. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - 737 FUGITIVES

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	0.0200
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0800
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance	

Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	636 FUGITIVES
*Process Type:	50.007
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. FU66HDS. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - 636 FUGITIVES

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0500
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	537 FUGITIVES
*Process Type:	50.007
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. 537-FUG. FUGITIVE EMISSIONS ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE.

Pollutant Information: LYONDELL - CITGO REFINING, LP - 537 FUGITIVES

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	N
*Control Method Description:	NONE INDICATED
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	LESS THAN
Emission Limit 2:	0.0100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost	

Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	TANK 599A
*Process Type:	42.009
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. TK599A. H2S EMISSIONS FROM CRUDE OIL ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE. HOWEVER, AT NO TIME SHALL THE EMISSIONS CAUSE A NUISANCE CONDITION.

Pollutant Information: LYONDELL - CITGO REFINING, LP - TANK 599A

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	P
*Control Method Description:	FOLLOW PROCEDURES SPECIFIED IN PERMIT FOR PROPER COVER, MAINTENANCE, LEAK DETECTION AND REPAIR ACCORDING TO VAPOR PRESSURE.
Emission Limit 1:	0.3700
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	1.6100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	

Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: TANKS 885 THROUGH 888
*Process Type: 42.009
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: COMBINED ENTRY FOR 4 TANKS WITH EMISSION PT NOS. TK885, TK886, TK887, AND TK888. H2S EMISSIONS FROM CRUDE OIL ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE. HOWEVER, AT NO TIME SHALL THE EMISSIONS CAUSE A NUISANCE CONDITION.

Pollutant Information: LYONDELL - CITGO REFINING, LP - TANKS 885 THROUGH 888

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: P
*Control Method Description: FOLLOW PROCEDURES IN PERMIT FOR PROPER COVER, MAINTENANCE, LEAK DETECTION AND REPAIR ACCORDING TO VAPOR PRESSURE.
Emission Limit 1: 0.3700
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition: EACH
Emission Limit 2: 1.5800
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition: EACH
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):

Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name: CRUDE OIL FUGITIVES
*Process Type: 50.007
Primary Fuel:
Throughput:
Throughput Unit:
Process Notes: H2S EMISSIONS FROM CRUDE OIL ARE AN ESTIMATE ONLY AND SHOULD NOT BE CONSIDERED A MAXIMUM ALLOWABLE EMISSION RATE. HOWEVER, AT NO TIME SHALL THE EMISSIONS CAUSE A NUISANCE CONDITION.

Pollutant Information: LYONDELL - CITGO REFINING, LP - CRUDE OIL FUGITIVES

*Pollutant Name Hydrogen Sulfide
*CAS Number: 7783-06-4
*Control Method Code: N
*Control Method Description: NONE INDICATED
Emission Limit 1: 0.0200
Emission Limit 1 Unit: LB/H
Emission Limit 1 Avg. Time/Condition:
Emission Limit 2: 0.0900
Emission Limit 2 Unit: T/YR
Emission Limit 2 Avg. Time/Condition:
Standard Emission Limit:
Standard Emission Limit Unit:
Standard Limit Avg. Time/Condition:
*Case-by-Case Basis: N/A
Other Applicable Requirements: NSPS
Did factors, other then air pollution technology considerations influence the

BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	FLARES
*Process Type:	19.330
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	COMBINED ENTRY FOR 4 FLARES WITH EMISSION POINT NOS. FL-3-COK (736 COKER FLARE), FL38 (MEROX FLARE), P-FL-4 (NO. 4 PLANT FLARE) AND HOUST-FL (HOUSTON STREET FLARE).

Pollutant Information: LYONDELL - CITGO REFINING, LP - FLARES

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	P
*Control Method Description:	OPERATE IN ACCORDANCE WITH 40 CFR 60.18 INCLUDING MINIMUM HEATING VALUE OF WASTE GAS, MAX TIP VELOCITY, AND PILOT FLAME MONITORING. FUEL GAS WILL BE ADDED FOR SUFFICIENT COMBUSTION IF NECESSARY.
Emission Limit 1:	0.0100
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	LESS THAN, EACH
Emission Limit 2:	0.0100
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	LESS THAN, EACH
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS

Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	6 MIN AV
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	6 MIN AV
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance	

Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	NO. 1 PLANT FLARE
*Process Type:	19.330
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. P-FL-1.

Pollutant Information: LYONDELL - CITGO REFINING, LP - NO. 1 PLANT FLARE

*Pollutant Name	Sulfur Trioxide
*CAS Number:	7446-11-9
*Control Method Code:	P
*Control Method Description:	OPERATE IN ACCORDANCE WITH 40 CFR 60.18 INCLUDING MINIMUM HEATING VALUE OF WASTE GAS, MAX TIP VELOCITY, AND PILOT FLAME MONITORING. FUEL GAS WILL BE ADDED FOR SUFFICIENT COMBUSTION IF NECESSARY.
Emission Limit 1:	0.0400
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0200
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	

Pollutants/Compliance Notes:

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	6 MIN AV
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	6 MIN AV
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	P
*Control Method Description:	OPERATE IN ACCORDANCE WITH 40 CFR 60.18 INCLUDING MINIMUM HEATING VALUE OF WASTE GAS, MAX TIP VELOCITY, AND PILOT FLAME MONITORING. FUEL GAS WILL BE ADDED FOR SUFFICIENT COMBUSTION IF NECESSARY.
Emission Limit 1:	3.9500
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	

Emission Limit 2:	2.0000
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	NO. 2 PLANT FLARE
*Process Type:	19.330
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. P-FL-2

Pollutant Information: LYONDELL - CITGO REFINING, LP - NO. 2 PLANT FLARE

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	P
*Control Method Description:	OPERATE IN ACCORDANCE WITH 40 CFR 60.18 INCLUDING MINIMUM HEATING VALUE OF WASTE GAS, MAX TIP VELOCITY, AND PILOT FLAME MONITORING. FUEL GAS WILL BE ADDED FOR SUFFICIENT COMBUSTION IF NECESSARY.
Emission Limit 1:	1.9900
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg.	

Time/Condition:	
Emission Limit 2:	2.1700
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance Notes:	

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	6 MIN AV
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	6 MIN AV
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Did factors, other then air	

pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

Process Information : LYONDELL - CITGO REFINING, LP

*Process Name:	NO. 3 PLANT FLARE
*Process Type:	19.330
Primary Fuel:	
Throughput:	
Throughput Unit:	
Process Notes:	EMISSION POINT NO. P-FL-3.

Pollutant Information: LYONDELL - CITGO REFINING, LP - NO. 3 PLANT FLARE

*Pollutant Name	Hydrogen Sulfide
*CAS Number:	7783-06-4
*Control Method Code:	P
*Control Method Description:	OPERATE IN ACCORDANCE WITH 40 CFR 60.18 INCLUDING MINIMUM HEATING VALUE OF WASTE GAS, MAX TIP VELOCITY, AND PILOT FLAME MONITORING. FUEL GAS WILL BE ADDED FOR SUFFICIENT COMBUSTION IF NECESSARY.
Emission Limit 1:	0.0300
Emission Limit 1 Unit:	LB/H
Emission Limit 1 Avg. Time/Condition:	
Emission Limit 2:	0.0200
Emission Limit 2 Unit:	T/YR
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	
Standard Emission Limit Unit:	
Standard Limit Avg. Time/Condition:	
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	NSPS

Did factors, other then air pollution technology considerations influence the BACT decisions?:
*Estimated Efficiency(%):
Compliance Verified:
Cost Effectiveness:
Incremental Cost Effectiveness:
Cost Verified By Agency (Y/N)?: No
Dollar Year Used In Cost Estimates:
Pollutants/Compliance Notes:

*Pollutant Name	Visible Emissions (VE)
*CAS Number:	VE
*Control Method Code:	N
*Control Method Description:	
Emission Limit 1:	5.0000
Emission Limit 1 Unit:	% OPACITY
Emission Limit 1 Avg. Time/Condition:	6 MIN AV
Emission Limit 2:	
Emission Limit 2 Unit:	
Emission Limit 2 Avg. Time/Condition:	
Standard Emission Limit:	5.0000
Standard Emission Limit Unit:	% OPACITY
Standard Limit Avg. Time/Condition:	6 MIN AV
*Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Did factors, other then air pollution technology considerations influence the BACT decisions?:	
*Estimated Efficiency(%):	
Compliance Verified:	
Cost Effectiveness:	
Incremental Cost Effectiveness:	
Cost Verified By Agency (Y/N)?:	No
Dollar Year Used In Cost Estimates:	
Pollutants/Compliance	

Notes:

Appendix B

Combustion Turbine and Boiler Performance Data and Supporting Calculations

Revised Table 1 based on February 2008 calculations

Pollutant	CTG, HRSG, Duct Burner (tons per year)	Package Boilers (tons per year)	Generator & Fuel Oil Storage (tons per year)	Total (tons per year)
PM10	31.8	65.7	0.1	97.6
SO2	8.9	76.9	0.1	85.9
NOX	13.7	28.9	1.9	44.5
CO	12.1	53.4	1.0	66.6
VOC	2.2	8.1	0.3	10.6
NH3	3.0	2.0	0.0	5.0

CTG potential emissions based on CTG burning natural gas with 90 days oil backup, duct burner burning natural gas only.

Table 1 contained in August 9, 2005 Approval	Difference
Total (tons per year)	Total (tons per year)
31.3	66.26
125.1	-39.22
44.1	0.39
49.2	17.38
13.5	-2.92
6.4	-1.40

Potential emissions for the package boilers as-built are based on the high pressure and one low pressure boiler burning oil at full load October 1 through April 30 (5,112 hours per boiler),and one low pressure burning oil at 50% load or the equivalent of 2556 hours and/or burning natural gas at 50% load or the equivalent of 2556 hours also October 1- April 30. One boiler (low pressure - 300 or 400) burning oil for (3672 hours May 1- Sept 30) and one low pressure boiler on standby burning oil at 50% load or the equivalent of 1836 hours and/or burning natural gas at 50% load or the equivalent of 1836 hours and the high pressure boiler operating on natural gas at full load from may 1- Sept 30.

Generator potential emissions are based on burning oil for 300 hours per year.

Table 1 contained in August 9, 2005 Approval

Pollutant	CTG, HRSG, Duct Burner (tons per year)	Package Boilers (tons per year)	Generator & Fuel Oil Storage (tons per year)	Total (tons per year)
PM10	6.3	24.8	0.2	31.3
SO2	9.0	116.0	0.1	125.1
NOX	11.7	24.8	7.6	44.1
CO	5.8	42.9	0.5	49.2
VOC	2.1	11.3	0.1	13.5
NH3	2.5	3.9	0.0	6.4

Revised Package Boiler Potential Emissions

October 1 - April 30

Pollutant	Boiler 200 (tons)	Boiler 300 (tons)	Boiler 400 (tons)	Total (tons)
PM10	17.7	16.0	10.0	43.7
SO2	21.3	21.3	10.9	53.5
NOx	6.9	6.2	4.9	18.0
CO	11.6	10.4	9.7	31.8
VOC	2.1	2.1	1.3	5.4
NH3	0.4	0.4	0.4	1.2

May 1 - September 30

Pollutant	Boiler 200 (tons)	Boiler 300 (tons)	Boiler 400 (tons)	Total (tons)
PM10	3.3	11.5	7.2	22.0
SO2	0.3	15.3	7.8	23.4
NOx	2.9	4.4	3.5	10.9
CO	7.2	7.5	7.0	21.6
VOC	0.3	1.5	0.9	2.7
NH3	0.3	0.3	0.3	0.8

Year-Round Totals

Pollutant	All Three Boilers Combined (tons per year)
PM10	65.7
SO2	76.9
NOx	28.9
CO	53.4
VOC	8.1
NH3	2.0

Potential emissions for the package boilers as-built are based on the high pressure and one low pressure boiler burning oil at full load October 1 through April 30 (5,112 hours per boiler),and one low pressure burning oil at 50% load or the equivalent of 2556 hours and/or burning natural gas at 50% load or the equivalent of 2556 hours also October 1- April 30. One boiler (low pressure - 300 or 400) burning oil for (3672 hours May 1- Sept 30) and one low pressure boiler on standby burning oil at 50% load or the equivalent of 1836 hours and/or burning natural gas at 50% load or the equivalent of 1836 hours and the high pressure boiler operating on natural gas at full load from May 1- Sept 30.

Table B Package Boiler Performance Data Revised

	Boiler 200 Natural Gas	Oil	Boiler 300 Natural Gas	Oil	Boiler 400 Natural Gas	Oil
Ambient Temperature (°F)	80	80	80	80	80	80
Steam Flow Rate (lb/hr)	125,000	125,000	125,000	125,000	125,000	125,000
Steam Temperature (°F)	740	740	466	466	466	466
Steam Pressure (psig)	625	625	200	200	200	200
Fuel Consumption (lb/hr)	7,956	8,907	7,174	8,017	7,174	8,017
Heat Input (MMBtu/hr)	179.72	173.41	162.06	156.07	162.06	156.07

The fuel consumption is based upon higher heating values of 1,022 Btu/scf for natural gas and 134,343 Btu/gal for motor vehicle diesel fuel.
Fuel Consumption and Heat Input above is at Ambient Temperature of 80F.
Maximum Heat Input and fuel consumption for the boilers would be at ambient temperature of 40 F

Table B Package Boiler Performance Data based on August 2005 Approval

	Natural Gas	Oil
Ambient Temperature (°F)	80	80
Steam Flow Rate (lb/hr)	131,250	131,250
Steam Temperature (°F)	460	460
Steam Pressure (psig)	175	175
Fuel Consumption (lb/hr)	7,803	8,332
Heat Input (MMBtu/hr)	170.1	162.2

The fuel consumption is based upon higher heating values of 1,000 Btu/scf for natural gas and 138,000 Btu/gal for motor vehicle diesel fuel.

Table E Criteria Pollutant Emissions from the Package Boilers (each unit) based on February 2008 recalculation

	Boiler 200						Boilers 300 and 400					
	Natural Gas (100% load)			Oil (100% load)			Natural Gas (100% load)			Oil (100% load)		
Pollutant	ppmvd	lb/hr	lb/MMBtu	ppmvd	lb/hr	lb/MMBtu	ppmvd	lb/hr	lb/MMBtu	ppmvd	lb/hr	lb/MMBtu
NOx	5.00	1.60	0.009	9.00	2.68	0.016	5.00	1.45	0.009	9.00	2.42	0.015
CO	20.00	3.90	0.022	25.00	4.54	0.026	20.00	3.52	0.022	25.00	4.08	0.026
PM10		1.80	0.010		6.94	0.040		1.62	0.010		6.24	0.040
SO2 (0.05 wt%S)		0.18	0.001		8.33	0.048		0.18	0.0011		8.33	0.053
VOC		0.17	0.001		0.81	0.005		0.17	0.0010		0.81	0.0052
H2SO4 (0.05 wt%S)		0.03			1.28			0.03			1.28	
NH3	2.00	0.16		2.00	0.17		2.00	0.14		2.00	0.15	

Table E Criteria Pollutant Emissions from the Package Boilers (each unit) contained in August 9, 2005 approval

	Natural Gas (100% load)			Oil (100% load)		
Pollutant	ppmvd	lb/hr	lb/MMBtu	ppmvd	lb/hr	lb/MMBtu
NOx	5.00	1.38	0.0061	9.00	2.38	0.011
CO	20.00	3.40	0.015	25.00	4.11	0.0190
PM10		2.27	0.010		2.38	0.011
SO2		0.24	0.0011		11.11	0.0514
VOC		0.23	0.0010		1.08	0.0050
H2SO4		0.04			1.70	
NH3	2.00	0.60		2.00	0.70	

Package Boilers @ 100% Load

Project Information

Project No.	**102998**
Client or Company Name:	**UMass Central Heating Plant**
Date of Report:	**02/05/08**
Boiler Manufacturer:	
Boiler Model No.:	

Stack Data

Stack Diameter:	4.5	feet
Stack Height:	125	feet
Site Elevation:	158	feet (above MSL)

Natural Gas	RECALC	
Heat Content:	1022	Btu/scf (HHV)
Fuel Density:	0.046	lb/scf
Heat Content:	22217	Btu/lb (HHV)
Sulfur Content	0.8	gr/100 ft3
Fuel Oil		
Heat Content:	134343	Btu/gal (HHV)
Fuel Density:	6.9	lb/gal
Heat Content:	19470	Btu/lb (HHV)
Sulfur Content:	0.05	% wt.
Alt. Sulfur Content:	0.0015	% wt.

Vendor Data Dated 12-28-07

	Natural Gas	Fuel Oil
Outlet NOx (ppmvdc 3% O2):	5	9
Outlet CO (ppmvdc 3% O2):	20	25
Outlet PM10 (lb/MMBtu):	0.01	0.04
Outlet SO2 (lb/MMBtu) Boiler 200:	0.001	0.048
Outlet SO2 (lb/MMBtu) Boiler 300/	0.0011	0.053
Outlet VOC (lb/MMBtu) Boiler 200	0.001	0.0045
Outlet VOC (lb/MMBtu) Boiler 300	0.0011	0.0052
Outlet NH3 (ppmvd@15%O2):	2	2

Package Boiler @ 100% Load Ambient Air Temperature 80 F

Revised Design and Performance Data for Each Boiler

			Boiler 200		Boiler 300		Boiler 400	
Fuel			Natural Gas	Fuel Oil	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil
Load (%)			100	100	100	100	100	100
Ambient Temperature (F)			80	80	80	80	80	80
Steam Flow (lb/hr)			125,000	125,000	125,000	125,000	125,000	125,000
Steam Pressure (psig)			625.00	625.00	200.00	200.00	200.00	200.00
Steam Temperature (F)			740.00	740.00	466.00	466.00	466.00	466.00
Fuel Consumption (lb/hr)			7,956	8,907	7,174	8,017	7,174	8,017
Heat Input (KBtu/hr)			179,720	173,410	162,060	156,070	162,060	156,070
Excess Air (%)			15	15	15	15	15	15
Combustion Air Flow (lb/hr):			150,569	152,670	135,771	137,407	135,771	137,407
Combustion Gas Flow (lb/hr):			158,524	161,550	142,945	145,399	142,945	145,399
Flue Gas Recirculation (lb/hr):			15,852	16,155	14,294	14,540	14,294	14,540
Flue Gas Recirculation (%):			10	10	10	10	10	10
Stack Gas Flow (acfm) based on data from Vanderweil			51,996	52,998	46,076	46,867	46,076	46,867
Stack Gas Temperature (F)			326	321	308	305	308	305
Stack Gas Velocity (fps)			54.49	55.54	48.28	49.11	48.28	49.11
Exhaust Composition (mole %):								
Nitrogen:	MW=	28	71.39	73.69	71.39	73.69	71.39	73.69
Argon:	MW=	40	0.00	0.00	0.00	0.00	0.00	0.00
Oxygen:	MW=	32	2.47	2.51	2.47	2.51	2.47	2.51
Carbon Dioxide:	MW=	44	8.32	11.33	8.32	11.33	8.32	11.33
Water:	MW=	18	17.82	12.47	17.82	12.47	17.82	12.47
Total			100.00	100.00	100.00	100.00	100.00	100.00
Exhaust Weight (lb/lbmole):			27.67	28.68	27.67	28.68	27.67	28.68
Emissions								
NO_x (ppmvd@3% O_2)			5.00	9.00	5.00	9.00	5.00	9.00
NO_x (lb/hr)			1.60	2.68	1.45	2.42	1.45	2.42
CO (ppmvd@3%O_2)			20.00	25.00	20.00	25.00	20.00	25.00
CO (lb/hr)			3.90	4.54	3.52	4.08	3.52	4.08
PM_{10} (lb/hr)			1.80	6.94	1.62	6.24	1.62	6.24
PM_{10} (lb/hr) (based on 0.02 lb/MMBtu on gas per Table 12b)			3.59		3.24		3.24	
SO_2 (lb/hr) (based on either 0.8gr/100scf or 0.05% S by wt. in oil)			0.40	8.91	0.36	8.02	0.36	8.02
SO_2 (lb/hr) (based on 0.0015% S by wt. in oil)				0.27		0.24		0.24
SO_2 (lb/hr) (based on vendor guarantee)			0.18	8.33	0.18	8.33	0.18	8.33
VOC (lb/hr)			0.17	0.81	0.17	0.81	0.17	0.81
H_2SO_4 (lb/hr) (based on 0.05% S by wt. in oil)			0.06	1.36	0.06	1.23	0.06	1.23
H_2SO_4 (lb/hr) (based on 0.0015% S by wt. in oil)				0.04		0.04		0.04
H_2SO_4 (lb/hr) (based on vendor SO_2 guarantee)			0.03	1.28	0.03	1.28	0.03	1.28
NH_3 (ppmvd @ 3% O_2)			2.00	2.00	2.00	2.00	2.00	2.00
NH_3 (lb/hr)			0.16	0.17	0.14	0.15	0.14	0.15

Fuel Use Based on 80 degree ambient temperature			
10/1-4/30	6598571.716	5939551.304	2969775.652
5/1-9/30		4238553.043	2119276.522

Package Boiler @ 75% Load Ambient Air Temperature 80 F

Revised Design and Performance Data for Each Boiler

					Boiler 200		Boiler 300		Boiler 400	
Fuel					Natural Gas	Fuel Oil	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil
Load (%)					100	100	100	100	100	100
Ambient Temperature (F)					80	80	80	80	80	80
Steam Flow (lb/hr) @ 100%					125,000	125,000	125,000	125,000	125,000	125,000
Steam Pressure (psig) @ 100%					625.00	625.00	200.00	200.00	200.00	200.00
Steam Temperature (F) @ 100%					466.00	466.00	466.00	466.00	466.00	466.00
Fuel Consumption (lb/hr)					5,895	6,628	5,341	5,966	5,341	5,966
Heat Input (KBtu/hr)					133,170	129,040	120,660	116,160	120,660	116,160
Excess Air (%)					15	15	15	15	15	15
Combustion Air Flow (lb/hr):					111,158	113,605	101,085	102,265	101,085	102,265
Combustion Gas Flow (lb/hr):					117,463	120,213	106,426	108,214	106,426	108,214
Flue Gas Recirculation (lb/hr):					11,746	12,021	10,643	10,821	10,643	10,821
Flue Gas Recirculation (%):					10	10	10	10	10	10
Stack Gas Flow (acfm) based on data from Vanderweil					37,138	37,887	33,063	33,420	33,063	33,420
Stack Gas Temperature (F)					294	291	279	277	279	277
Stack Gas Velocity (fps)					38.92	39.70	34.65	35.02	34.65	35.02
Exhaust Composition (mole %):										
Nitrogen:	MW=	28			71.39	73.69	71.39	73.69	71.39	73.69
Argon:	MW=	40			0.00	0.00	0.00	0.00	0.00	0.00
Oxygen:	MW=	32			2.47	2.51	2.47	2.51	2.47	2.51
Carbon Dioxide:	MW=	44			8.32	11.33	8.32	11.33	8.32	11.33
Water:	MW=	18			17.82	12.47	17.82	12.47	17.82	12.47
Total					100.00	100.00	100.00	100.00	100.00	100.00
Exhaust Weight (lb/lbmole):					27.67	28.68	27.67	28.68	27.67	28.68
Emissions										
NO_x (ppmvd@3% O_2)					5.00	9.00	5.00	9.00	5.00	9.00
NO_x (lb/hr)					1.19	2.00	1.08	1.80	1.08	1.80
CO (ppmvd@3%O_2)					20.00	25.00	20.00	25.00	20.00	25.00
CO (lb/hr)					2.89	3.38	2.62	3.04	2.62	3.04
PM_{10} (lb/hr)					1.33	5.16	1.21	4.65	1.21	4.65
PM_{10} (lb/hr) (based on 0.02 lb/MMBtu on gas per Table 12b)					2.66		2.41		2.41	
SO_2 (lb/hr) (based on 0.05% S by wt. in oil)					0.30	6.63	0.27	5.97	0.27	5.97
SO_2 (lb/hr) (based on 0.0015% S by wt. in oil)						0.20		0.18		0.18
SO_2 (lb/hr) (based on vendor guarantee)					0.13	6.19	0.13	6.16	0.13	6.16
VOC (lb/hr)					0.13	0.58	0.13	0.60	0.13	0.60
H_2SO_4 (lb/hr) (based on 0.05% S by wt. in oil)					0.05	1.01	0.04	0.91	0.04	0.91
H_2SO_4 (lb/hr) (based on 0.0015% S by wt. in oil)						0.03		0.03		0.03
H_2SO_4 (lb/hr) (based on vendor SO_2 guarantee)					0.02	0.95	0.02	0.94	0.02	0.94
NH_3 (ppmvd @ 3% O_2)					2.00	2.00	2.00	2.00	2.00	2.00
NH_3 (lb/hr)					0.12	0.13	0.11	0.11	0.11	0.11

Package Boiler @ 50% Load Ambient Air Temperature 80 F

Revised Design and Performance Data for Each Boiler

					Boiler 200		Boiler 300		Boiler 400	
Fuel					Natural Gas	Fuel Oil	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil
Load (%)					100	100	100	100	100	100
Ambient Temperature (F)					80	80	80	80	80	80
Steam Flow (lb/hr) @ 100%					125,000	125,000	125,000	125,000	125,000	125,000
Steam Pressure (psig) @ 100%					625.00	625.00	200.00	200.00	200.00	200.00
Steam Temperature (F) @ 100%					466.00	466.00	466.00	466.00	466.00	466.00
Fuel Consumption (lb/hr)					3,905	4,389	3,538	3,956	3,538	3,956
Heat Input (KBtu/hr)					88,220	85,440	79,920	77,010	79,920	77,010
Excess Air (%)					17	17	17	17	17	17
Combustion Air Flow (lb/hr):					75,199	76,531	68,124	68,982	68,124	68,982
Combustion Gas Flow (lb/hr):					79,104	80,907	71,662	72,926	71,662	72,926
Flue Gas Recirculation (lb/hr):					7,910	8,091	7,166	7,293	7,166	7,293
Flue Gas Recirculation (%):					10	10	10	10	10	10
Stack Gas Flow (acfm) based on data from Vanderweil					24,127	24,677	21,499	21,878	21,499	21,878
Stack Gas Temperature (F)					267	265	256	255	256	255
Stack Gas Velocity (fps)					25.28	25.86	22.53	22.93	22.53	22.93
Exhaust Composition (mole %):										
Nitrogen:	MW=	28			71.49	73.76	71.49	73.76	71.49	73.76
Argon:	MW=	40			0.00	0.00	0.00	0.00	0.00	0.00
Oxygen:	MW=	32			2.75	2.80	2.75	2.80	2.75	2.80
Carbon Dioxide:	MW=	44			8.19	11.14	8.19	11.14	8.19	11.14
Water:	MW=	18			17.57	12.29	17.57	12.29	17.57	12.29
Total					100.00	99.99	100.00	99.99	100.00	99.99
Exhaust Weight (lb/lbmole):					27.68	28.68	27.68	28.68	27.68	28.68
Emissions										
NO_x (ppmvd@3% O_2)					5.00	9.00	5.00	9.00	5.00	9.00
NO_x (lb/hr)					0.78	1.32	0.71	1.19	0.71	1.19
CO (ppmvd@3%O_2)					20.00	25.00	20.00	25.00	20.00	25.00
CO (lb/hr)					1.91	2.23	1.73	2.01	1.73	2.01
PM_{10} (lb/hr)					0.88	3.42	0.80	3.08	0.80	3.08
PM_{10} (lb/hr) (based on 0.02 lb/MMBtu on gas per Table 12b)					1.76		1.60		1.60	
SO_2 (lb/hr) (based on 0.05% S by wt. in oil)					0.20	4.39	0.18	3.96	0.18	3.96
SO_2 (lb/hr) (based on 0.0015% S by wt. in oil)						0.13		0.12		0.12
SO_2 (lb/hr) (based on vendor guarantee)					0.09	4.10	0.09	4.08	0.09	4.08
VOC (lb/hr)					0.09	0.38	0.09	0.40	0.09	0.40
H_2SO_4 (lb/hr) (based on 0.05% S by wt. in oil)					0.03	0.67	0.03	0.61	0.03	0.61
H_2SO_4 (lb/hr) (based on 0.0015% S by wt. in oil)						0.02		0.02		0.02
H_2SO_4 (lb/hr) (based on vendor SO_2 guarantee)					0.01	0.63	0.01	0.62	0.01	0.62
NH_3 (ppmvd @ 3% O_2)					2.00	2.00	2.00	2.00	2.00	2.00
NH_3 (lb/hr)					0.08	0.08	0.07	0.08	0.07	0.08

Revised

Table H Non-Criteria Pollutant Emissions from Package Boilers (per unit)

			Boiler 200		Boilers 300 and 400 (each)	
	Emission Factors [a]		Maximum Emission Rate [b]		Maximum Emission Rate [c]	
Pollutant	**Gas (lb/MMcf)**	**Oil (lb/Mgal)**	**Gas (lb/hr)**	**Oil (lb/hr)**	**Gas (lb/hr)**	**Oil (lb/hr)**
Lead [d]	5.00E-04	7.20E-04	8.79E-05	9.29E-04	7.93E-05	8.36E-04
Benzene	2.10E-03	2.14E-04	3.69E-04	2.76E-04	3.33E-04	2.49E-04
Dichlorobenzene	1.20E-03	0.00E+00	2.11E-04	0.00E+00	1.90E-04	0.00E+00
7,12-Dimethylbenz(a)anthracene	8.00E-06	0.00E+00	1.41E-06	0.00E+00	1.27E-06	0.00E+00
Ethyl Benzene	0.00E+00	6.36E-05	0.00E+00	8.21E-05	0.00E+00	7.39E-05
Formaldehyde	7.50E-02	3.30E-02	1.32E-02	4.26E-02	1.19E-02	3.83E-02
Hexane	1.80E+00	0.00E+00	3.17E-01	0.00E+00	2.85E-01	0.00E+00
2-Methylnapthalene	2.40E-05	0.00E+00	4.22E-06	0.00E+00	3.81E-06	0.00E+00
3-Methylchloranthene	9.00E-07	0.00E+00	1.58E-07	0.00E+00	1.43E-07	0.00E+00
Naphthalene	6.10E-04	1.13E-03	1.07E-04	1.46E-03	9.67E-05	1.31E-03
1,1,1-Trichloroethane	0.00E+00	2.36E-04	0.00E+00	3.05E-04	0.00E+00	2.74E-04
Toluene	3.40E-03	6.20E-03	5.98E-04	8.00E-03	5.39E-04	7.20E-03
o-Xylene	0.00E+00	1.09E-04	0.00E+00	1.41E-04	0.00E+00	1.27E-04
Acenapthene	9.00E-07	2.11E-05	1.58E-07	2.72E-05	1.43E-07	2.45E-05
Acenapthylene	9.00E-07	2.53E-07	1.58E-07	3.27E-07	1.43E-07	2.94E-07
Anthracene	1.20E-06	1.22E-06	2.11E-07	1.57E-06	1.90E-07	1.42E-06
Benz(a)anthracene	9.00E-07	4.01E-06	1.58E-07	5.18E-06	1.43E-07	4.66E-06
Benzo(a)pyrene	6.00E-07	0.00E+00	1.06E-07	0.00E+00	9.51E-08	0.00E+00
Benzo(b)fluoranthene	9.00E-07	0.00E+00	1.58E-07	0.00E+00	1.43E-07	0.00E+00
Benzo(b,k)fluoranthene	0.00E+00	1.48E-06	0.00E+00	1.91E-06	0.00E+00	1.72E-06
Benzo(k)fluoranthene	9.00E-07	0.00E+00	1.58E-07	0.00E+00	1.43E-07	0.00E+00
Benzo(g,h,i)perylene	6.00E-07	2.26E-06	1.06E-07	2.92E-06	9.51E-08	2.63E-06
Chrysene	9.00E-07	2.38E-06	1.58E-07	3.07E-06	1.43E-07	2.76E-06
Dibenzo(a,h)anthracene	6.00E-07	1.67E-06	1.06E-07	2.16E-06	9.51E-08	1.94E-06
Fluoranthene	3.00E-06	4.84E-06	5.28E-07	6.25E-06	4.76E-07	5.62E-06
Fluorene	2.80E-06	4.47E-06	4.92E-07	5.77E-06	4.44E-07	5.19E-06
Indo(1,2,3-cd)pyrene	9.00E-07	2.14E-06	1.58E-07	2.76E-06	1.43E-07	2.49E-06
Phenanthene	1.70E-05	1.05E-05	2.99E-06	1.36E-05	2.70E-06	1.22E-05
Pyrene	5.60E-06	4.25E-06	9.85E-07	5.49E-06	8.88E-07	4.94E-06
OCDD	0.00E+00	3.10E-09	0.00E+00	4.00E-09	0.00E+00	3.60E-09
Arsenic [e]	2.00E-04	1.24E-05	3.52E-05	1.60E-05	3.17E-05	1.44E-05
Beryllium	6.00E-06	4.03E-04	1.06E-06	5.20E-04	9.51E-07	4.68E-04
Cadmium	1.10E-03	4.03E-04	1.93E-04	5.20E-04	1.74E-04	4.68E-04
Chromium	1.40E-03	4.03E-04	2.46E-04	5.20E-04	2.22E-04	4.68E-04
Cobalt	8.40E-05	0.00E+00	1.48E-05	0.00E+00	1.33E-05	0.00E+00
Manganese	3.80E-04	8.06E-04	6.68E-05	1.04E-03	6.03E-05	9.36E-04
Mercury	2.60E-04	4.03E-04	4.57E-05	5.20E-04	4.12E-05	4.68E-04
Nickel	2.10E-03	5.37E-04	3.69E-04	6.94E-04	3.33E-04	6.24E-04
Selenium	1.20E-05	2.02E-03	2.11E-06	2.60E-03	1.90E-06	2.34E-03

[a] Based on emission factors cited in USEPA Document No. AP-42.

[b] Based on Boiler 200 firing natural gas at 179.7 MMBtu/hr or oil at 173.4 MMBtu/hr@ ambient condition of 80F.

[c] Based on Boiler 300 or Boiler 400 firing natural gas at 162.06 MMBtu/hr or oil at 156.07 MMBtu/hr @ ambient condition of 80F.

[d] Based on typical analysis of 500 ppm motor vehicle diesel fuel.

[e] Based on twice detection limit from typical diesel fuel analysis

	Boiler 200		Boilers 300 and 400 (each)	
Fuel	**Natural Gas**	**Fuel Oil**	**Natural Gas**	**Fuel Oil**
Load	100	100	100	100
Ambient Temperature (F)	80	80	80	80
Annual Hours (hr/yr)	8,760	8,760	8,760	8,760
Annual Emission (tpy)				
Lead	3.85E-04	4.07E-03	3.47E-04	3.66E-03
Benezene	1.62E-03	1.21E-03	1.46E-03	1.09E-03
Dichlorobenzene	9.24E-04	0.00E+00	8.33E-04	0.00E+00
7,12-Dimethylbenz(a)anthracene	6.16E-06	0.00E+00	5.56E-06	0.00E+00
Ethyl Benzene	0.00E+00	3.60E-04	0.00E+00	3.24E-04
Formaldehyde	5.78E-02	1.87E-01	5.21E-02	1.68E-01
Hexane	1.39E+00	0.00E+00	1.25E+00	0.00E+00
2-Methylnapthalene	1.85E-05	0.00E+00	1.67E-05	0.00E+00
3-Methylchloranthene	6.93E-07	0.00E+00	6.25E-07	0.00E+00
Naphthalene	4.70E-04	6.39E-03	4.24E-04	5.75E-03
1,1,1-Trichloroethane	0.00E+00	1.33E-03	0.00E+00	1.20E-03
Toluene	2.62E-03	3.51E-02	2.36E-03	3.15E-02
o-Xylene	0.00E+00	6.16E-04	0.00E+00	5.55E-04
Acenapthene	6.93E-07	1.19E-04	6.25E-07	1.07E-04
Acenapthylene	6.93E-07	1.43E-06	6.25E-07	1.29E-06
Anthracene	9.24E-07	6.90E-06	8.33E-07	6.21E-06
Benz(a)anthracene	6.93E-07	2.27E-05	6.25E-07	2.04E-05
Benzo(a)pyrene	4.62E-07	0.00E+00	4.17E-07	0.00E+00
Benzo(b)fluoranthene	6.93E-07	0.00E+00	6.25E-07	0.00E+00
Benzo(b,k)fluoranthene	0.00E+00	8.37E-06	0.00E+00	7.53E-06
Benzo(k)fluoranthene	6.93E-07	0.00E+00	6.25E-07	0.00E+00
Benzo(g,h,i)perylene	4.62E-07	1.28E-05	4.17E-07	1.15E-05
Chrysene	6.93E-07	1.35E-05	6.25E-07	1.21E-05
Dibenzo(a,h)anthracene	4.62E-07	9.44E-06	4.17E-07	8.50E-06
Fluoranthene	2.31E-06	2.74E-05	2.08E-06	2.46E-05
Fluorene	2.16E-06	2.53E-05	1.94E-06	2.27E-05
Indo(1,2,3-cd)pyrene	6.93E-07	1.21E-05	6.25E-07	1.09E-05
Phenanthene	1.31E-05	5.94E-05	1.18E-05	5.34E-05
Pyrene	4.31E-06	2.40E-05	3.89E-06	2.16E-05
OCDD	0.00E+00	1.75E-08	0.00E+00	1.58E-08
Arsenic	1.54E-04	7.02E-05	1.39E-04	6.32E-05
Beryllium	4.62E-06	2.28E-03	4.17E-06	2.05E-03
Cadmium	8.47E-04	2.28E-03	7.64E-04	2.05E-03
Chromium	1.08E-03	2.28E-03	9.72E-04	2.05E-03
Cobalt	6.47E-05	0.00E+00	5.83E-05	0.00E+00
Manganese	2.93E-04	4.56E-03	2.64E-04	4.10E-03
Mercury	2.00E-04	2.28E-03	1.81E-04	2.05E-03
Nickel	1.62E-03	3.04E-03	1.46E-03	2.73E-03
Selenium	9.24E-06	1.14E-02	8.33E-06	1.03E-02
Total HAPs	1.45E+00	2.64E-01	1.31E+00	2.38E-01

	Boiler 200		Boilers 300 and 400 (each)	
Fuel	**Natural Gas**	**Fuel Oil**	**Natural Gas**	**Fuel Oil**
Model Input (g/s)				
Lead	1.11E-05	1.17E-04	9.99E-06	1.05E-04
Benezene	4.65E-05	3.48E-05	4.20E-05	3.13E-05
Dichlorobenzene	2.66E-05	0.00E+00	2.40E-05	0.00E+00
7,12-Dimethylbenz(a)anthracene	1.77E-07	0.00E+00	1.60E-07	0.00E+00
Ethyl Benzene	0.00E+00	1.03E-05	0.00E+00	9.31E-06
Formaldehyde	1.66E-03	5.37E-03	1.50E-03	4.83E-03
Hexane	3.99E-02	0.00E+00	3.60E-02	0.00E+00
2-Methylnapthalene	5.32E-07	0.00E+00	4.80E-07	0.00E+00
3-Methylchloranthene	1.99E-08	0.00E+00	1.80E-08	0.00E+00
Naphthalene	1.35E-05	1.84E-04	1.22E-05	1.65E-04
1,1,1-Trichloroethane	0.00E+00	3.84E-05	0.00E+00	3.45E-05
Toluene	7.53E-05	1.01E-03	6.79E-05	9.08E-04
o-Xylene	0.00E+00	1.77E-05	0.00E+00	1.60E-05
Acenapthene	1.99E-08	3.43E-06	1.80E-08	3.09E-06
Acenapthylene	1.99E-08	4.11E-08	1.80E-08	3.70E-08
Anthracene	2.66E-08	1.98E-07	2.40E-08	1.79E-07
Benz(a)anthracene	1.99E-08	6.52E-07	1.80E-08	5.87E-07
Benzo(a)pyrene	1.33E-08	0.00E+00	1.20E-08	0.00E+00
Benzo(b)fluoranthene	1.99E-08	0.00E+00	1.80E-08	0.00E+00
Benzo(b,k)fluoranthene	0.00E+00	2.41E-07	0.00E+00	2.17E-07
Benzo(k)fluoranthene	1.99E-08	0.00E+00	1.80E-08	0.00E+00
Benzo(g,h,i)perylene	1.33E-08	3.68E-07	1.20E-08	3.31E-07
Chrysene	1.99E-08	3.87E-07	1.80E-08	3.48E-07
Dibenzo(a,h)anthracene	1.33E-08	2.72E-07	1.20E-08	2.44E-07
Fluoranthene	6.65E-08	7.87E-07	5.99E-08	7.08E-07
Fluorene	6.20E-08	7.27E-07	5.59E-08	6.54E-07
Indo(1,2,3-cd)pyrene	1.99E-08	3.48E-07	1.80E-08	3.13E-07
Phenanthene	3.77E-07	1.71E-06	3.40E-07	1.54E-06
Pyrene	1.24E-07	6.91E-07	1.12E-07	6.22E-07
OCDD	0.00E+00	5.04E-10	0.00E+00	4.54E-10
Arsenic	4.43E-06	2.02E-06	4.00E-06	1.82E-06
Beryllium	1.33E-07	6.55E-05	1.20E-07	5.90E-05
Cadmium	2.44E-05	6.55E-05	2.20E-05	5.90E-05
Chromium	3.10E-05	6.55E-05	2.80E-05	5.90E-05
Cobalt	1.86E-06	0.00E+00	1.68E-06	0.00E+00
Manganese	8.42E-06	1.31E-04	7.59E-06	1.18E-04
Mercury	5.76E-06	6.55E-05	5.19E-06	5.90E-05
Nickel	4.65E-05	8.74E-05	4.20E-05	7.87E-05
Selenium	2.66E-07	3.28E-04	2.40E-07	2.95E-04

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Additional Predicted Performance Data Rev. 2

Low Pressure Boilers					
100% MCR					
Natural Gas Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	7147	7174	7213	7260
Combustion air Flow	Lbs/hr	136621	135771	135747	136271
Excess Air	%	15	15	15	15
Flue Gas Recirculation Flow	Lbs/Hr	14377	14294	14296	14353
Stack Gas Flow	Lbs/Hr	143768	142945	142960	143531
Economizer Outlet Flow	°F	310	308	308	308
Heat Input	MMBtu/Hr	161.45	162.06	162.94	164.00
Flue Gas Analysis					
CO_2	% Vol	8.20	8.32	8.39	8.42
H_2O	% Vol	19.02	17.82	17.14	16.82
N_2	% Vol	70.35	71.39	71.98	72.26
O_2	% Vol	2.43	2.47	2.49	2.50

Low Pressure Boilers					
75% MCR					
Natural Gas Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	5316	5341	5357	5392
Combustion air Flow	Lbs/hr	101631	101085	100818	101205
Excess Air	%	15	15	15	15
Flue Gas Recirculation Flow	Lbs/Hr	10695	10643	10618	10660
Stack Gas Flow	Lbs/Hr	106947	106426	106175	106597
Economizer Outlet Flow	°F	281	279	279	279
Heat Input	MMBtu/Hr	120.10	120.66	121.02	121.80
Flue Gas Analysis					
CO_2	% Vol	8.20	8.32	8.39	8.42
H_2O	% Vol	19.02	17.82	17.14	16.82
N_2	% Vol	70.35	71.39	71.98	72.26
O_2	% Vol	2.43	2.47	2.49	2.50

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Low Pressure Boilers					
50% MCR					
Natural Gas Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	3519	3538	3550	3573
Combustion air Flow	Lbs/hr	68446	68124	67970	68236
Excess Air	%	17	17	17	17
Flue Gas Recirculation Flow	Lbs/Hr	7197	7166	7152	7181
Stack Gas Flow	Lbs/Hr	71965	71662	71520	71809
Economizer Outlet Flow	°F	257	256	256	256
Heat Input	MMBtu/Hr	79.56	79.92	80.19	80.72
Flue Gas Analysis					
CO2	% Vol	8.07	8.19	8.26	8.29
H2O	% Vol	18.77	17.57	16.89	16.56
N2	% Vol	70.44	71.49	72.08	72.36
O2	% Vol	2.71	2.75	2.77	2.79

Low Pressure Boilers					
100% MCR					
Oil Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	8008	8017	8092	8141
Combustion air Flow	Lbs/hr	138642	137407	137926	138390
Excess Air	%	15	15	15	15
Flue Gas Recirculation Flow	Lbs/Hr	14663	14540	14599	14651
Stack Gas Flow	Lbs/Hr	146625	145399	145993	146507
Economizer Outlet Flow	°F	306	256	304	305
Heat Input	MMBtu/Hr	155.90	156.07	157.55	158.49
Flue Gas Analysis					
CO2	% Vol	11.16	11.33	11.42	11.47
H2O	% Vol	13.78	12.47	11.72	11.37
N2	% Vol	72.59	73.69	74.32	74.62
O2	% Vol	2.47	2.51	2.53	2.54

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Low Pressure Boilers					
75% MCR					
Oil Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	5941	5966	5989	6025
Combustion air Flow	Lbs/hr	102868	102265	102074	102417
Excess Air	%	15	15	15	15
Flue Gas Recirculation Flow	Lbs/Hr	10879	10821	10804	10842
Stack Gas Flow	Lbs/Hr	108791	108214	108045	108423
Economizer Outlet Flow	°F	278	277	276	277
Heat Input	MMBtu/Hr	115.67	116.16	116.59	117.30
Flue Gas Analysis					
CO2	% Vol	11.16	11.33	11.42	11.47
H2O	% Vol	13.78	12.47	11.72	11.37
N2	% Vol	72.59	73.69	74.32	74.62
O2	% Vol	2.47	2.51	2.53	2.54

Low Pressure Boilers					
50% MCR					
Oil Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	3938	3956	3966	3993
Combustion air Flow	Lbs/hr	69374	68982	68773	69060
Excess Air	%	17	17	17	17
Flue Gas Recirculation Flow	Lbs/Hr	7330	7293	7273	7304
Stack Gas Flow	Lbs/Hr	73300	72926	72727	73041
Economizer Outlet Flow	°F	255	255	254	254
Heat Input	MMBtu/Hr	76.68	77.01	77.21	77.68
Flue Gas Analysis					
CO2	Vol %	10.98	11.14	11.24	11.28
H2O	Vol %	13.61	12.29	11.55	11.19
N2	Vol %	72.65	73.76	74.39	74.69
O2	Vol %	2.76	2.80	2.82	2.84

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High Pressure Boiler					
100% MCR					
Natural Gas Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	7915	7956	8005	8057
Combustion air Flow	Lbs/hr	151297	150569	150651	151234
Excess Air	%	15	15	15	15
Flue Gas Recirculation Flow	Lbs/Hr	15921	15852	15866	15929
Stack Gas Flow	Lbs/Hr	159212	158524	158656	159291
Economizer Outlet Flow	°F	328	326	326	326
Heat Input	MMBtu/Hr	178.79	179.72	180.83	182.01
Flue Gas Analysis					
CO2	% Vol	8.20	8.32	8.39	8.42
H2O	% Vol	19.02	17.82	17.14	16.82
N2	% Vol	70.35	71.39	71.98	72.26
O2	% Vol	2.43	2.47	2.49	2.50

High Pressure Boiler					
75% MCR					
Natural Gas Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	5868	5895	5923	5956
Combustion air Flow	Lbs/hr	112165	11158	111464	111793
Excess Air	%	15	15	15	15
Flue Gas Recirculation Flow	Lbs/Hr	11803	11746	11739	11775
Stack Gas Flow	Lbs/Hr	118033	117463	117386	117749
Economizer Outlet Flow	°F	295	294	293	293
Heat Input	MMBtu/Hr	132.55	133.17	133.80	134.54
Flue Gas Analysis					
CO2	% Vol	8.20	8.32	8.39	8.42
H2O	% Vol	19.02	17.82	17.14	16.82
N2	% Vol	70.35	71.39	71.98	72.26
O2	% Vol	2.43	2.47	2.49	2.50

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High Pressure Boiler					
50% MCR					
Natural Gas Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	3888	3905	3937	3946
Combustion air Flow	Lbs/hr	75624	75199	75372	75363
Excess Air	%	17	17	17	17
Flue Gas Recirculation Flow	Lbs/Hr	7951	7910	7931	7931
Stack Gas Flow	Lbs/Hr	79512	79104	79308	79310
Economizer Outlet Flow	°F	268	267	267	267
Heat Input	MMBtu/Hr	87.84	88.22	88.93	89.15
Flue Gas Analysis					
CO2	% Vol	8.07	8.19	8.26	8.29
H2O	% Vol	18.77	17.57	16.89	16.56
N2	% Vol	70.44	71.49	72.08	72.36
O2	% Vol	2.71	2.75	2.77	2.79

High Pressure Boiler					
100% MCR					
Oil Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	8879	8907	8970	9024
Combustion air Flow	Lbs/hr	153719	152670	152883	153399
Excess Air	%	15	15	15	15
Flue Gas Recirculation Flow	Lbs/Hr	16257	16155	16183	16240
Stack Gas Flow	Lbs/Hr	162571	161550	161825	162395
Economizer Outlet Flow	°F	323	321	321	321
Heat Input	MMBtu/Hr	172.82	173.41	174.63	175.68
Flue Gas Analysis					
CO2	% Vol	11.16	11.33	11.42	11.47
H2O	% Vol	13.78	12.47	11.72	11.37
N2	% Vol	72.59	73.69	74.32	74.62
O2	% Vol	2.47	2.51	2.53	2.54

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High Pressure Boiler					
75% MCR					
Oil Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	6592	6628	6648	6688
Combustion air Flow	Lbs/hr	114135	113605	113311	113692
Excess Air	%	15	15	15	15
Flue Gas Recirculation Flow	Lbs/Hr	12071	12021	11994	12036
Stack Gas Flow	Lbs/Hr	120707	120213	119939	120360
Economizer Outlet Flow	°F	292	291	290	291
Heat Input	MMBtu/Hr	128.34	129.04	129.43	130.21
Flue Gas Analysis					
CO2	% Vol	11.16	11.33	11.42	11.47
H2O	% Vol	13.78	12.47	11.72	11.37
N2	% Vol	72.59	73.69	74.32	74.62
O2	% Vol	2.47	2.51	2.53	2.54

High Pressure Boiler					
50% MCR					
Oil Fired	Units				
Combustion Air Temperature	°F	100	80	60	40
Fuel Flow	Lbs/hr	4366	4389	4415	4442
Combustion air Flow	Lbs/hr	76898	76531	76568	76831
Excess Air	%	17	17	17	17
Flue Gas Recirculation Flow	Lbs/Hr	8125	8091	8097	8126
Stack Gas Flow	Lbs/Hr	81250	80907	80970	81260
Economizer Outlet Flow	°F	266	265	265	265
Heat Input	MMBtu/Hr	84.99	85.44	85.96	86.49
Flue Gas Analysis					
CO2	% Vol	10.98	11.14	11.24	11.28
H2O	% Vol	13.61	12.29	11.55	11.19
N2	% Vol	72.65	73.76	74.39	74.69
O2	% Vol	2.76	2.80	2.82	2.84

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Emissions Summary (Low Pressure Units)

	Units	Natural Gas Fired	#2 Oil Fired
NOx	PPM (ref to 3% O2)	5	9
CO	PPM (ref to 3% O2)	20	25
PM/PM10	Lbs/MMBtu	0.01	0.04
VOC	Lbs/Hr (lbs/MMBtu*)	0.17 (0.0011)	0.81 (0.0052)
NH3 Slip	PPM (ref to 3% O2)	2	2
SOx	Lbs/Hr (lbs/MMBtu*)	0.18 (0.0011)	8.33 (0.053)

- Based on heat input at 100% MCR and 80°F ambient air

Emissions Summary (High Pressure Unit)

	Units	Natural Gas Fired	#2 Oil Fired
NOx	PPM (ref to 3% O2)	5	9
CO	PPM (ref to 3% O2)	20	25
PM/PM10	Lbs/MMBtu	0.01	0.04
VOC	Lbs/Hr (lbs/MMBtu*)	0.17 (0.0010)	0.81 (0.0045)
NH3 Slip	PPM (ref to 3% O2)	2	2
SOx	Lbs/Hr (lbs/MMBtu*)	0.18 (0.0010)	8.33 (0.048)

* Based on heat input at 100% MCR and 80°F ambient air

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SURVEY OF ULTRA-TRACE METALS IN GAS TURBINE FUELS

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Gas turbines are multi-fuel capable power generation systems. Because of their robust design, they can operate on low heating value gases, liquid fuels, natural gases and refinery gases. In a recent industry study, the environmental impact related to gas turbine operation on fuel oil was determined based on the available emissions data for metal emissions from gas turbines. Data collected by EPA reported the noted detectable trace metal emissions during oil operation. However, many of the tests were over fifteen years old, and fuel from the storage tanks at the facility may have been even older. Attempts to determine an accurate environmental assessment were hindered by the quality of the emissions data, and the paucity of fuel sample analytical results for distillate fuels..

Considering the great improvements in the US refining infrastructure, we concluded that any metals in a distillate fuel oil sample would probably be at the ultra-trace level, and would very likely be at the detection limits of the most analytical methods. Further, the concentrations of any hazardous metals (such as lead or mercury) would be extremely low, and the modeled emissions from using such a fuel would yield no measurable health impact. To address this question, we reviewed the existing literature on the subject, and found that no coordinated effort had attempted to identify the concentrations of trace hazardous metals, certainly not using some of the latest measurement methods (in this case ICP-MS).

The next step was to collect samples, and screen them for the presence of eight hazardous metals. Fuel samples (distillate) were collected from around the United States, taken from existing storage facilities, with fuel tanks assigned to a gas turbine power generation unit. Samples were taken to be representative of each Petroleum Administrative Defense Districts (PADD). The survey results revealed no measurable concentrations of Arsenic, Mercury or Lead in any fuel sample taken. No detectable levels of Chromium VI were reported. All samples were screened using Mass-Spec, with detection levels below 1 ppb. These results indicate that the distillate feedstocks available to the power generation industry are essentially free of toxic metals, and pose no health risk to the public when used in a gas turbine. The results also suggest that the petroleum distillate transmission and distribution system does not introduce cross contamination to the fuel supply.

Introduction

Non-combustible materials present in a fuel are typically released into the environment during the combustion process. With low-grade fuels, such as residual fuel oil or coal, metals, including toxic metals can be present in significant concentrations. Such is not the case for distillate fuels. Yet, there has been a widely held perspective that distillate fuels encumbered with potentially toxic metals.

The metals of most concern are those that exhibit a high degree of toxicity, or carcinogenicity, at very low concentrations. Mercury and lead are two key metals where there has been intense interest to reduce or eliminate their release into the environment. Removal of lead from gasoline, and switching to cleaner fuels has had a positive impact in reducing these emissions into the environment. In the twenty years since the removal of lead from gasoline was mandated there has been a steady decrease in lead emissions, and a steady increase in the quality of liquid fuels available for the power generation industry. As the results show here, the quality of distillate fuels is exceptional, and the metal contaminants found in liquid fuel oil are even lower than those mandated in drinking water.

Experimental

Samples from across the US were collected at storage facilities supplying fuel to power generation installations. Thirteen samples were collected and analyzed using ion mass spectrometry to identify the presence of specific metal toxins in the fuels

The toxic metals selected for this study were based on the need for conducting an environmental health risk analysis related to gas turbine operation. In the risk analysis, emissions from a gas or fuel oil fired gas turbine were determined based on the mass emission rates of each toxic component. Both organic and inorganic emissions were used in the health risk analysis. For liquid fuel (No. 2 fuel oil) operation, the analysis assumed that any metal in the exhaust was due to the presence of metals in the fuel oil. In the initial phase of the study, the dominant metal of concern (based on results of emission tests on gas turbines) was chromium, since emission measurements of chromium yielded the highest emission factors. Yet with chromium, the dominant risk is the Cr-VI oxidation state. However, the existing emissions test data did not attempt to quantify the oxidation state of any metals reportedly detected in the exhaust.

Routine industrial fuel tests, with metal detection levels in the ppm range, report measurable concentrations of arsenic and lead. However, the metals are almost routinely reported at the detection limits of the apparatus, which was not sufficient for our needs. In the risk analysis, the presence of either arsenic or lead at the ppm level would calculate unacceptable risk levels. To address the accuracy of the earlier fuel tests, and to estimate health risks related to emissions from burning liquid fuels, the set of metals selected for a detailed ultra-trace survey was selected. Those metals in selected are shown in the following table.

1. Arsenic	5. Nickel
2. Cadmium	6. Manganese
3. Chromium	7. Selenium
4. Lead	8. Mercury

Analytical Method

Fuel characterization methods have been used extensively to quantify the presence of various components, including metals, in fuel oil. Historically, most of the test methods have cutoff their analysis at the 1 ppm (1,000 ppb) level, and usually this has been sufficient. But to accurately determine the impact of burning liquid fuel, and the subsequent release of any metals into the environment, it has been necessary to push for a deeper and more thorough analysis using improved methods methods. For this study, an Inductively Coupled Plasmas-Mass Spectrometer (Thermo-Elemental X7 ICP/MS) was used. It uses a high temperature plasma between 6000 K and 8000 K, connected to a high sensitivity mass spectrometer. The plasma is formed in an RF chamber, where the sample can be delivered as a solution, vapor, or even solid. The mass spectrometer is a quadrapole mass-spec designed to rapidly measure ions at each mass unit. Detection limits are species dependent, and range from parts-per-trillion (ppt) to parts-per-billion (ppb).

No. 2 Fuel Oil Analysis Results

The results of the survey show that No.2 Fuel Oil to be remarkably clean and of high quality. A detailed summary of the analytical results is shown in Table 1. the most prevalent compound in the fuel samples was chromium, although no Cr-VI was detected. The fuels were essentially free of arsenic, cadmium, selenium, and mercury. The concentration of arsenic permitted in drinking water is higher than the quantities reported in the fuel samples.

Table 1. Summary Of Distillate Oil ICP Results.

Metal Analysis from Fuel Samples Selected from Across United States
Samples collected from Gas Turbine Installations around the United States

All concentrations are reported in units of ppb (by weight)

	State or Region	Sample ID	PADD	Arsenic	Cadmium	Total Chromium	Chrome VI	Lead	Manganese	Nickel	Selenium	Mercury
1	California	30352	V	0	0	175	0	3.01	6.9	0	0	0
2	Colorado	30374	IV	0	0	203	0	1.89	6.73	0	0	0
3	Florida	30391	III	0	0	244.6	0	3.48	5.56	0	0	0
4	Wisconsin	30353	III	0	0	226.8	0	2.07	6.03	4.93	0	0
5	Florida	30354	III	0	0	238.2	0	5.29	5.76	12.33	0	0
6	Minnesota	30355	II	0	0	272.1	0	7.2	6.35	184.77	0	0
7	California-South	30405	V	0	0	175.8	0	18.79	10.07	15.05	0	0
8	NC	30423	III	0	0	259.16	0	2.3	6.61	28.95	0	0
9	Arkansas	30424	IV	0	0	202.49	0	46.18	10.95	28.2	0	0
10	Arkansas	30447	IV	0	0	403		61	0	0	0	0
11	Arizona	30494	IV	0	0	306		41	0	0	0	0
12	California-North	30522	V	0	0	165	0	0	0	0	0	0
13	Maine	30425	I	0	0	279.88	0	2.59	7.11	101.78	0	0
	Average			0	0	242.4		15.0	5.5	28.9	0	0
	SD			0	0	65.05		20.59	3.53	54.51	0	0
	Max			0	0	403		61	10.95	184.77	0	0
	Detection Limit, ppb			0.9	0.1	0.07		0.08	0.1	0.2	5	0.2

Comparison with Other Fuel Samples.

As the name implies, residual fuel is the components of the petroleum feedstock that remain after distillation. Because of the nature of the distillation process (atmospheric or vacuum), most of the heavy metals would be expected to be found in the residual fuel oil. This appears to be the general rule that is easily demonstrated.

However, the mere presence of a metal, such as chromium, in the fuel, does not necessarily imply that it is in a toxic form in the turbine exhaust. For chromium, the oxidation state of concern is the +6. A 1998 survey of industrial boilers using heavy oil reported that the metal of critical concern was Nickel. In the case of Nickel, it is the presence of nickel-subsulfide (Ni2S3) that is the hazardous component. But it is not the nickel oxide of concern, NiO, but the nickel subsulfide (Ni2S3). However, nickel sub-sulfide is in a reduced state, a condition that should be difficult to maintain in intense industrial burner.

With the recent regulatory focus on a wide range of industries, there has been intense focus to determine what compounds represent any real, or potential hazard. A recent survey of residual fuels used in large boilers indicated that nickel was present in ranges from 30-40 ppm, significantly higher than the levels of nickel observed in the current fuel study)(1). Stack test measurements revealed that there was no evidence of reduced nickel in the particulates, indicating that good combustion (and excess oxygen levels) are effective means of fully oxidizing all the compounds in the fuel. We would expect similar results from the nickel present in the No. 2 fuel oil samples noted in this study.

In a 1999 survey of crude oil samples, McGaw reported data on 18 metals trace metals in a wide range of crude oil samples(2). A comparison of the average concentrations found in the McGaw reveals are markedly improved compared to the distillate samples from this study.

Table 2. Comparison Of Crude Samples With Distillate Results

Metal	As	Cr	Pb	Ni	Hg	Cd
Concentration in crude oil samples (McGaw 1999 study), ppb	60	270	32	19690	60	10
Concentrations in distillate fuel oil (this study). ppb	0	242	15	28	0	0

In a study on Iowa ground water quality, researchers used similar techniques as those selected here to identify any role between underground storage of fuels and possible aquifer contamination.3

The Iowa ground water survey examined transportation fuels, which are even more tightly specified than the fuels used in gas turbines. The authors of that study also failed to identify the presence of any mercury in No. 2 diesel fuels taken from selected regional sources. The highest chromium reported in the study was only 31 ppb, although there was no attempt to identify the presence of any specific oxidation states of the chromium. In essence, this earlier study from a relatively select group of sources further confirms the high quality, and lack of toxic metals, in the US distillate fuels base.

Conclusions

Gas turbine liquid fuel samples were characterized for the presence of eight trace hazardous metals. The study revealed that many of the metals of concern (including mercury and arsenic) are not present at any level above the detection limits of the ICP-MS used. Chromium is not present in the +6 oxidation state, the oxidation state of most concern. Nickel is present at even lower concentrations, but there is no evidence that nickel could form the toxic sulfide compound during a combustion process that occurs with excess oxygen available. The source of lead is probably due to cross contamination from the small quantities of leaded fuels that are still used today (aviation gasoline is still marketed as a low lead fuel).

References

(1) *"Nickel Speciation of Flyash from Residual Oil-Fired Power Plants"*, Kevin Galbreath, University of North Dakota Energy & Environmental Research Center; presented at Air Quality IV, 22-24 Sep 2003, Arlington, Va.

(2) Magaw, RI, McMillen, SJ, Gala, WR., 1999. Risk evaluation of metals in crude oils: *Proc. 6th Int'l Petrol. Environmental Conf.* Nov. 16-18, Houston, TX, pp. 460-473.

(3) Rich Heathcote, Don Simmons, and Steven Hernholz, *Analysis of Motor-Vehicle Fuels for Metals by Inductively Coupled Plasma-Mass Spectrometry;* **Hygenic Laboratory,** Volume 39, No. 4, pp. 1-4, 2001, The University of Iowa.

Combustion Turbine

Project Information

Project Number:	**102998**
Client or Company Name:	**UMass Central Heating Plant**
Date of Report:	**02/05/08**
Turbine Mfgr:	**Solar**
Turbine Model #:	**Mars 100**

Stack Data

Stack Diameter:	6	feet
Stack Height:	125	feet
Site Elevation:	158	feet (above MSL)

Fuel Data

Natural Gas		
Heat Content:	20,599	Btu/lb (LHV)
HHV/LHV Ratio:	1.1087	(dimensionless)
Sulfur Content:	0.80	gr/100 ft3
Fuel Oil		
Heat Content:	18,381	Btu/lb (LHV)
	19,470	Btu/lb (HHV)
Fuel Density:	6.9	lb/gal
HHV/LHV Ratio:	1.059	(dimensionless)
Sulfur Content:	0.05	%
Vendor Reference Nitrogen:	0	%
Fuel Nitrogen Content:	0.05	%

APC Data

	100 % load	
Outlet NOx (Gas):	2.5	ppmv (with duct firing)
Outlet NOx (Gas):	2.5	ppmv (without duct firing)
Outlet NOx (Oil):	6	ppmv (with duct firing)
Outlet NOx (Oil):	6	ppmv (without duct firing)
Reference	15	% O2
SO2 to SO3 conversion:	10	% (including turbine)
Ammonia Slip:	2	ppmv
Outlet CO (Gas):	5	ppmv (with duct firing)
Outlet CO (Gas):	5	ppmv (without duct firing)
Outlet CO (Oil):	5	ppmv (with duct firing)
Outlet CO (Oil):	5	ppmv (without duct firing)
CO Catalyst Efficiency:	90	%
Barometric Pressure	Standard Ats	in. Hg
VOC (gas)	0.44/lb/hr	ppmvd with duct firing
VOC (gas)	0.44/lb/hr	ppmvd without duct firing
VOC (gas)	0.44/lb/hr	lb/MMBtu or lb/hr with duct firing (identify which one and condition)
VOC (gas)	0.44/lb/hr	lb/MMBtu or lb/hr without duct firing (identify which one and condition)
VOC (oil)	0.71/lb/hr	ppmvd with duct firing
VOC (oil)	0.71/lb/hr	ppmvd without duct firing
VOC (oil)	0.71/lb/hr	lb/MMBtu or lb/hr with duct firing (identify which one and condition)
VOC (oil)	0.71/lb/hr	lb/MMBtu or lb/hr without duct firing (identify which one and condition)
PM (gas)	0.03	lb/MMBtu or lb/hr with duct firing (identify which one and condition)
PM (gas)	0.03	lb/MMBtu or lb/hr without duct firing (identify which one and condition)
PM (oil)	0.05	lb/MMBtu or lb/hr with duct firing (identify which one and condition)
PM (oil)	0.05	lb/MMBtu or lb/hr without duct firing (identify which one and condition)

Fuel			Natural Gas						Fuel Oil					
Load			100%						100%					
Ambient Temperature (F)			0	0	60	60	100	100	0	0	60	60	100	100
Engine Inlet Temperature (F):			0	0	60	60	100	100	0	0	60	60	100	100
Relative Humidity (%)			60	60	60	60	60	60	60	60	60	60	60	60
Duct Burner (Yes/No)			no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Duct Burner Fuel				gas		gas		gas		gas		gas		gas
Output (kW) (from Solar)			11835	11835	10250	10250	8574	8574	11712	11712	9582	9582	7715	7715
Heat Rate, LHV (Btu/kWh) (from Solar):			10510	10510	10762	10762	11340	11340	10552	10552	10903	10903	11734	11734
Heat Rate (Btu/kWh) (from Solar)			11652	11652	11932	11932	12573	12573	11177	11177	11549	11549	12429	12429
Gas Consumption (lb/hr)			6038	10058	5355	8773	4720	7672		3957		3344		2816
Oil Consumption (lb/hr)									6724	6724	5684	5684	4925	4925
Duct Burner Fuel Flow (Gas lb/hr)				4018		3417		2951		3957		3344		2816
Heat Input from Duct Firing (MMBtu/hr - HHV)				91.8		78		67.4		90.4		76.4		61.3
Heat Input, LHV (MMBtu/hr):			124.39	207.19	110.31	180.71	97.23	158.03	123.59	205.09	104.47	173.37	90.53	148.53
Heat Input (MMBtu/hr)			137.91	229.71	122.30	200.30	107.80	175.20	130.91	221.31	110.66	187.06	95.89	157.19
Exhaust Flow GT (lb/hr):			365247	365247	325635	325635	287873	287873	365373	365373	318558	318558	276323	276323
Exhaust Temp (F):														
DB Gas Consumption (lb/hr)				4018		3417		2951		3957		3344		2816
Stack Exit Temp (F)			393	321	381	316	373	311	392	321	382	314	373	309
Stack Exhaust Flow (lb/hr)			365247	369265	325635	329052	287873	290824	365373	369330	318558	321902	276323	279139
Stack Exit Flow (acfm) (Vanderweil)			130913.047	120750	115228.116	107271	100755.55	94275	130958.2086	121140	112723.872	104940	96713.05	90208
Exit Velocity (fps)			77.17	71.18	67.92	63.23	59.39	55.57	77.19	71.41	66.45	61.86	57.01	53.17
Exhaust Composition (mole %):														
Nitrogen:	MW=	28.02	75.86	74.45	75.15	73.83	73.04	71.81	76.65	75.24	75.96	74.61	73.79	72.54
Argon:	MW=	39.94	0.91	0.89	0.9	0.88	0.87	0.86	0.92	0.9	0.91	0.89	0.88	0.87
Oxygen:	MW=	32	14.73	10.77	14.62	10.86	14.22	10.59	14.98	11.03	15.02	11.2	14.6	10.94
Carbon Dioxide:	MW=	44.01	2.9	4.73	2.85	4.59	2.76	4.44	3.87	5.67	3.71	5.46	3.6	5.28
r:	MW=	18.02	5.61	9.16	6.48	9.84	9.1	12.3	3.58	7.15	4.4	7.84	7.12	10.38
Total			100.01	100.00	100.00	100.00	99.99	100.00	100.00	99.99	100.00	100.00	99.99	100.01
Exhaust Weight (lb/lbmole):			28.62	28.40	28.52	28.31	28.22	28.02	28.99	28.76	28.88	28.66	28.57	28.37
Emissions														
Uncontrolled NOx (ppmdv @ 15% O2):			24.98	26.02	24.99	25.99	25	25.99	64.96	50.31	64.97	50.25	64.99	33.53
NO_x (ppmdv @ 15% O_2)			2.50	2.50	2.50	2.50	2.50	2.50	6.00	6	6	6	6	6
NO_x (lb/hr)			1.40	2.52	1.25	2.23	1.15	2.04	3.28	5.84	2.80	4.99	2.52	4.47
Controlled NOx (lb/MMBtu):			0.0102	0.0110	0.0102	0.0111	0.0107	0.0116	0.0251	0.0264	0.0253	0.0267	0.0263	0.0284
Uncontrolled CO (ppmvd 15%O2):			49.96	44.46	49.98	44.58	50	44.59	24.99	29.39	25	25	25	25
CO (ppmvd 15% O_2)			5	5	5	5	5	5	5	5	5	5	5	5
CO (lb/hr)			1.70	3.07	1.53	2.71	1.40	2.48	1.66	2.96	1.42	2.53	1.28	2.26
Controlled CO (lb/MMBtu):			0.0123	0.0134	0.0125	0.0135	0.0130	0.0142	0.0127	0.0134	0.0128	0.0135	0.0133	0.0144
VOC (lb/hr)			0.44	0.440	0.44	0.44	0.44	0.44	0.71	0.71	0.71	0.71	0.71	0.71
Controlled VOC (lb/MMBtu):			0.0032	0.0019	0.0036	0.0022	0.0041	0.0025	0.0054	0.0032	0.0064	0.0038	0.0074	0.0045
Sulfur (lb/hr):			0.15	0.25	0.13	0.22	0.12	0.19	3.36	3.46	2.84	2.92	2.46	2.53
SO_2 (lb/hr) (ng)			0.30	0.50	0.27	0.44	0.23	0.38						
SO_2 (lb/hr) (based on 0.05% S by wt. in oil)									6.72	6.92	5.68	5.85	4.93	5.07
SO_2 (lb/hr) (based on 0.0015% S by wt. in oil)									0.20	0.20	0.17	0.17	0.15	0.15
Controlled SO2 (lb/MMBtu):			0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0514	0.0313	0.0514	0.0313	0.0514	0.0322
H_2SO_4 (lb/hr) (ng)			0.05	0.08	0.04	0.07	0.04	0.06	1.03	1.06	0.87	0.90	0.75	0.78
H_2SO_4 (lb/hr) (based on 0.05% S by wt. in oil)									1.030	1.060	0.870	0.896	0.754	0.776
H_2SO_4 (lb/hr) (based on 0.0015% S by wt. in oil)									0.031	0.031	0.026	0.026	0.023	0.023
NH_3 (ppmdv @ 15% O_2)			2	2	2	2	2	2	2	2	2	2	2	2
NH_3 (lb/hr)			0.41	0.75	0.37	0.66	0.34	0.60	0.40	0.72	0.35	0.61	0.31	0.55
PM (lb/MMBtu):			0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
PM_{10} (lb/hr) (based on lb/MMBtu)			4.14	6.89	3.67	6.01	3.23	5.26	3.93	6.64	3.32	5.61	2.88	4.72
PM, NH3 salts (lb/hr):			0.17	0.31	0.15	0.27	0.14	0.25	0.17	0.30	0.14	0.25	0.13	0.23
including NH3 salts (lb/hr):			4.31	7.20	3.82	6.28	3.37	5.50	4.09	6.94	3.46	5.86	3.00	4.94
$_{10}$ (lb/hr) (based on 0.03 lb/MMBtu EPA PSD limit - filterable only)			4.14	6.89	3.67	6.01	3.23	5.26	3.93	6.64	3.32	5.61	2.88	4.72
PM_{10} (lb/hr) (based on 0.05 lb/MMBtu Vendor Guarantee)									6.55	11.07	5.53	9.35	4.79	7.86

	Natural Gas						Fuel Oil					
Load	100%						100%					
Ambient Temperature (F)	0	0	60	60	100	100	0	0	60	60	100	100
Engine Inlet Temperature (F):	0	0	60	60	100	100	0	0	60	60	100	100
Relative Humidity (%)	60	60	60	60	60	60	60	60	60	60	60	60
Duct Burner (Yes/No)	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Fuel oil Use (LHV)							2104904.348	2104904.348	1779339.13	1779339.13	1541739.13	1541739.13

Annual PTE based on 6600 hours NG plus 2160 hours oil

	Natural gas	Fuel Oil	Total
NO_x (tpy)	7.36	6.31	13.67
CO (tpy)	8.94	3.20	12.14
VOC (tpy)	1.45	0.77	2.22
SO_2 (tpy)	1.44	7.47	8.91
H_2SO_4 (tpy)	0.22	1.14	1.36
NH_3 (tpy)	2.18	0.78	2.96
PM_{10} (tpy)	19.83	11.95	31.78

PM10 lb/hr using Table 12a lb/MMBtu rates

	Natural gas	Oil
Emission factor, lb/MMBtu	0.03	0.05
w/o duct burner, lb/MMBtu	0.03	0.05
PM10 lb/hr w/ duct burner	6.89	11.07
PM10 lb/hr w/o duct burner	4.14	6.55

Fuel	Natural Gas						Fuel Oil					
Load	75%						75%					
Ambient Temperature (F)	0	0	60	60	100	100	0	0	60	60	100	100
Engine Inlet Temperature (F):	0	0	60	60	100	100	0	0	60	60	100	100
Relative Humidity (%)	60	60	60	60	60	60	60	60	60	60	60	60
Duct Burner (Yes/No)	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Duct Burner Fuel		gas		gas		gas		gas		gas		gas
Output (kW) (from Solar)	8876	8876	7687	7687	6431	6431	8784	8784	7187	7187	5786	5786
Heat Rate, LHV (Btu/kWh) (from Solar):	11882	11882	11860	11860	12536	12536	11863	11863	12141	12141	13142	13142
Heat Rate (Btu/kWh) (from Solar)	13174	13174	13149	13149	13898.6	13898.6	12566	12566	12860	12860	13921	13921
Gas Consumption (lb/hr)	5120	9052	4426	7659	3914	6657		3867		3344		2816
Oil Consumption (lb/hr)							5669	5669	4747	4747	4137	4137
Duct Burner Fuel Flow (Gas lb/hr)		3933		3233		2745		3867		3344		2816
Heat Input from Duct Firing (MMBtu/hr - HHV)		89.8		73.8		62.7		88.3		71.1		59.4
Heat Input, LHV (MMBtu/hr):	105.46	186.46	91.17	157.77	80.62	137.12	104.20	183.90	87.26	151.46	76.04	129.64
Heat Input (MMBtu/hr)	116.93	206.73	101.08	174.88	89.38	152.08	110.38	198.68	92.43	163.53	80.54	139.94
Exhaust Flow GT (lb/hr):	345298	345298	296327	296327	258793	258793	343694	343696	288715	288715	248960	248960
Exhaust Temp (F):												
DB Gas Consumption (lb/hr)		3933		3233		2745		3867		3115		2601
Stack Exit Temp (F)	400	318	387	311	376	307	399	317	386	310	375	305
Stack Exhaust Flow (lb/hr)	345298	349231	296327	299560	258793	261538	343694	347563	288715	291830	248960	251561
Stack Exit Flow (acfm) (Vanderweil)	125107.8	114199	105305	97107	90900.2	84302	124256.8	113653	102599.7	94602	87446.4	81086
Exit Velocity (fps)	73.75	67.32	62.07	57.24	53.58	49.69	73.24	66.99	60.48	55.76	51.55	47.80
Exhaust Composition (mole %):												
Nitrogen:	76.08	74.63	75.34	73.97	73.19	71.91	76.79	75.32	76.06	74.68	73.87	72.59
Argon:	0.91	0.89	0.9	0.88	0.88	0.86	0.92	0.9	0.91	0.89	0.88	0.87
Oxygen:	15.36	11.25	15.17	11.25	14.68	10.91	15.6	11.49	15.47	11.54	14.97	11.21
...rbon Dioxide:	2.6	4.5	2.6	4.41	2.55	4.3	3.47	5.35	3.42	5.22	3.36	5.09
...er:	5.05	8.73	5.98	9.48	8.7	12.02	3.22	6.94	4.13	7.67	6.91	10.25
Total	100.00	100.00	99.99	99.99	100.00	100.00	100.00	100.00	99.99	100.00	99.99	100.01
Exhaust Weight (lb/lbmole):	28.65	28.42	28.55	28.33	28.25	28.04	28.98	28.75	28.88	28.65	28.56	28.36
Emissions												
Uncontrolled NOx (ppmdv @ 15% O2):	25	25	25	25	25	25	65	65	65	65	65	65
NO_x (ppmdv @ 15% O_2)	2.50	2.50	2.50	2.50	2.50	2.50	6	6	6	6	6	6
NO_x (lb/hr)	1.17	2.25	1.02	1.93	0.94	1.76	2.74	5.20	2.32	4.34	2.11	3.89
Controlled NOx (lb/MMBtu):	0.0100	0.0109	0.0101	0.0110	0.0105	0.0116	0.0248	0.0262	0.0251	0.0265	0.0262	0.0278
Uncontrolled CO (ppmvd 15%O2):	50	50	50	50	50	50	25	25	25	25	25	25
CO (ppmvd 15% O_2)	5	5	5	5	5	5	5	5	5	5	5	5
CO (lb/hr)	1.42	2.74	1.25	2.35	1.15	2.14	1.39	2.64	1.18	2.20	1.07	1.97
Controlled CO (lb/MMBtu):	0.0121	0.0133	0.0124	0.0134	0.0129	0.0141	0.0126	0.0133	0.0128	0.0135	0.0133	0.0141
VOC (lb/hr)	0.44	0.44	0.44	0.44	0.44	0.44	0.71	0.71	0.71	0.71	0.71	0.71
Controlled VOC (lb/MMBtu):	0.0038	0.0021	0.0044	0.0025	0.0049	0.0029	0.0064	0.0036	0.0077	0.0043	0.0088	0.0051
Sulfur (lb/hr):	0.13	0.22	0.11	0.19	0.10	0.17	2.83	2.93	2.37	2.46	2.07	2.14
SO_2 (lb/hr) (ng)	0.25	0.45	0.22	0.38	0.19	0.33						
SO_2 (lb/hr) (based on 0.05% S by wt. in oil)							5.67	5.86	4.75	4.91	4.14	4.28
SO_2 (lb/hr) (based on 0.0015% S by wt. in oil)							0.17	0.17	0.14	0.14	0.12	0.12
Controlled SO2 (lb/MMBtu):	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0514	0.0295	0.0514	0.0300	0.0514	0.0306
H_2SO_4 (lb/hr) (ng)	0.04	0.07	0.03	0.06	0.03	0.05	0.87	0.90	0.73	0.75	0.63	0.65
H_2SO_4 (lb/hr) (based on 0.05% S by wt. in oil)							0.868	0.898	0.727	0.752	0.633	0.655
H_2SO_4 (lb/hr) (based on 0.0015% S by wt. in oil)							0.026	0.026	0.022	0.022	0.019	0.019
NH_3 (ppmdv @ 15% O_2)	2	2	2	2	2	2	2	2	2	2	2	2
NH_3 (lb/hr)	0.35	0.67	0.30	0.57	0.28	0.52	0.34	0.64	0.29	0.53	0.26	0.48
PM (lb/MMBtu):	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
PM_{10} (lb/hr) (based on lb/MMBtu)	3.51	6.20	3.03	5.25	2.68	4.56	3.31	5.96	2.77	4.91	2.42	4.20
PM, NH3 salts (lb/hr):	0.14	0.28	0.12	0.24	0.12	0.21	0.14	0.26	0.12	0.22	0.11	0.20
..., including NH3 salts (lb/hr):	3.65	6.48	3.16	5.48	2.80	4.78	3.45	6.22	2.89	5.12	2.52	4.40
...M_{10} (lb/hr) (based on 0.03 lb/MMBtu EPA PSD limit - filterable only)	3.51	6.20	3.03	5.25	2.68	4.56	3.31	5.96	2.77	4.91	2.42	4.20
PM_{10} (lb/hr) (based on 0.05 lb/MMBtu Vendor Guarantee)							5.52	9.93	4.62	8.18	4.03	7.00

Fuel	Natural Gas						Fuel Oil					
Load	50%						65%					
Ambient Temperature (F)	0	0	60	60	100	100	0	0	60	60	100	100
Engine Inlet Temperature (F):	0	0	60	60	100	100	0	0	60	60	100	100
Relative Humidity (%)	60	60	60	60	60	60	60	60	60	60	60	60
Duct Burner (Yes/No)	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Duct Burner Fuel		gas		gas		gas		gas		gas		gas
Output (kW) (from Solar)	5917	5917	5125	5125	4287	4187	7613	7613	6228	6228	5015	5015
Heat Rate, LHV (Btu/kWh) (from Solar):	15223	15223	15148	15148	16126	16126	12909	12909	13227	13227	14405	14405
Heat Rate (Btu/kWh) (from Solar)	16878	16878	16795	16795	17879	17879	13674	13674	14011	14011	15258	15258
Gas Consumption (lb/hr)	4373	7834	3769	6541	3356	5637		3867		3344		2816
Oil Consumption (lb/hr)							5347	5347	4482	4482	3930	3930
Duct Burner Fuel Flow (Gas lb/hr)		3463		2771		2359		3705		2940		2456
Heat Input from Duct Firing (MMBtu/hr - HHV)		79.1		63.3		53.9		84.6		67.1		56.1
Heat Input, LHV (MMBtu/hr):	90.07	161.37	77.63	134.73	69.13	116.12	98.28	174.58	82.38	142.98	72.24	122.84
Heat Input (MMBtu/hr)	99.87	178.97	86.07	149.37	76.65	130.55	104.10	188.70	87.26	154.36	76.52	132.62
Exhaust Flow GT (lb/hr):	312292	312292	263120	263120	230491	230491	331931	331931	276521	276521	239053	239053
Exhaust Temp (F):												
DB Gas Consumption (lb/hr)		3463		2771		2359		3705		2940		2456
Stack Exit Temp (F)	392	313	378	307	369	303	397	316	382	308	375	303
Stack Exhaust Flow (lb/hr)	312292	315755	263120	265891	230491	232850	365373	335636	276521	279461	239053	241509
Stack Exit Flow (acfm) (Vanderweil)	111932.74	103252	92713	85706	80261.6	74628	119744	109417	97848.8	90312	83966.57	77404
Exit Velocity (fps)	65.98	60.86	54.65	50.52	47.31	43.99	70.58	64.50	57.68	53.24	49.50	45.63
Exhaust Composition (mole %):												
Nitrogen:	76.18	74.77	75.42	74.1	73.25	72.01	76.82	75.37	76.08	74.71	73.89	72.62
Argon:	0.91	0.89	0.9	0.88	0.88	0.87	0.92	0.9	0.91	0.89	0.88	0.87
Oxygen:	15.66	11.65	15.4	11.61	14.88	11.24	15.73	11.65	15.54	11.66	15.03	11.33
...rbon Dioxide:	2.46	4.31	2.49	4.24	2.46	4.15	3.39	5.26	3.38	5.15	3.33	5.03
...er:	4.78	8.38	5.78	9.17	8.53	11.74	3.14	6.83	4.09	7.58	6.87	10.16
Total	99.99	100.00	99.99	100.00	100.00	100.01	100.00	100.01	100.00	99.99	100.00	100.01
Exhaust Weight (lb/lbmole):	28.66	28.44	28.56	28.35	28.26	28.06	28.98	28.75	28.88	28.65	28.57	28.37
Emissions												
Uncontrolled NOx (ppmdv @ 15% O2):	25	25	25	25	25	25	65	65	65	65	65	65
NO_x (ppmdv @ 15% O_2)	2.50	2.50	2.50	2.50	2.50	2.50	6	6	6	6	6	6
NO_x (lb/hr)	0.99	1.93	0.87	1.63	0.81	1.50	2.84	4.92	2.19	4.09	2.00	3.67
Controlled NOx (lb/MMBtu):	0.0099	0.0108	0.0101	0.0109	0.0106	0.0115	0.0273	0.0261	0.0251	0.0265	0.0261	0.0277
Uncontrolled CO (ppmvd 15%O2):	50	50	50	50	50	50	25	25	25	25	25	25
CO (ppmvd 15% O_2)	5	5	5	5	5	5	5	5	5	5	5	5
CO (lb/hr)	1.21	2.35	1.06	1.99	0.98	1.82	1.44	2.50	1.11	2.07	1.02	1.86
Controlled CO (lb/MMBtu):	0.0121	0.0131	0.0123	0.0133	0.0128	0.0139	0.0138	0.0132	0.0127	0.0134	0.0133	0.0140
VOC (lb/hr)	0.44	0.44	0.44	0.44	0.44	0.44	0.71	0.71	0.71	0.71	0.71	0.71
Controlled VOC (lb/MMBtu):	0.0044	0.0025	0.0051	0.0029	0.0057	0.0034	0.0068	0.0038	0.0081	0.0046	0.0093	0.0054
Sulfur (lb/hr):	0.11	0.19	0.09	0.16	0.08	0.14	2.67	2.77	2.24	2.31	1.97	2.03
SO_2 (lb/hr) (ng)	0.22	0.39	0.19	0.33	0.17	0.28						
SO_2 (lb/hr) (based on 0.05% S by wt. in oil)							5.35	5.53	4.48	4.63	3.93	4.05
SO_2 (lb/hr) (based on 0.0015% S by wt. in oil)							0.16	0.16	0.13	0.13	0.12	0.12
Controlled SO2 (lb/MMBtu):	0.0022	0.0022	0.0022	0.0022	0.0022	0.0021	0.0514	0.0293	0.0514	0.0300	0.0514	0.0306
H_2SO_4 (lb/hr) (ng)	0.03	0.06	0.03	0.05	0.03	0.04	0.82	0.85	0.69	0.71	0.60	0.62
H_2SO_4 (lb/hr) (based on 0.05% S by wt. in oil)							0.819	0.847	0.686	0.709	0.602	0.620
H_2SO_4 (lb/hr) (based on 0.0015% S by wt. in oil)							0.025	0.025	0.021	0.021	0.018	0.018
NH_3 (ppmdv @ 15% O_2)	2	2	2	2	2	2	2	2	2	2	2	2
NH_3 (lb/hr)	0.29	0.57	0.26	0.48	0.24	0.44	0.35	0.61	0.27	0.50	0.25	0.45
PM (lb/MMBtu):	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
PM_{10} (lb/hr) (based on lb/MMBtu)	3.00	5.37	2.58	4.48	2.30	3.92	3.12	5.66	2.62	4.63	2.30	3.98
PM, NH3 salts (lb/hr):	0.12	0.24	0.11	0.20	0.10	0.18	0.14	0.25	0.11	0.21	0.10	0.19
..., including NH3 salts (lb/hr):	3.12	5.60	2.69	4.68	2.40	4.10	3.27	5.91	2.73	4.84	2.40	4.16
...M_{10} (lb/hr) (based on 0.03 lb/MMBtu EPA PSD limit - filterable only)	3.00	5.37	2.58	4.48	2.30	3.92	3.12	5.66	2.62	4.63	2.30	3.98
PM_{10} (lb/hr) (based on 0.05 lb/MMBtu Vendor Guarantee)	4.99	8.95	4.30	7.47	3.83	6.53	5.20	9.43	4.36	7.72	3.83	6.63

Revised

Table G Non-Criteria Pollutant Emissions from Combustion Turbine / HRSG

Pollutant	Emission Factors[a]		Maximum Emission Rate (lb/hr)[b]				Maximum Emission Rate (tpy)[d]	
	Gas (lb/MMBtu)	Oil (lb/MMBtu)	Gas (w/o DB)	Gas (w/ DB)	Oil (w/o DB)	Oil (w/ DB)	Gas (w/ DB)	Oil (w/ DB)
Formaldehyde	7.10E-04	2.80E-04	9.79E-02	1.63E-01	3.67E-02	1.01E-01	5.38E-01	3.96E-02
1,3 Butadiene	2.15E-07	8.00E-06	2.96E-05	4.94E-05	1.05E-03	1.07E-03	1.63E-04	1.13E-03
Acetaldehyde	4.00E-05	0.00E+00	5.52E-03	9.19E-03	0.00E+00	3.62E-03	3.03E-02	0.00E+00
Benzene	1.20E-05	5.50E-05	1.65E-03	2.76E-03	7.20E-03	8.28E-03	9.10E-03	7.78E-03
Ethylbenzene	3.20E-05	0.00E+00	4.41E-03	7.35E-03	0.00E+00	2.89E-03	2.43E-02	0.00E+00
Naphthalene	1.30E-06	3.50E-05	1.79E-04	2.99E-04	4.58E-03	4.70E-03	9.85E-04	4.95E-03
PAH	2.20E-06	4.00E-04	3.03E-04	5.05E-04	5.24E-02	5.26E-02	1.67E-03	5.66E-02
Propylene Oxide	1.45E-05	0.00E+00	2.00E-03	3.33E-03	0.00E+00	1.31E-03	1.10E-02	0.00E+00
Toluene	1.30E-04	0.00E+00	1.79E-02	2.99E-02	0.00E+00	1.18E-02	9.85E-02	0.00E+00
Xylenes	6.40E-05	0.00E+00	8.83E-03	1.47E-02	0.00E+00	5.79E-03	4.85E-02	0.00E+00
Arsenic[c]	0.00E+00	2.59E-07	0.00E+00	0.00E+00	3.39E-05	3.39E-05	0.00E+00	3.66E-05
Beryllium[c]	0.00E+00	2.59E-07	0.00E+00	0.00E+00	3.39E-05	3.39E-05	0.00E+00	3.66E-05
Cadmium[c]	0.00E+00	2.59E-07	0.00E+00	0.00E+00	3.39E-05	3.39E-05	0.00E+00	3.66E-05
Chromium[c]	0.00E+00	7.77E-07	0.00E+00	0.00E+00	1.02E-04	1.02E-04	0.00E+00	1.10E-04
Lead[c]	0.00E+00	5.18E-06	0.00E+00	0.00E+00	6.78E-04	6.78E-04	0.00E+00	7.32E-04
Manganese	0.00E+00	6.00E-06	0.00E+00	0.00E+00	7.85E-04	7.85E-04	0.00E+00	8.48E-04
Mercury[c]	0.00E+00	2.59E-07	0.00E+00	0.00E+00	3.39E-05	3.39E-05	0.00E+00	3.66E-05
Nickel[c]	0.00E+00	5.18E-06	0.00E+00	0.00E+00	6.78E-04	6.78E-04	0.00E+00	7.32E-04
Selenium	0.00E+00	1.50E-05	0.00E+00	0.00E+00	1.96E-03	1.96E-03	0.00E+00	2.12E-03
Total			1.39E-01	2.31E-01	1.06E-01	1.97E-01	7.63E-01	3.50E-01

[a] Based on emission factors cited in USEPA Document No. AP-42.

[b] Based on the combustion turbine firing natural gas at 137.9 MMBtu/hr or oil at 130.9 MMBtu/hr, and the duct burner firing natural gas at 91.8 MMBtu/hr.

[c] Based on typical analysis of 500 ppm motor vehicle diesel fuel.

[b] Based on the firing natural gas for 6600 hr/yr and firing oil for 2160 hours/yr

Revised Combustion Turbine/HRSG Potential Emissions

Pollutant	Natural Gas (tons per year)	Motor Vehicle Diesel Fuel (tons per year)	Total (tons per year)
PM10	19.8	12.0	31.8
SO2	1.4	7.5	8.9
NOx	7.4	6.3	13.7
CO	8.9	3.2	12.1
VOC	1.5	0.8	2.2
NH3	2.2	0.8	3.0

Annual potential emissions are based on the CTG burning natural gas with 90 days oil backup and the duct burner burning natural gas only. (Natural gas tons per year based on CTG plus duct burner for 6600 hours at 60 deg. ambient temperature. Oil tons per year based on CTG firing oil plus duct burner firing natural gas for 2160 hours at 0 deg. ambient temperature.)

Revised Total Facility-wide Motor Vehicle Diesel Fuel Use

Combustion Source	Potential Fuel Use (gallons per year)
CTG/HRSG	2,229,611
Package Boilers October 1 - April 30	15,508,252
Package Boilers May 1 - September 30	6,357,830
Emergency Generator	20,436
Facility-wide Total	24,116,129

Potential diesel use for the CTG/HRSG is unchanged from Approval; but is now based on HHV to be consistent with package boilers.

Potential diesel use for the package boilers based on as-built input rates at Ambient Temperature 80F

Potential diesel use for the emergency generator based on as-built heat input rates.
Package Boilers Fuel Oil HHV assumed to be 134343 Btu/gal

Design and Performance Data for the Emergency Generator

Unit	**Emergency Generator**	
Fuel Type	**Natural Gas**	**Fuel Oil**
Generator Capacity (kW)	900	900
Heat Input (MMBtu/hr)	9.13	9.13
Annual Hours (hr/yr)	300	300
Annual Fuel Usage (MMcf or Mgal)	2.74	20.44
Emissions:		
NO_x (g/KW-hr)	6.40	6.40
NO_x (lb/hr)	12.72	12.72
NOx (tpy)	1.91	1.91
CO (g/KW-hr)	3.50	3.50
CO (lb/hr)	6.95	6.95
CO (tpy)	1.04	1.04
VOC (lb/MMBtu)	0.20	0.09
VOC (lb/hr)	1.83	0.82
NMHC (tpy)	0.27	0.12
PM_{10} (g/KW-hr)	0.20	0.20
PM_{10} (lb/hr)	0.40	0.40
PM10 (tpy)	0.06	0.06
SO_2 (lb/MMBtu)	0.00252	0.05
SO_2 (lb/hr)	0.02	0.46
SO2 (tpy)	0.003	0.07

Based on manfacturer's data or AP-42 Section 3.4, Large Stationary Diesel and All Stationary Dual-Fuel Engines, October 1996 Ed.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

2006 Model Year Certificate of Conformity

Manufacturer:	**CATERPILLAR INC.**		
Engine Family:	**6CPXL32.0ESK**		
Certificate Number:	**CPX-NR9-06-02**		
Intended Service Class:	**NR 9 (>560 KW)**		
Fuel Type:	**DIESEL**		
FELs: g/kW-hr	NMHC+NOx: **N/A**	NOx: **N/A**	PM: **N/A**
Effective Date:	**12/6/2005**		
Date Issued:	DEC 0 7 2005		

Merrylin Zaw-Mon, Director
Compliance and Innovative Strategies Division
Office of Transportation and Air Quality

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 89, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 89 and produced in the stated model year.

This certificate of conformity covers only those new nonroad compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 89 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 89.

This certificate of conformity is conditional upon compliance of said manufacturer with the averaging, banking and trading provisions of 40 CFR Part 89, Subpart C. Failure to comply with these provisions may render this certificate void ab initio.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 89.129-96 and 89.506-96 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 89. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void ab initio for other reasons specified in 40 CFR Part 89.

This certificate does not cover nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

DIESEL GENERATOR SET

CATERPILLAR®

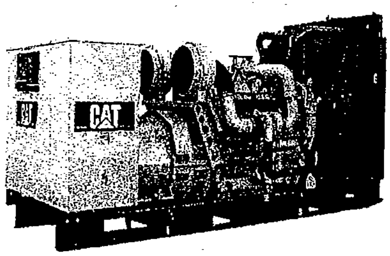

Image shown may not reflect actual package.

STANDBY
900 ekW 1125 kVA
60 Hz 1800 rpm 480 Volts

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

EMISSIONS
- EPA Tier 2 and CARB Emissions Certified for non-road mobile applications

DESIGN CRITERIA
- The generator set accepts rated load in one step

FULL RANGE OF ATTACHMENTS
- Wide range of bolt-on system expansion attachments, factory designed and tested

UL 2200
- UL 2200 listed packages are available. Certain restrictions may apply. Consult with your Caterpillar Dealer.

WORLDWIDE PRODUCT SUPPORT
- Worldwide parts availability through the Caterpillar dealer network
- With over 1844 dealer branch stores operating in 200 countries, you're never far from the Caterpillar part you need
- 99.7% of parts orders filled within 24 hours. The best product support record in the industry.
- Caterpillar dealers service technicians are trained to service every aspect of your electric power generation system
- Preventative maintenance agreements
- The Cat® SOS program effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by products

CAT C32 ATAAC DIESEL ENGINE
- Utilizes ACERT™ Technology
- Reliable, rugged, durable design
- Four-cycle diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Electronic engine control

CAT SR4B GENERATOR
- Designed to match performance and output characteristics of Caterpillar diesel engines
- Optimum winding pitch for minimum total harmonic distortion and maximum efficiency
- Single point access to accessory connections
- UL 1446 recognized Class H insulation system
- Digital Voltage Regulator

CAT EMCP 3 SERIES CONTROL PANELS
- Controls designed to meet individual customer needs
- EMCP 3 provides the option for full-featured power metering and protective relaying

STANDBY 900 ekW 1125 kVA

60 Hz 1800 rpm 480 Volts

CATERPILLAR®

FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	• Single element canister type air cleaner • Service indicator	• Dual element air cleaners • Air inlet adapters
Cooling	• Radiator with guard (43°C) • Low profile (frontal area) • Low airflow • Coolant drain line with valve • Fan and belt guards • Caterpillar Extended Life Coolant • Coolant level sensors • Radiator duct flange	• Radiator with 27°C ambient capability • Jacket water heater
Exhaust	• Dry exhaust manifold • Flanged faced outlets	• Stainless steel exhaust flex fittings • Elbows, flanges, expanders & Y adapters
Fuel	• Primary fuel filter with water separator • Secondary fuel filter • Fuel priming pump • Flexible fuel lines • Fuel cooler	
Generators	• Permanent magnet excited • Class H insulation • Class F temperature (105°C prime/130°C standby) • Winding temperature detectors (select models) • Anti-condensation space heaters	• Oversize & premium generators
Power Termination	• Bus bar (NEMA and IEC mechanical lug holes) -right side standard • Bottom cable entry	• Circuit breakers, UL listed, 3 pole with shunt trip, 80% or 100% rated, choice of trip units, manual or electrically operated (low voltage only) • Circuit breakers, IEC compliant, 3 or 4 pole with shunt trip (low voltage only), choice of trip units, manual or electrically operated • Shroud cover for bottom cable entry • Power terminations can be located on the left and/or rear as an option. Also, multiple circuit breakers can be ordered (up to 3) • Top cable entry
Governor	• ADEM™ A4	• Load Share Module
Control Panels	• User Interface panel (UIP) - rear mount • EMCP 3.1 generator set controller • Speed adjust • AC & DC customer wiring area (right side) • CAT Digital Voltage Regulator (CDVR) with KVAR/PF control, 3-phase sensing • Emergency Stop Push button	• EMCP 3.2 and EMCP 3.3 • Option for right or left mount UIP • Option for rear or left mount Customer wiring area • Local & remote annunciator modules • Discrete I/0 Module • Generator temperature monitoring & protection • Voltage raise/lower switch
Lube	• Lubricating oil and filter • Oil drain line with valves • Fumes disposal • Gear type lube oil pump	• Deep sump oil pan
Mounting	• Structual steel tube • Anti-vibration mounts (shipped loose)	
Starting/Charging	• 24 volt starting motor(s) • Batteries with rack and cables • Battery disconnect	• Battery chargers (10 Amp) • 45 amp charging alternator • Oversize batteries • Ether starting aid
General	• Right-hand service • Paint - Caterpillar Yellow (except rails and radiators gloss black) • SAE standard rotation • Flywheel and Flywheel housing - SAE No. 0	• UL 2200 • CSA certification • EU Declaration of Incorporation • EEC Declaration of Conformity

STANDBY 900 ekW 1125 kVA

60 Hz 1800 rpm 480 Volts

CATERPILLAR®

SPECIFICATIONS

CAT GENERATOR

SR4B Generator
Frame size.. 691
Excitation.. Permanent Magnet
Pitch..0.7143
Number of poles..4
Number of bearings... 002
Insulation...................... UL 1446 Recognized Class H with tropicalization and antiabrasion
IP rating...Drip Proof IP22
Alignment.. Close Coupled
Overspeed capability - % of rated................................. 150
Wave form..003.00
Voltage regulator.3 Phase sensing with selectible volts/Hz
Voltage regulation............Less than +/- 1/2% (steady state)
Less than +/- 1% (no load to full load)
Telephone Influence Factor............................. Less than 50
Harmonic distortion.. Less than 5%

CAT DIESEL ENGINE

C32 TA, V-12, 4-stroke watercooled diesel
Bore - mm... 145.00 mm (5.71 in)
Stroke - mm.. 162.00 mm (6.38 in)
Displacement - L.................................. 32.10 L (1958.86 in³)
Compression ratio.. 15:1
Aspiration... TA
Fuel system..MEUI
Governor type..ADEM™ A4

CAT EMCP 3 SERIES CONTROLS

• EMCP 3.1 (Standard)
•Integral to generator terminal box
•Single location for customer connection
•IP 23 enclosure
• 24 Volt DC Control
• UL/CSA
• Lockable hinged door (option)
• Run/Auto/Stop control
• True RMS metering, 3-phase
•Speed Adjust
• Voltage adjust (optional on 3.1)
• Digital indications for:
  - RPM
  - Operating hours
  - Oil pressure
  - Coolant temperature
  - System DC volts
  - L-L volts, L-N volts, phase amps, Hz
- ekW, kVA, kVAR, kW-hr, %kW, PF(*)
• Shutdowns with indicating lights (with optional annunciator):
  - Low oil pressure
  - High coolant temperature
  - Overspeed
  - Emergency stop
  - Failure to start (overcrank)
• Programmable protective relaying functions (*):
  - Under and over voltage
  - Under and over frequency
  - Reverse power
  - Overcurrent
• MODBUS isolated data link (RS-485 half-duplex) supports serial communication at data rate up to 115.2 kbaud (*)
(*) Available on EMCP 3.2 & EMCP 3.3

STANDBY 900 ekW 1125 kVA

60 Hz 1800 rpm 480 Volts

CATERPILLAR®

TECHNICAL DATA

Open Generator Set - - 1800 rpm/60 Hz/480 Volts	DM8140	
EPA Certified Tier 2		
Generator Set Package Performance		
Genset Power rating @ 0.8 pf	1125 kVA	
Genset Power rating with fan	900 ekW	
Coolant to aftercooler		
Coolant to aftercooler temp max	49 ° C	120 ° F
Fuel Consumption		
100% load with fan	246.9 L/hr	65.2 Gal/hr
75% load with fan	193.2 L/hr	51.0 Gal/hr
50% load with fan	134.8 L/hr	35.6 Gal/hr
Cooling System[1]		
Ambient air temperature	55 ° C	131 ° F
Air flow restriction (system)	0.12 kPa	0.48 in. water
Air flow (max @ rated speed for radiator arrangement)	1245 m^3/min	43967 cfm
Engine Coolant capacity with radiator/exp. tank	190.0 L	50.2 gal
Engine coolant capacity	55.0 L	14.5 gal
Radiator coolant capacity	135.0 L	35.7 gal
Inlet Air		
Combustion air inlet flow rate	87.2 m^3/min	3079.4 cfm
Exhaust System		
Exhaust stack gas temperature	429.0 ° C	804.2 ° F
Exhaust gas flow rate	215.0 m^3/min	7592.7 cfm
Exhaust flange size (internal diameter)	203 mm	8 in
Exhaust system backpressure (maximum allowable)	10.0 kPa	40.2 in. water
Heat Rejection		
Heat rejection to coolant (total)	320 kW	18198 Btu/min
Heat rejection to exhaust (total)	1004 kW	57097 Btu/min
Heat rejection to aftercooler	257 kW	14616 Btu/min
Heat rejection to atmosphere from engine	43 kW	2445 Btu/min
Heat rejection to atmosphere from generator	52.4 kW	2980.0 Btu/min
Alternator[2]		
Motor starting capability @ 30% voltage dip	2015 skVA	
Frame	691	
Temperature Rise	130 ° C	266 ° F
Lube System		
Sump refill with filter	68.0 L	18.0 gal
Emissions (Nominal)[3]		
NOx g/hp-hr	4.57 g/hp-hr	
CO g/hp-hr	.11 g/hp-hr	
HC g/hp-hr	.04 g/hp-hr	
PM g/hp-hr	.026 g/hp-hr	

[1] Ambient capability at 300m (984 ft) above sea level. For ambient capability at other altitudes, consult your Caterpillar dealer.

[2] UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40°C ambient per NEMA MG1-32.

[3] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

RATING DEFINITIONS AND CONDITIONS

Meets or Exceeds International Specifications: AS1359, BS4999, EGSA101P, ISO3046, ISO8528, NEMA MG 1-32, 89/336/EEC, 98/37/EEC, 72/23/EEC, CSA, UL 508 and IEC 60034

Standby - Output available with varying load for the duration of the interruption of the normal source power. Standby power in accordance with ISO8528. Fuel stop power in accordance with ISO3046/1, AS2789, DIN6271, and BS5514. Standby ambients shown indicate ambient temperature at 100 percent load which results in a coolant top tank temperature just below the shutdown temperature.

Ratings are based on SAE J1995 standard conditions. These ratings also apply at ISO3046/1, DIN6271, and BS5514 standard conditions.

Fuel Rates are based on fuel oil of 35° API (16° C or 60° F) gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.).

Additional Ratings may be available for specific customer requirements. Consult your Caterpillar representative for details.

DIMENSIONS

Package Dimensions		
Length	4766.9 mm	187.67 in
Width	2024.3 mm	79.7 in
Height	2254.0 mm	88.74 in
Weight	7917 kg	17,454 lb

Note: Do not use for installation design.
See general dimension drawings for detail (Drawing #2763027).

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Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

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GEN SET PACKAGE PERFORMANCE DATA
[DM8140]

Performance Number: DM8140

Sales Model: C32 DITA	**Combustion:** DI	**Aspr:** TA
Engine Power: 900 W/F EKW 942 W/O F EKW 1,357 HP	**Speed:** 1,800 RPM	**After Cooler:** ATAAC
Manifold Type: DRY	**Governor Type:** ELEC	**After Cooler Temp(F):** 120
Turbo Quantity: 2	**Engine App:** GP	**Turbo Arrangement:**
Hertz: 60	**Engine Rating:** PGS	**Strategy:**
Rating Type: STANDBY	**Certification:** EPA TIER-2 2006 - ----	

General Performance Data

GEN W/F EKW	PERCENT LOAD	ENGINE POWER BHP	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
900.0	100	1357	305	0.336	65.2	120.4	72.9	3,079.4	1,117.4	804.2	7,592.7
810.0	90	1227	276	0.347	60.8	115.0	70.0	3,030.0	1,090.9	786.4	7,352.5
720.0	80	1098	247	0.346	54.3	112.6	62.5	2,811.1	1,048.5	768.7	6,713.3
675.0	75	1035	232	0.345	51.0	111.4	58.2	2,687.4	1,027.4	760.1	6,374.3
630.0	70	971	218	0.345	47.8	109.4	53.3	2,546.2	1,008.5	754.2	6,014.1
540.0	60	845	190	0.345	41.6	104.5	43.6	2,260.1	972.7	744.3	5,300.7
450.0	50	719	162	0.347	35.6	99.7	33.9	1,974.1	937.0	734.7	4,590.9
360.0	40	597	134	0.350	29.8	96.4	25.2	1,712.8	889.0	714.6	3,912.9
270.0	30	472	106	0.356	24.0	94.1	17.6	1,476.2	817.7	674.4	3,259.5
225.0	25	409	92	0.363	21.2	92.8	14.1	1,366.7	774.1	647.4	2,938.2
180.0	20	344	77	0.372	18.3	91.6	10.9	1,260.7	725.4	615.7	2,627.4
90.0	10	214	48	0.415	12.7	88.9	6.3	1,123.0	596.3	518.0	2,115.4

Heat Rejection Data

GEN W/F EKW	PERCENT LOAD	REJ TO JW BTU/MN	REJ TO ATMOS BTU/MN	REJ TO EXHAUST BTU/MN	EXH RCOV TO 350F BTU/MN	FROM OIL CLR BTU/MN	FROM AFT CLR BTU/MN	WORK ENERGY BTU/MN	LHV ENERGY BTU/MN	HHV ENERGY BTU/MN
900.0	100	18,198	2,423	57,097	30,255	7,507	14,616	57,552	140,639	149,852
810.0	90	16,947	2,275	54,311	28,492	6,995	14,104	52,036	131,142	139,672
720.0	80	15,241	2,189	48,737	25,136	6,256	11,943	46,576	116,981	124,659
675.0	75	14,445	2,087	46,008	23,601	5,858	10,748	43,904	109,986	117,152
630.0	70	13,763	1,990	43,392	22,122	5,516	9,497	41,174	103,105	109,816
540.0	60	12,455	1,826	38,160	19,336	4,777	7,279	35,828	89,684	95,541
450.0	50	11,146	1,769	32,928	16,492	4,095	5,346	30,482	76,717	81,722
360.0	40	10,293	1,581	27,411	13,478	3,412	3,753	25,307	64,206	68,414
270.0	30	9,270	1,479	21,895	10,180	2,730	2,445	20,018	51,752	55,107
225.0	25	9,099	1,490	18,653	8,303	2,445	1,934	17,345	45,553	48,510
180.0	20	9,725	1,518	14,616	6,028	2,104	1,422	14,616	39,354	41,913
90.0	10	10,862	1,570	6,711	1,934	1,479	853	9,042	27,298	29,061

EMISSIONS DATA

EPA TIER-2 2006 - ---- ** B5

Gaseous emissions data measurements are consistent with those described in EPA 40 CFR PART 89 SUBPART D and ISO 8178 for measuring HC, CO, PM, and NOx.

Gaseous emissions values are WEIGHTED CYCLE AVERAGES and are in compliance with the following non-road regulations:

LOCALITY	AGENCY/LEVEL	MAX LIMITS - g/kw-hr		
U.S. (incl Calif)	EPA/TIER-2	CO:3.5	NOx + HC:6.4	PM:0.20

EXHAUST STACK DIAMETER	--
WET EXHAUST MASS	14,072.1 LB/HR
WET EXHAUST FLOW (804.20 F STACK TEMP)	7,599.72 CFM
WET EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	2,932.00 STD CFM
DRY EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	2,686.04 STD CFM
FUEL FLOW RATE	65 GAL/HR

RATED SPEED "Nominal Data"

GEN PWR EKW	PERCENT LOAD	ENGINE POWER BHP	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL HC LB/HR	TOTAL CO2 LB/HR	PART MATTER LB/HR	OXYGEN IN EXHAUST PERCENT
900.0	100	1357	13.69	0.32	0.11	1,445.2	0.080	11.10
675.0	75	1035	8.20	0.33	0.20	1,131.6	0.050	12.10
450.0	50	719	5.52	0.50	0.17	792.2	0.090	12.60
225.0	25	409	3.54	0.83	0.15	471.7	0.120	13.80
90.0	10	214	2.25	1.21	0.21	282.2	0.090	15.80

RATED SPEED "Nominal Data"

GEN PWR EKW	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HP-HR	TOTAL CO G/HP-HR	TOTAL HC G/HP-HR	PART MATTER G/HP-HR	OXYGEN IN EXHAUST PERCENT
900.0	100	1,012.0	4.57	0.11	0.04	0.03	11.10
675.0	75	771.6	3.60	0.15	0.09	0.02	12.10
450.0	50	536.3	3.48	0.31	0.11	0.06	12.60
225.0	25	304.7	3.93	0.93	0.16	0.14	13.80
90.0	10	159.4	4.77	2.57	0.44	0.20	15.80

Table C Design Data for Petroleum and Chemical Storage Tanks based on July 2007 recalculation

Description	Number	Type	Capacity (gallons)	Height/Length (ft.)	Diameter (ft.)
Condensate Storage	1	Vertical	214,339	30	36
Raw Water Storage	1	Vertical	238,000	30	38
Oil Storage	2	Vertical	234,810	30	36.5
Ammonia Storage	2	Horizontal	5,000	12.7	8.5
Waste Neutralization	1	Vertical	20,000	25	13
Bulk H2SO4 Storage	1	Vertical	2,000	6.6	7.5
Bulk NaOH Storage	1	Vertical	2,000	6.6	7.5
Bulk Sodium Phosphate Storage	1	Vertical	275	4.4	3.6
Bulk Amine Storage	1	Vertical	275	4.4	3.6
Bulk O2 Scavenger Storage	1	Vertical	275	4.4	3.6
Brine Storage	1	Vertical	305	4.1	3.8
Amine Storage	1	Vertical	500	N.A.	N.A.
Amine Storage	1	Vertical	80	N.A.	N.A.
Water Treatment Chemicals	4	Drums	50	N.A.	N.A.
Emergency Gengerator Fuel Oil Storage Tank	1	N.A	1500	N.A.	N.A.

Table C Design Data for Petroleum and Chemical Storage Tanks contained in August 9, 2005 approval

Description	Number	Type	Capacity (gallons)	Height/Length (ft.)	Diameter (ft.)
Condensate Storage	1	Vertical	650,000	32	60
Raw Water Storage	1	Vertical	200,000	26	36
Oil Storage	2	Vertical	115,000	20	32
Ammonia Storage	2	Horizontal	5,000	12.7	8.5
Waste Neutralization	1	Vertical	7,000	12	10
Bulk H2SO4 Storage	1	Vertical	1,000	8	6
Bulk NaOH Storage	1	Vertical	1,000	8	6
Bulk Sodium Phosphate Storage	1	Vertical	1,000	8	6
Bulk Amine Storage	1	Vertical	1,000	8	6
Bulk O2 Scavenger Storage	1	Vertical	1,000	8	6
Brine Storage	1	Vertical	1,000	8	6
Water Treatment Chemicals	4	Drums	50	N.A.	N.A.

Appendix C

Supporting Documentation for the Air Quality Modeling Results

Earth Tech letter dated November 20, 2007 regarding modeling protocol

Follow up memorandum dated January 22, 2008

Follow up memorandum dated February 28, 2008

Dr. Petersen's Analysis (Letter and Supporting Documentation)

EarthTech
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November 20, 2007

Mr. Brian Hennessey
U.S. Environmental Protection Agency – Region 1
1 Congress Street
Suite 1100
Boston, MA 02114-2023

Subject: **Air Quality Modeling Protocol**
Proposed Central Heating Plant
University of Massachusetts
Amherst, Massachusetts

Dear Mr. Hennessey:

Earth Tech, Inc. is providing in this letter the proposed procedures for a dispersion modeling analysis intended to assess the potential air quality impacts associated with particulate emissions from the proposed Central Heating Plant (CHP) at the University of Massachusetts in Amherst, Massachusetts. The air quality impact assessment is required to demonstrate compliance with applicable ambient air quality criteria in accordance with the requirements of the Prevention of Significant Deterioration (PSD) regulation (40 CFR Part 52.21). The project was previously permitted in 2004 with the Massachusetts Department of Environmental Protection Agency (Mass DEP) issuing a Permit on February 20, 2004 and a modified permit on August 9, 2005. The Environmental Protection Agency (EPA) issued a PSD permit for the facility on July 27, 2005. A revised application is now required, because of differences between the facility as permitted and "as-built". The proposed modeling procedures closely follow those used in 2004-2005, as described in the 2005 PSD application submitted in August 2004.

Project Overview

The University of Massachusetts Building Authority (the Authority) proposes to construct and operate a new Central Heating Plant at University's campus in Amherst, Massachusetts. The proposed CHP will consist of a combustion turbine nominally rated at 10 megawatts, a heat recovery steam generator (HRSG) with a duct burner, three conventional package boilers (two rated at 162.9 MMBtu/hr on natural gas and one boiler rated at 179.7 MMBtu/hr on natural gas) , and an emergency generator. Because of limitations on the availability of natural gas, the Authority requires flexibility in fuel selection to meet the electrical and steam demand at the campus. Accordingly, the combustion turbine and package boilers are designed to burn either natural gas or transportation grade fuel oil; the duct burner is fired exclusively with natural gas. Upon startup of the CHP, UMass will be decommissioning the seven boilers fired with coal, fuel oil and natural gas at its existing steam plant, as well as the coal handling and storage facilities elsewhere on campus.

The proposed project is classified as a "major modification" to an existing major source of particulate matter with a mean diameter of 2.5 microns or less (PM2.5) and with a mean diameter of 10 microns or less (PM10) and, hence, is subject to the requirements of the PSD regulations for those pollutants, as specified in 40 CFR Part 52.21. Because the plant is not classified as a major modification of either nitrogen oxides (NOx) or volatile organic compounds (VOC), it is not subject to the requirements of Nonattainment New Source Review (NNSR) as set forth in 310 CMR 7.00, Appendix A. In support of the PSD permit application, an air quality impact assessment is required to demonstrate that the proposed project will comply with the applicable National Ambient Air Quality Standards (NAAQS) and PSD allowable increments. The remainder of this letter provides the protocol for the revised dispersion modeling analysis.

Modeling Procedures

This section describes the dispersion modeling procedures that are proposed for the air quality impact assessment, including the models employed, the model input options, and the supporting meteorological, terrain, air quality and point source data.

Technical Approach

The objective of the air quality modeling analysis is to demonstrate that the PM_{10} emissions from the proposed project will comply with the applicable NAAQS and PSD allowable increments. Currently, the Town of Amherst is located in a region classified as an attainment area for PM_{10}. To identify those new sources with the potential to violate or contribute to a violation of ambient air quality standards, the EPA has adopted significant impact levels (SILs) for criteria pollutants, including PM_{10}. If the impacts of a new source are found to be below the SILs, no further analysis is required to assess compliance with ambient air quality criteria. If the impacts are found to exceed the SILs, on the other hand, a more detailed dispersion modeling analysis is required to assess compliance with ambient air quality standards. This analysis must consider the impacts associated not only with the new source, but also with existing sources in the region.

Source Parameters

As previously stated, the combustion turbine system and boilers will have the capability of firing both natural gas and transportation grade fuel oil. Because particulate emissions are greater when firing fuel oil than when firing natural gas, the modeling analysis considers only the fuel oil firing configuration for each unit. Table 1 provides the stack parameters for the combustion turbine firing oil and the combustion turbine system with the duct burner firing natural gas under various operating loads and meteorological conditions. The stack parameters for the three package boilers firing oil under various operating loads are then provided in Table 2.

GEP Stack Height

The Good Engineering Practice (GEP) Guidelines provide a method for determining the GEP formula stack height based on the dimensions of the "nearby" structures. A structure is considered nearby if it is within "five times the lesser of the height or the width dimension of the structure." For the proposed CHP, the only building structures having a potential effect on the stack emissions from the combustion installations are elements of the Turbine and Boiler Building at the CHP. According to the GEP Guidelines, the GEP formula stack height equals the controlling structure's height plus 1.5 times the lesser of the structure's height or projected width. Based on the building's maximum height of 56 feet, the GEP formula height is 140 feet above grade. The University has constructed four 125-foot stacks, one serving the combustion turbine/HRSG and the others serving the three package boilers. A 118-foot "screen" enclosure surrounds the four stacks. Potential wake effects from the Turbine and Boiler Building and the stack enclosure will be considered. The "PRIME" version of the EPA Building Profile Input Program (BPIPPRM) will be used to define building inputs for AERMOD.

Model Selection

The AERMOD model, version 07026, is proposed for this application. This is the current, EPA-recommended version of AERMOD (Support Center for Regulatory Air Modeling (SCRAM) website, November 18, 2007). AERMOD is the recommended model for industrial source applications, per the EPA *Guideline on Air Quality Models*, 40 CFR 51 Appendix W, revised November 9, 2005.)

Meteorological Data

Dispersion models use meteorological data, including wind speed and wind direction, to simulate the transport and dispersion of air contaminants in the atmosphere. According to the EPA Guideline on Air Quality Models, modeling analyses should use either one-year of onsite observations or five years of nearby, representative observations compiled by the National Weather Service.

Because there are no onsite meteorological measurements available at the project site, representative observations from the nearest NWS station are used in the modeling analysis. The nearest first-order weather station is located at Westover Air Force Base (AFB) in Chicopee Falls, Massachusetts (FAA Identifier CEF, WBAN No. 14703). This station is located approximately 13 miles south of the site. The five-year data record 1991 through 1995 was used for the 2005 application and is proposed for the current application. The nearest upper air soundings collected during the same period were available from Albany, New York (FAA Identifier ALB, WBAN No. 14735). These soundings were used in conjunction with the surface observations from Westover AFB to develop the mixing heights used in the modeling analysis.

The AERMET (version 02222) was used to process the surface and upper air data. AERMET requires roughness length, albedo and daytime Bowen ratio. Land use characteristics around the data collection site were used to characterize the roughness length, albedo and Bowen ratio, consistent with EPA recommendations. Land use at Westover AFB was classified as "Urban" for wind directions 210 through 325 degrees, and "Grassland" for directions 325 through 210. The seasonal values for roughness length, albedo and Bowen ratio were taken from Tables 4-1, 4-2 and 4-3, respectively, of the *AERMET Users Guide*, except that a roughness length of 0.5 m was chosen (instead of 1.0) for the "Urban" area.

Model Receptors

The four CHP stacks are adjacent to each other. A polar grid to 20 kilometers was defined to determine the Significant Impact Area. Modeling receptors were located every 10 degrees at the following distances from a central point among the stacks:

- 100-meter intervals from 100 to 2,000 meters;
- 250-meter intervals from 2,000 to 5,000 meters;
- 1000-meter intervals from 5,000 to 10,000 meters; and
- 2500-meter intervals from 10,000 to 20,000 meters.

This resulted in a total of 1,476 receptors. For the revised application, a new receptor grid was developed, based on a revised stack location. The source of elevation data was the USGS seamless National Elevation Data Set (NEDS). The elevation data (by latitude and longitude) for the area of interest were downloaded into ARCINFO and projected to UTM zone 18 with the WGS-84 datum. An ASCII XYZ file was created, with a resulting default resolution of 8.8 m between elevation points.

An Earth Tech developed program based on AERMAP was used to create an AERMOD-ready receptor file, using (1) the cell center elevation of the cell a receptor resides in for the receptor elevation and (2) the AERMAP algorithm for estimating scale height. Bi-linear interpolation of elevations (as in AERMAP) was not used, due to the high spatial density of NEDS sample points. The AERMAP program is designed for handling multiple USGS quadrangle DEM's with a row and column length less than 2500 elements. The current version of AERMAP treats only bluebook formatted data files. The AERMAP modeling Addendum indicates that NEDS data handling is planned, but is not presently available.

Background Air Quality

The CHP will be located in Hampshire County, which is currently designated as an attainment area for PM_{10}. If the projected impacts of PM_{10} from the proposed CHP are greater than the SILs, background contributions of PM_{10} from major sources affecting the Significant Impact Area, along with the contribution of other smaller sources estimated from monitored background, must be added to the projected impacts of the proposed plant in determining compliance with the standards.

The major sources within 25 km of the proposed site were identified by John Kirzec of the DEP. These sources include the following combustion installations: Mount Holyoke College, Mount Tom, MMWEC, Solutia, and MASSPOWER. These sources were included in the assessment of compliance with the NAAQS. Of these sources, only MMWEC and MASSPOWER were subject to the PSD regulations for PM_{10} and, hence, must be included in the assessment of PSD allowable increment. The stack parameters for these major sources are provided in Table 3.

To estimate the contribution of other minor sources in the region, ambient PM_{10} background concentrations were based on the peak short-term and annual average concentrations measured at nearby Mass DEP monitoring stations over the last three years. The Main Street (AIRS #25-013-2009) station operated in 2004-2006. Table 4 summarizes the background concentrations for PM_{10}.

If you have any questions about our proposed modeling approach or preliminary modeling results, please do no hesitate to contact me at (978) 371-4258. Upon resolution of comments received on this protocol, we will revise the air quality modeling analysis and document the final results in the PSD permit application.

Sincerely yours,

Earth Tech, Inc.

Richard J. Londergan, Ph.D.
Senior Program Director

cc: Richard Fields, Mass DEP
Dan Brown, U.S. EPA Region 1
Stephan Chait, University of Massachusetts Building Authority
Judy Bourdon, Earth Tech

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Table 1

Stack Parameters for Combustion Turbine (with Duct Burner)

Fuel Type	**Fuel Oil**								
Load Condition	**100%**			**75%**			**50%**		
Ambient Temperature (°F)	0	60	100	0	60	100	0	60	100
Stack Height (m)	38.10	38.10	38.10	38.10	38.10	38.10	38.10	38.10	38.10
Stack Diameter (m)	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
Exit Velocity (m/s)	21.37	17.41	15.39	18.37	15.89	13.96	15.87	14.15	13.30
Exit Temperature (°K)	436.1	436.1	436.1	436.1	436.1	436.1	436.1	436.1	436.1
PM_{10} Emissions (g/s)	1.15	1.05	0.97	1.03	0.93	0.88	0.84	0.86	0.82

Table 2

Stack Parameters for Package Boilers

Fuel Type	**Fuel Oil**		
Load Condition	**100%**	**75%**	**50%**
Boiler 200			
Stack Height (m)	38.10	38.10	38.10
Stack Diameter (m)	1.37	1.37	1.37
Exit Velocity (m/s)	13.88	10.41	6.94
Exit Temperature (°K)	440.0	440.0	440.0
PM_{10} Emissions (g/s)	0.87	0.66	0.44
Boiler 300 and 400			
Stack Height (m)	38.10	38.10	38.10
Stack Diameter (m)	1.37	1.37	1.37
Exit Velocity (m/s)	12.57	9.43	6.28
Exit Temperature (°K)	440.0	440.0	440.0
PM_{10} Emissions (g/s) (each)	0.79	0.59	0.40

Table 3

Major Sources in The Region

Source	Heat Input (MMBtu/hr)	UTM Coordinates (m)		Stack Height (m)	Stack Diameter (m)	Temperature (°K)	Exit Velocity (m/s)	PM_{10} Emissions (g/s)
		Easting	Northing					
Smith College	289.2	694493.4	4686997	48.77	1.32	555.2	27.22	4.37
Mt. Tom	1480	697447.1	4683556.5	112.77	3.05	555.2	26.16	14.92
MMWEC	952	704221.1	4669917	45.72	4.72	555.2	7.00	4.80
	952	704221.1	4669917	45.72	4.72	555.2	7.00	4.80
	952	704221.1	4669917	45.72	4.72	555.2	7.00	0.00
	952	704221.1	4669917	36.57	4.34	555.2	8.29	4.80
	952	704221.1	4669917	36.57	4.34	555.2	8.29	0.00
Solutia	249	704662.5	4670028.5	59.74	2.13	555.2	8.98	0.85
MASSPOWER	1250	705502.9	4674506.5	64.92	4.80	555.2	8.91	7.72
	1250	705502.9	4674506.5	64.92	4.80	555.2	8.91	7.72

Table 4

Measured Background Concentrations of PM_{10} (2004-2006)

Pollutant	Averaging Period	Measured Concentration (µg/m³)			Background Concentration (µg/m³)[a]
		2004	2005	2006	
PM_{10}		Main St, Springfield (ID 25-013-2009)			
	24-hour	48	53	49	51[a]
	Annual	19.4	23.6	18.6	20.5[b]

[a] 24-hour background value for PM_{10} is the 4th highest value over three years;.

[b] Annual background value for PM_{10} is the average of the annual average values over three years; (the annual NAAQS for PM_{10} has been rescinded).

1/22/08

Modeling for Central Heating Plant at UMass Amherst

This memorandum presents our modeling approach and provides supporting information for the proposed modeling approach for the CHP stacks and screens. Standard modeling techniques are not well-suited to this unique design of the stacks with the aesthetic screens.

The three boiler stacks and the turbine stack are grouped in a cluster and supported by a common superstructure, surrounded on the north and south by two porous aesthetic screens. The boilers are vented through three identical 125 feet high, 54-in diameter stacks. The gas turbine/HRSG is vented through a 125 feet high, 72-inch diameter stack. The stacks are arranged as shown in Figure 1 attached.

Figures 2 through 5 provide views of the stacks and screens from different vantage points. Figure 2 shows a West view of the stacks and screens, with the screens on either side of the turbine stack. Figure 3 shows the East view, with two boiler stacks visible between the screens. Figure 4 shows a long-range view of the screens from the South; the tops of the stacks are visible above the screen. Figure 5 is an enlarged South view, with two of the boiler stacks visible through the screen. The screens are constructed of 4-ft by 8-ft stainless steel panels; individual panels can be seen in Figure 5. A close-up view of a screen is provided in Figure 6. More than 50 % of the surface area of the screen is open, allowing air to flow through as well as around the screens.

For this application, the boiler stacks are being modeled as a single "merged" stack, with an "effective" diameter that produces the same cross-sectional area as the three individual stacks. (The effective diameter is 93.5 inches, or 1.732 times the single-stack diameter.) This approach is supported by four considerations:

(1) the same modeling approach was followed in the original (2002) application, for a similar stack configuration. That approach was approved by both EPA Region I and MaDEP, for a nearly identical stack arrangement;

(2) the stacks are identical, and the design exhaust temperatures and air flows are very similar for each of the boilers (at full load, the flow from B-200 is about 12 % higher). The stack parameters (temperature, flow and exit velocity) by load are summarized for the boilers and turbine in Table 1. The turbine stack has considerably higher exit velocity and a different exit diameter; this stack would be modeled separately.

(3) The separation distance between neighboring stacks is so small that individual plumes will rapidly disappear. The individual plumes will mix and merge within a few tens of meters downwind of the stack exit, as the warm, buoyant plumes expand and entrain ambient air upon exiting the stacks. AERMOD and other regulatory models account for this expansion as "buoyancy-induced dispersion". Attachment A, from the Model Clearinghouse, indicates that EPA has supported the "merged stacks" approach in the past under similar circumstances.

(4) Merging stacks should have only a minor effect (if any) on predicted building-wake downwash, since the stack exit velocity (and momentum plume rise) is conserved. The primary effect on predictions will be seen farther downwind, where buoyant plume rise is more important.

While the porous screen will obviously induce less of a "building wake" than a solid structure of the same dimensions, we are aware of no practical alternatives to the "Building Profile Input Program" (BPIP) for use with AERMOD. This BPIP approach will disregard the airflow through the screens and will therefore greatly overstate any wake effect that might result from the screens. With this approach, it may be necessary to remove the top row of panels from both screens, in order to achieve predicted compliance with air quality standards and increments.

Table 1 – Stack Parameters with Oil Firing

	Boiler 200	Boiler 300	Boiler 400	Turbine plus DB
100% Load				
Exit velocity (m/s)	16.93	14.97	14.97	21.77
Exit temperature (K)	434	425	425	434
Flow (ACFM)	52,988	46,867	46,867	121,040
75% Load				
Exit velocity (m/s)	12.10	10.68	10.68	20.43
Exit temperature (K)	417	409	409	431
Flow (ACFM)	37,887	33,420	33,420	113,653
50% Load				(65% Load)
Exit velocity (m/s)	7.88	6.99	6.99	19.66
Exit temperature (K)	402	397	397	431
Flow (ACFM)	24,677	21,878	21,878	109,417

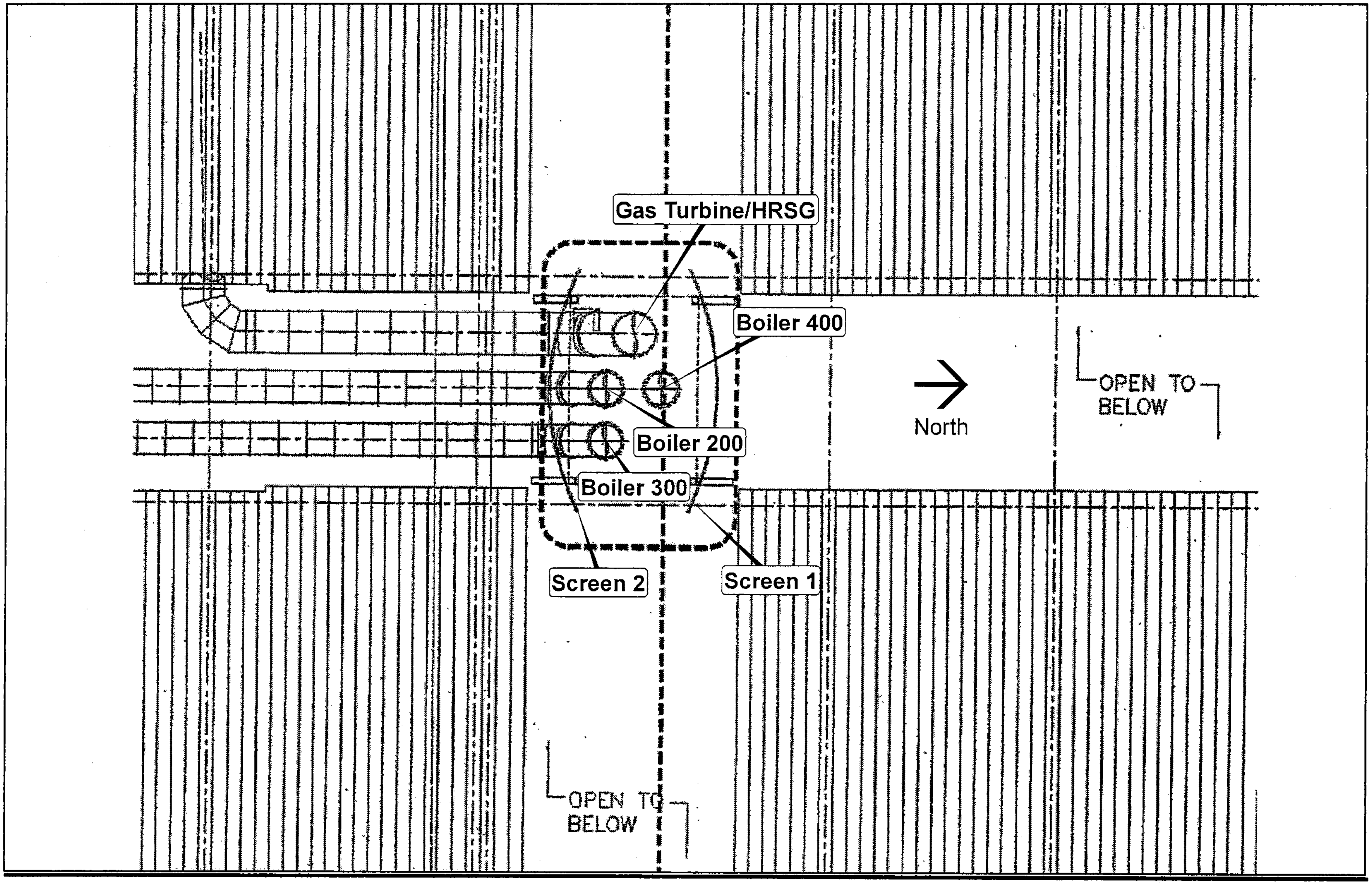


Figure 1
Detail of Stack and Screens

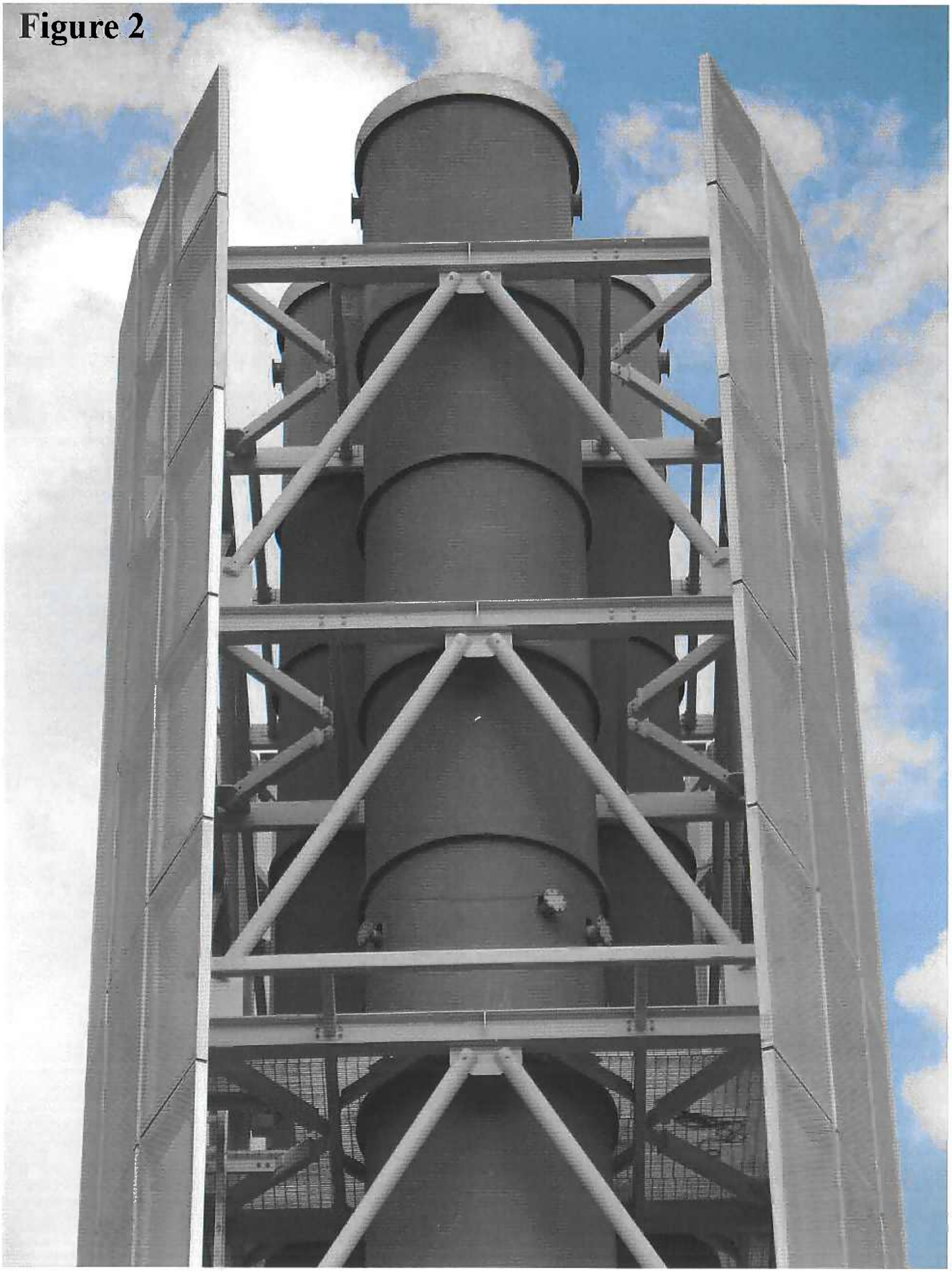
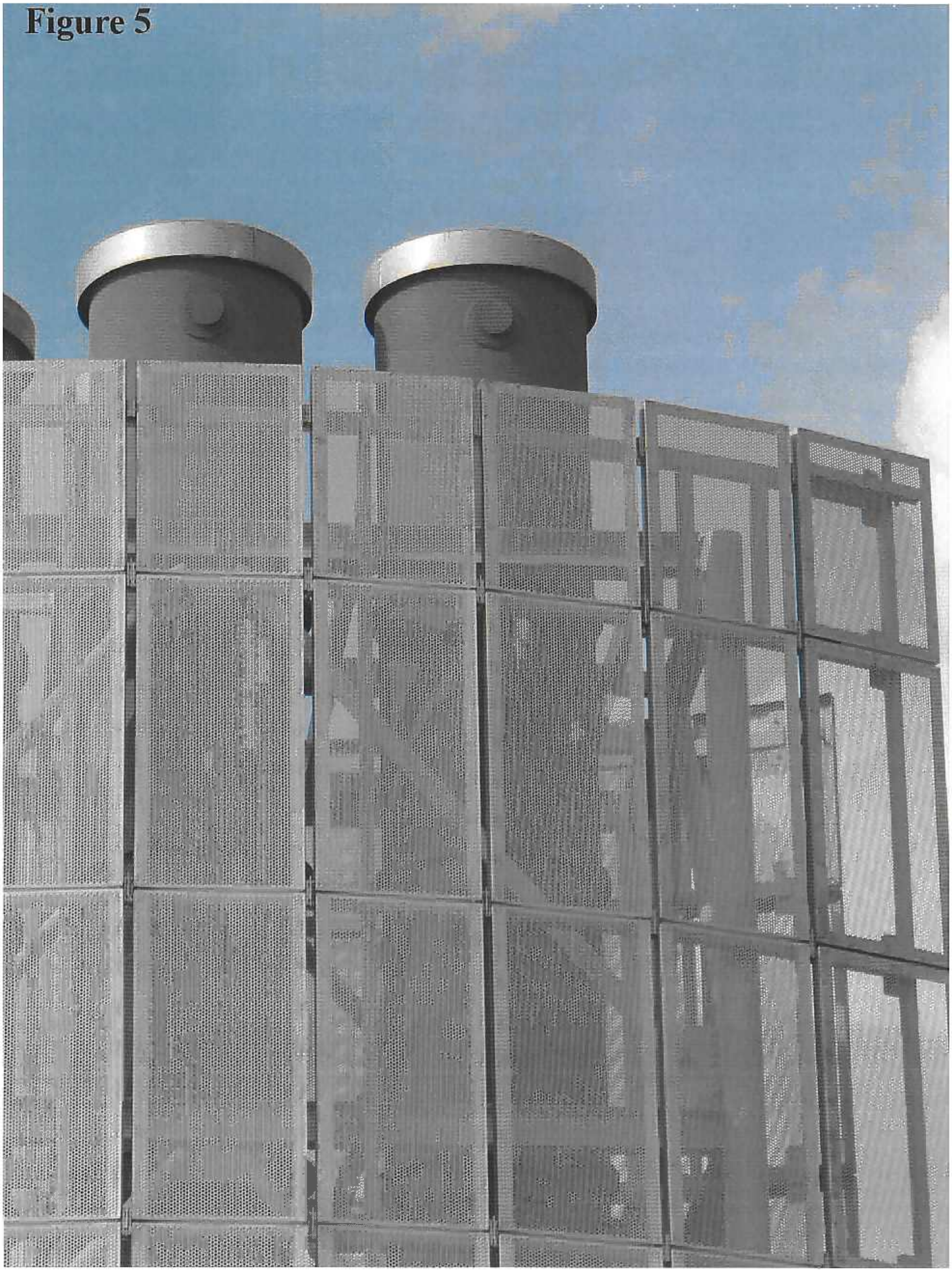


Figure 2

Figure 3

Figure 4

Figure 5



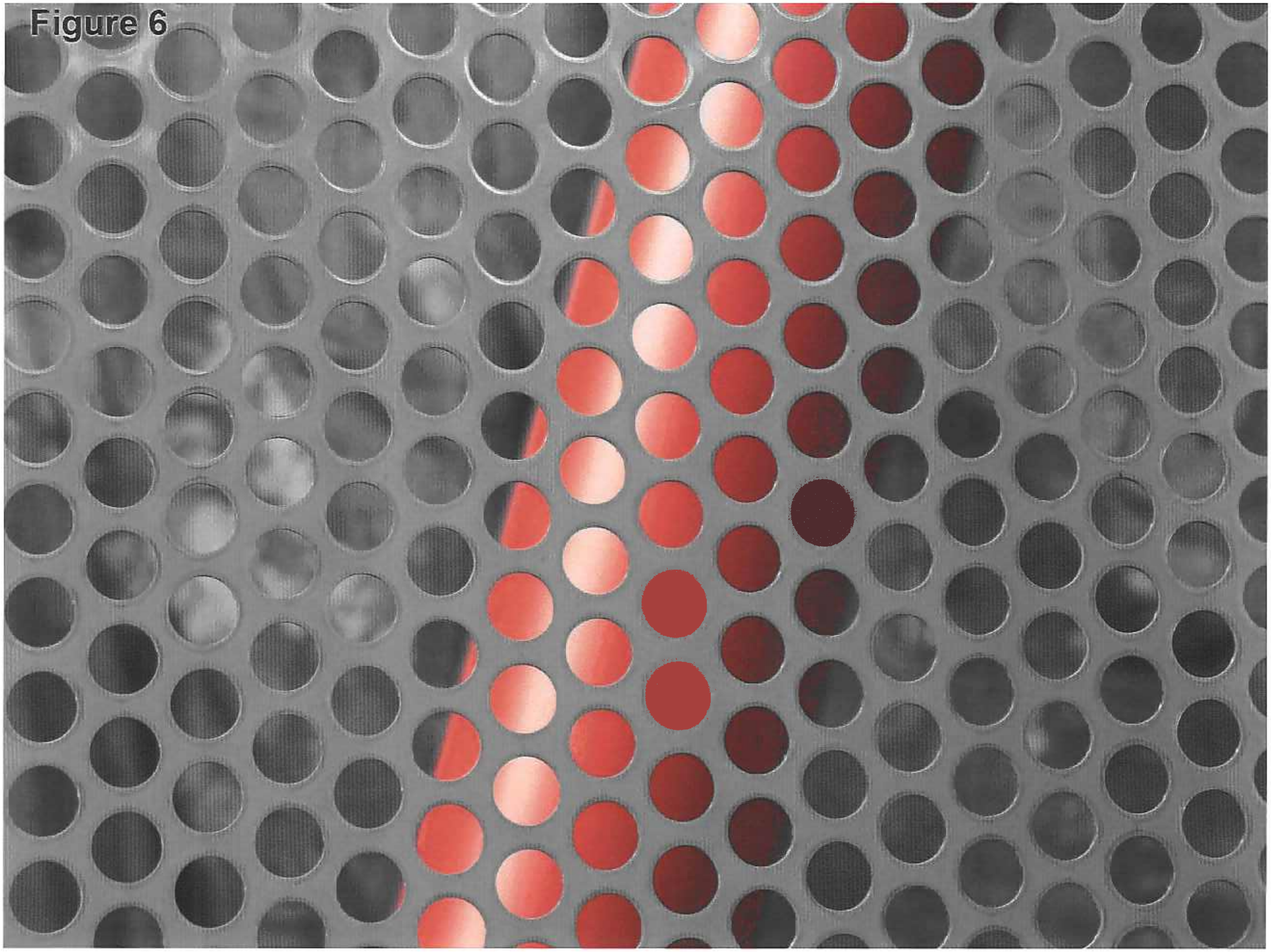


Figure 6

Attachment A

From: MODEL CLEARINGHOUSE
Subject: Merged Stacks

The memo reproduced below addresses the issue of combining the flows from neighboring stacks and treating them as a single stack. Based on my review, this is the discussion that is most pertinent to the CHP case. The "New Jersey" case, with three stacks in a "cluster", is similar to the CHP boiler stacks. In that case, as with the CHP, the separation distances between neighboring stacks were less than one stack diameter.

TO: D. Doll, D. Wilson
FROM: M. Onischak, Region V
DATE: 8/12-14/96
TIME:
SUBJ: Ohio Bubble

SUMMARY OF COMMUNICATION:
Source in OH wants to do a bubble but wants to avoid having to model by showing that the sources that are increasing emissions are the ones that always have the higher effective plume height. (This scenario is allowed under the bubble policy.) However, they cannot make this showing by modeling existing sources separately so they want to combine the flows from neighboring stacks and treat them as if they were being emitted from the same stack. The stacks are relatively close to each other.
Issues: 1. Is there written guidance on what stack separation distance qualifies for them to be treated as one for modeling purposes? 2. Are there cases from the past where the C/H has dealt with this question?
C/H Comments: 1. There does not seem to direct written guidance on the stack separation question. However, long standing common practice has been to model separate stacks as separate sources, each with its own plume rise independent of its neighbor. Likewise it has been long-standing practice that multi-flued stacks are treated as a single source. This practice is reflected in the GEP stack height regulations and guidance where it presumed that merged plumes, including multi-flued stacks, would be technically modeled as a single stack with combined flow parameters. (However, except under certain circumstances, the source would not get credit for modeling them this way and for purposes of determining emission limits, would have to go back and remodel as if they were separate stacks.)
2. There are at least 2 cases in the C/H records where this issue has been dealt with. In one case in Nebraska in FY86, the source wanted to be allowed to model stacks with diameters 1 to 2 meters, and separated by distances of 4 to 9 meters ranging from as single sources. Region VII wrote a memo to the C/H indicating that if the source wanted to do this they would need to undertake a field study to show the plume merging is warranted. The C/H agreed with Region VII. (The field study was never undertaken.) (C/H Record 86-VII-04)
In the second case a source in NJ had 3 stacks 15 feet in diameter arranged in a cluster and separated by about 5 feet from each other. In this case the C/H said that these stacks are

really the same as a multi-flued stack. The logic for this decision is based in Section 3.3.2 of the GEP Stack height guideline, buildings that are sufficiently close together should be treated as a single building for purposes of determining L in the stack height formula. This logic was extended to closely separated stacks, with the general result that if the stacks are separated by less than their width (diameter), they could be treated as one (C/H Record 91-II-01). It is not clear whether this logic can be extended to stacks that are not clustered but perhaps, in a line. It is also not clear that one could treat closely clustered stacks as one if such stacks were significantly different in height from each other. In such a case, under moderate or greater wind speeds, one can envision that both plumes are immediately "bent over" by the wind and would not merge for significant distances downstream. One could use the same logic if the volumetric flow rates from the adjacent stacks were greatly different. For example, if one stack had a very large volumetric flow rate and high buoyancy while its neighbor had a low flow, low buoyancy plume, then again a moderate wind would probably bend over each plume separately and keep the two plumes from merging, at least initially.

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Memo

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February 28, 2008

To: Brian Hennessey, EPA Region I

Copy: Richard Fields, Massachusetts DEP

From: Richard Londergan

Subject: Stack Merging and Issue of "Prohibited Dispersion Techniques"

The most pertinent EPA guidance relating to "merged gas streams" in the context of the stack height regulations is summarized in an EPA memorandum entitled *Implementation of Stack Height Regulations – Exceptions from Restrictions on Credit for Merged Stacks*, dated October 28, 1985. The prohibition relating to merging of gas streams, or combining of stacks, is intended to prevent a facility from using those techniques in order to increase allowable emissions or to avoid emission controls. The EPA memorandum allows credit for merging of gas streams under the following circumstances:

"*A. The source owner or operator demonstrates that the facility was originally designed and constructed with such merged gas streams;*

B. After July 8, 1985, such merging is part of a change in operation at the facility that includes the installation of pollution controls……

C. Before July 8, 1985, such merging was part of a change in operation at the facility that included the installation of emissions control equipment or was carried out for sound economic or engineering reasons. Where there was an increase in the federally-approved emission limitation for any pollutant or, in the event that no emission limitation was in existence prior to the merging, an increase in the quantity of any pollutants actually emitted from existing units prior to the merging, the reviewing agency shall presume that merging was significantly motivated by an intent to gain emissions credit for greater dispersion. Absent a demonstration by the source owner or operator that merging was not significantly motivated by such an intent, the reviewing agency shall deny credit for the effects of such merging in calculating the allowable emissions for the source."

Under this guidance, the boiler stacks for the new Central Heating Plant (CHP) at the University of Massachusetts – Amherst qualify for credit on several grounds. First, since the CHP is a new facility, it is self-evident that the facility was originally designed and constructed with the present stack configuration. (The original design as permitted in 2004 had an equivalent configuration of stacks on the south end of the Boiler and Turbine Building. For the current design, the stacks were moved to the north end of the building, but the stack height and spacing between stacks did not change.)

Second, the stack configuration is related primarily to the alignment of the package boilers in the CHP. Boiler flues exit the CHP into a roof "slot", and then are routed along the "slot" (for aesthetic purposes) to the north end of the CHP. The spacing of the vertical stack cluster is dictated by the installation and maintenance access of the Continuous Emission Monitoring System. This configuration was a result of economic engineering design and entirely unrelated to dispersion considerations. The stacks in question are not self-supporting structures, but instead are a group of exhaust ducts supported by an external frame superstructure. With this stack "cluster", a single superstructure supports four stacks (the three boiler stacks and the turbine stack). Four separate, self-supporting 125-foot stacks (or four separate superstructures) would be far more expensive and would also be of less positive value for building design and aesthetics.

Third, enhanced dispersion would not provide a means for CHP emission units to avoid emission controls. Under PSD New Source Review, the facility is subject to BACT requirements; economically feasible emission controls are required, independent of the magnitude of ambient air quality impacts. The proposed facility satisfies BACT for PM_{10} using state-of-the art burner design, combustion controls and clean-burning fuels.

For all of these reasons, we conclude that credit for merged gas streams is allowable for the CHP boiler stacks.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

OCT 28 1985

MEMORANDUM

SUBJECT: Implementation of Stack Height Regulations - Exceptions From Restrictions on Credit for Merged Stacks

FROM: Darryl D. Tyler, Director
Control Programs Development Division (MD-15)

TO: Director, Air Management Division
Regions I-X

This guidance has been prepared to address two issues pertaining to credit for merged stacks prior to July 8, 1985. It establishes a procedure that should be used to prepare and to review justifications for merging gas streams for economic or engineering reasons, and to address the presumption that merging was significantly motivated by an intent to gain credit for increased dispersion. Please note that this is guidance; States may submit alternative demonstrations in support of merged stack exemptions if they feel the individual circumstances warrant.

Background

Recent revisions to EPA's stack height regulations place certain restrictions on the degree to which stationary sources may rely on the effects of dispersion techniques when calculating allowable emissions. One such restriction is provided for the merging of gas streams, or combining of stacks. Several exemptions have been provided in the regulation, however. More specifically, 40 CFR Part 51.1(hh)(2)(ii) allows credit under circumstances where:

A. The source owner or operator demonstrates that the facility was originally designed and constructed with such merged gas streams;

B. After July 8, 1985, such merging is part of a change in operation at the facility that includes the installation of pollution controls and is accompanied by a net reduction in the allowable emissions of a pollutant. This exclusion from the definition of "dispersion techniques" shall apply only to the emission limitation for the pollutant affected by such change in operation; or

C. Before July 8, 1985, such merging was part of a change in operation at the facility that included the installation of emissions control equipment or was carried out for sound economic or engineering reasons. Where there was an increase in the federally-approved emission limitation for any pollutant or, in the event that no emission limitation was in existence prior to the merging, an increase in the quantity of any pollutants actually emitted from existing units prior to the merging, the reviewing agency shall presume that merging was significantly motivated by an intent to gain emissions credit for greater dispersion. Absent a demonstration by the source owner or operator that merging was not significantly motivated by such an intent, the reviewing agency shall deny credit for the effects of such merging in calculating the allowable emissions for the source.

General Requirements

Figure 1 illustrates a framework for evaluating claims for merged stack credit. Because merged gas streams are generally regarded as prohibited dispersion techniques under the regulations, it is incumbent on the State or the source owner or operator to demonstrate that such merging was conducted for sound economic or engineering reasons, and was not significantly motivated by an intent to avoid emission controls. Consequently, the first step should entail a review of State and EPA files to determine the existence of any evidence of intent on the part of the source owner or operator. Information showing that merging was conducted specifically to increase final exhaust gas plume rise serves as a demonstration of dispersion intent that justifies a denial of credit for merged gas streams. Demonstrations that merging was carried out for sound economic or engineering reasons are expected to show that either the benefits of merging due to reduced construction and maintenance costs outweigh the benefits relating to lower emission control costs or that relevant engineering considerations showed the merging to be clearly superior to other configurations.

Demonstration Requirements

Several exemptions from prohibitions on gas stream merging are provided for existing sources in the stack height regulations:

1- where sources constructed their stacks before December 31, 1970,

2- where the total facility-wide emissions from the source do not exceed 5,000 tons per year,

3- where the facility was originally designed and constructed with merged gas streams, and

4- where the merging was part of a change in facility operation that included the installation of pollution control equipment and resulted in no increase in the allowable emissions of any pollutant.* Where there was an increase in emissions in conjunction with the merging and installation of control equipment, the regulations require that source owners also make an affirmative demonstration that the merging was not motivated by dispersive intent.

*Where there was no federally-approved emission limit prior to merging gas streams, there must be no increase in the actual emissions of any pollutant. Moreover, it is incumbent on the State to demonstrate that there was a logical relationship between the merging of existing gas streams and the installation of controls.

Sources that are not covered under these criteria may still qualify for exemption if they can show that merging was conducted for sound economic or engineering reasons. Such demonstrations should include justifications for having replaced existing stacks. This may be done, for instance, by documenting through maintenance records, correspondence, or other contemporaneous evidence, that the existing stacks had reached the end of their useful life, were prematurely corroded, had sustained other damage making them unservicable, were of a height less than that regarded as good engineering practice, thereby causing downwash problems, or that the addition of new units at the facility necessitated additional stacks and insufficient land was available. The absence of any evidence supporting the need for stack replacement creates a strong presumption that merging was carried out specifically to avoid the installation of pollution controls, i.e., was "significantly motivated by an intent to gain emissions credit for increased dispersion."

No Increase in Allowable Emissions

Once this initial criterion is satisfied, demonstrations may show that merging was based either on sound economic or sound engineering reasons. Claims based on strict engineering justifications may be more difficult to show, since the existence of more than one reasonable engineering solution generally leads to a decision based on economics. However, if it can be documented that the merged stack configuration was clearly superior to other stack configurations for purely engineering reasons, without consideration of cost, then credit for merging may be granted.

In order to most reliably implement the provisions of the regulations regarding the merging of gas streams for sound economic reasons, it would be necessary to ascertain the actual intent of the source owner or operator at the time the decision was made to merge gas streams. Recognizing that the difficulty of doing so was the basis for EPA's rejection of an "intent test" in the rule, the following approach provides a surrogate demonstration of intent. This approach is summarized in Figure 2.

Because the potential savings attributable to the avoidance of pollution controls can significantly influence decisions to merge stacks, one way to show the absence of dispersion intent is to conduct an analysis of the annualized capital and maintenance costs for merged stacks and for individual stacks, and compare the results to the compliance costs (fuel and operation and maintenance of any control equipment) calculated based on the emission limitations derived with and without merged stack credit. If, when the difference in capital and maintenance costs is compared with the difference in compliance costs over the period of capital amortization, the capital and maintenance cost saving is greater than the compliance cost saving, then merging can be accepted as having a sound economic basis.

In establishing this rule of thumb, we are aware that a benefit of as little as 10-20 percent could be considered "significant" in the context of the court's holding on this matter--i.e., such a benefit could have been considered to be a relevant factor in decisions to construct merged stacks.

However, recognizing that documentation of cost analyses after an extended period of time--up to 15 years--is likely to be limited, we believe that the 50 percent test articulated above would constitute a more reasonable basis for initial determinations (that is, a level at which we believe that there was likely a significant incentive to merge stacks to avoid control requirements).

Affirmative Demonstrations of Nondispersion Intent

In some instances, a State or emission source owner may not be able to make a demonstration as described above, or believe that sound economic reasons existed for merging stacks, regardless of the relationship between financial savings attributable to reduced emission control requirements versus lower stack construction cost. In such cases, an opportunity should be provided to affirmatively demonstrate that merged stacks were not "significantly motivated by an intent to obtain emissions credit for increased dispersion." The burden of proof rests solely with source owners or operators attempting to make this showing.

Demonstrations may rely on any relevant evidence, including but not limited to the following:

- construction permits, or permits to operate from pollution control agencies
- correspondence between the source owner or operator and government agencies
- engineering reports relating to the facility
- facility records
- affidavits
- any other relevant materials

For instance, such a demonstration could be made by submitting documentary or other evidence (e.g., internal company memoranda presenting the alternative construction opportunities available to the company) that indicates the intent of the source owner or operator and shows that consideration of dispersion advantages was conspicuously absent.

Alternatively, it might be shown that either action by the State in approving a revised emission limit followed actual merging sufficiently later in time to suggest that dispersion credit was not considered by the source at the time of merging or the State approved limit was unrelated to the merging.

In attempting to make demonstrations, source owners or operators should present as much evidence as can be located, with the understanding that demonstrations based on any single category of evidence (such as affidavits) presented in isolation are less likely to constitute acceptable showings than demonstrations based on cumulative bodies of evidence.

As discussed below, affirmative showings will be required of sources whose merged stacks were associated with an increase in allowable emissions as well as some sources whose mergers were not associated with such increases. However, EPA expects sources whose emission limits increased subsequent to the merging to present stronger showings than those with no increase, since the regulatory definition of "dispersion technique" views such increases as an explicit indication that the merged stacks were significantly motivated by an intent to gain credit for increased dispersion. Sources who do not increase their emissions, but who have difficulty making other demonstrations, such as the installation of pollution controls, or merging for sound economic or engineering reasons convey a more implicit indication of dispersion intent that must be rebutted; for such sources, however, the presumption of intent is not as compelling.

Increases in Allowable Emissions

As stated above, in cases where the allowable emissions of any pollutant increased in conjunction with the merging of gas streams, such an increase provides even stronger circumstantial evidence that merging was not carried out for sound economic or engineering reasons, but was "significantly motivated by an intent to gain emissions credit for greater dispersion." This presumption may be rebutted by making one of the following demonstrations.

1- by showing that the cost savings associated with reduced compliance costs for merged stacks are less than 50 percent of the total savings due to merged stacks (i.e., annual compliance savings plus annualized capital and maintenance savings), and by making an affirmative showing, as described above, that there was no significant motivation to gain credit for the increased dispersion provided by merged stacks; or

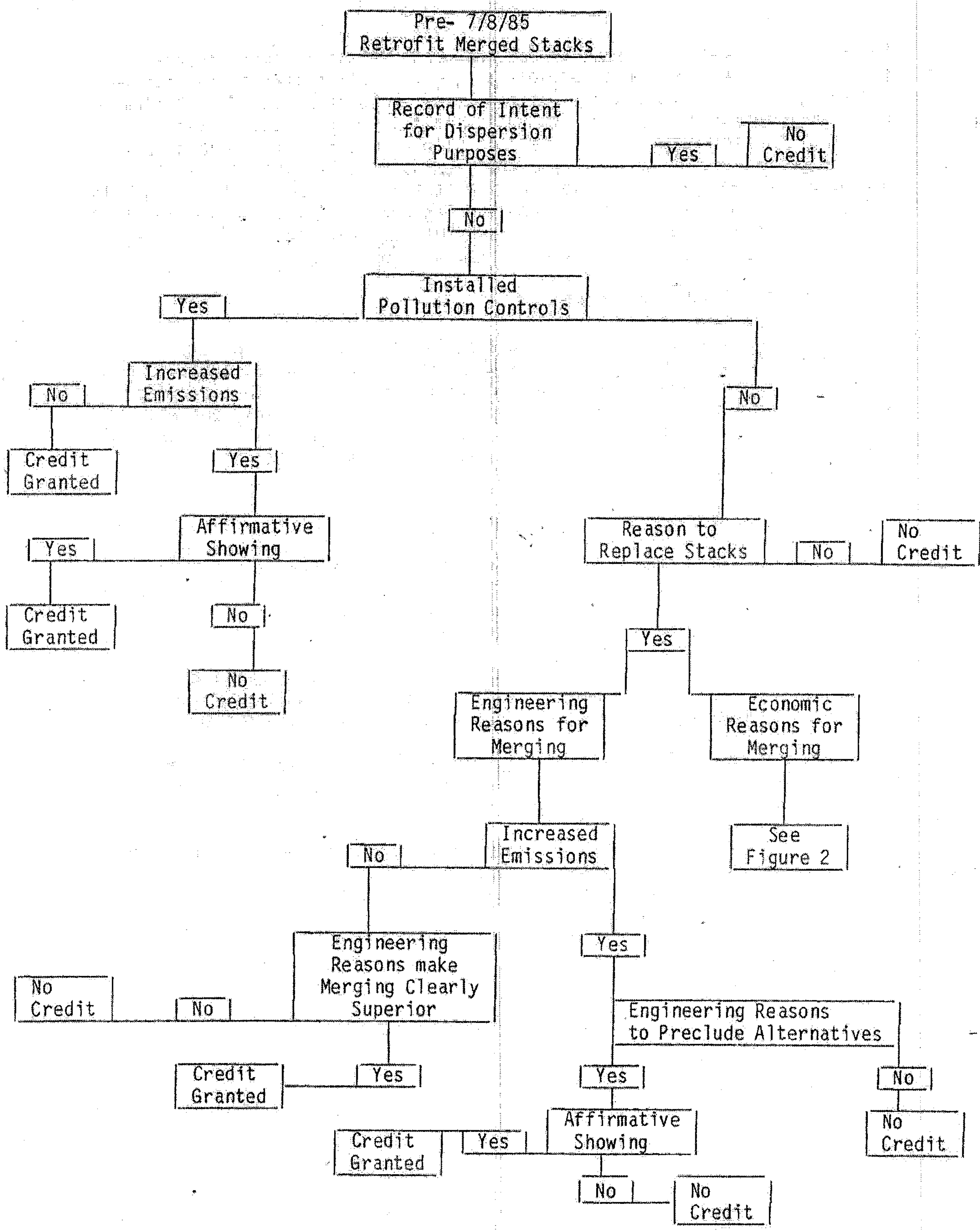
2- by showing that alternatives to stack merging were reasonably precluded strictly for engineering reasons, and by affirmatively demonstrating the absence of significant dispersion intent, as noted above.

In the absence of such a showing, it should be presumed that avoidance of emissions control was a significant factor in the decision to merge gas streams, and credit should be denied.

If you or your staff have any questions regarding the application of this guidance in specific instances, please contact Eric Ginsburg at (FTS) 629-5540 or Sharon Reinders at (FTS) 629-5526.

Attachments

FIGURE 1



Pre- 7/8/85
Retrofit Merged Stacks
Record of Intent for Dispersion Purposes
Yes
No Credit
No
Installed Pollution Controls
Yes
Increased Emissions
No
Credit Granted
Yes
Affirmative Showing
Yes
Credit Granted
No
No Credit
No
Reason to Replace Stacks
No
No Credit
Yes
Engineering Reasons for Merging
Economic Reasons for Merging
See Figure 2
Increased Emissions
No
Engineering Reasons make Merging Clearly Superior
No Credit
No
Credit Granted
Yes
Yes
Engineering Reasons to Preclude Alternatives
Yes
No
No Credit
Affirmative Showing
Credit Granted
Yes
No
No Credit

Figure 2

Economic Justification

for Merged Stacks

Savings due to Avoidance of More Stringent Emission Limit	No Increase In Emissions	Increase In Emissions
Less than 50% of Total Savings due to Merged Stack Construction	Credit Granted	Affirmative Showing
Exceed 50% of Total Savings due to Merged Stack Construction	Affirmative Showing	No Credit

March 27, 2008

Richard Londergan, Ph.D.
Earth Tech
300 Baker Avenue, Suite 290
Concord, MA 01742

Re: Appropriate Building Height Input into AERMOD for the UMass Amherst Central Heating Plant Boiler Stacks
CPP Project: 4453

Dear Dr. Londergan:

The purpose of this letter is to recommend the appropriate building height input into AERMOD to account for the porous screen surrounding the UMass Amherst Central Heating Plant Boiler Stacks. The relevant physical characteristics are summarized below.

- Boiler Stack Heights: 125 ft, AGL
- Screen Wall Height: 118 ft, AGL
- Screen Porosity: 50%
- Building Height: 56 ft, AGL

Use of the full height of the porous screen wall in the AERMOD model calculations would be unduly conservative. Past studies by CPP have demonstrated that the building height input for a porous structure should be less than the actual physical height of the structure. This is due to the fact that a porous structure creates a smaller wake and cavity region than a solid structure. Hence, to accurately model a porous structure in AERMOD, a shorter solid building height input would be needed to obtain the equivalent dispersion.

The first study that will be used to help establish the appropriate building height input is an ASHRAE research study (Petersen et al., 1999 - paper included as Attachment 1). The purpose of this study was to determine the equivalent stack height that should be used when modeling roof top mounted stacks surrounded by a porous screen wall. The stack heights evaluated were always nearly the same height as the screen wall height and all stack heights were measured above the top of the solid building. The study found that for a solid screen, the physical stack height used for modeling should be reduced by multiplying the physical stack height by 0.2. The multiplication factor for a 50% porous screen was found to be 0.6. For example, if a 30 ft stack on a roof is surrounded by a solid screen wall, the study found that the appropriate stack height for modeling this case would be 6 ft. If the stack was surrounded by a 50% porous screen, the appropriate stack height input would be 18 ft.

For the UMass Amherst Central Heating Plant Boiler Stacks, the screen wall height above the solid building height is 62 ft. To estimate the equivalent solid building height, assume the screen wall and stack height are the same height. Based on the ASHRAE study, the equivalent stack height is 12.4 ft with a solid screen wall. To obtain the same equivalent stack height with a 50% porous screen wall, the screen wall height would be 20.7 ft (e.g., 12.4/0.6) or 77.7 ft above grade. The ratio of equivalent building height to solid screen wall height in this case is 0.65. Hence, this study would suggest that the appropriate building height input for the porous wall screen is 78 ft.

The second related study is by Petersen et al., 1992 (paper included as Attachment 2). For this study, a 160 ft stack was located directly adjacent to a lattice type structure that was 165 ft tall. It was estimated that the porosity of the structure was about 50%. Wind tunnel testing was conducted to determine the equivalent solid building height that would give the same dispersion as the lattice structure versus wind direction. For this case, the maximum solid building height was found to be 110 ft, or a lattice building height reduction ratio of 0.67. Application of this same reduction factor to the UMass boiler screen wall, would suggest that the solid building height dimension input for the screen wall should be 79 ft.

The third study is summarized in Carter et al., 2001 (see Attachment 3). For this study a 150 ft stack was surrounded by a 50%+ porous screen that was 130 ft high. The tallest height of the solid building was 98 ft. Wind tunnel testing was conducted to determine the appropriate solid building dimensions that should be input into ISC-PRIME versus wind direction to account for the unusually shaped structure and the porous screen around the stack. The tallest solid building dimension that was found was 106 ft which gives a screen wall height reduction factor of 0.81. Application of this same reduction factor to the UMass boiler screen wall, would suggest that the solid building height dimension input for the screen wall should be 96 ft.

Based on the above discussion, a conservative estimate of the appropriate building height dimension to account for the porous screen wall around the UMass Amherst Central Heating Plant Boiler Stacks is 96 ft.

If you have questions on the above analysis or need additional information, please let me know.

Sincerely,

CPP, Inc.
Wind Engineering and Air Quality Consultants

Ronald L. Petersen, Ph.D., CCM
Principal and Vice President

Influence of Architectural Screens on Rooftop Concentrations Due to Effluent from Short Stacks

Ronald L. Petersen, Ph.D.
Member ASHRAE

John J. Carter

Michael A. Ratcliff, Ph.D., P.E.
Member ASHRAE

ABSTRACT

This paper describes the wind tunnel study conducted on behalf of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to evaluate and quantify the effect of architectural screens on rooftop concentration levels due to effluent from short stacks. An equivalent stack height (ESH) concept is introduced, which is used to develop a stack height reduction (SHR) factor that may be used in conjunction with existing stack design procedures found in the 1997 ASHRAE Handbook—Fundamentals *to account for the presence of architectural screens.*

INTRODUCTION

This paper describes the wind tunnel study conducted on behalf of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to evaluate and quantify the effect of architectural screens on rooftop concentration levels due to effluent from short stacks. Architectural screens are often placed around rooftop equipment in order to reduce noise or hide the equipment. Unfortunately, these screens interact with wind flow patterns on the roof and can adversely affect rooftop concentration levels. This, in turn, can lead to high concentrations inside the building due to the effluent entering the building through building air intakes. Presently, there have been no known studies conducted to systematically quantify the effect of screens on rooftop concentrations. There are many studies dealing with the aerodynamics of porous windbreaks and shelter belts. A comprehensive review of these studies was presented in the *World Meteorological Organization Technical Note 59* (van Eimern et al. 1964). There have also been numerous studies of flow through screens and perforated plates (Castro 1971; Perera 1981; Richardson 1987; Ranga Raju et al. 1988; Richardson 1995); however, only one study relating the effects of a solid parapet to rooftop dilution has been found (Lowery and Jacko 1996).

The primary objective of the study was to evaluate and quantify the effect of architectural screens on rooftop concentration levels. Since there are no simple methods available in the *ASHRAE Handbook—Fundamentals* (1997) for evaluating the effect of screens on exhaust concentration (or dilution), a secondary objective of the study was to develop a method for accounting for screens that can be included in a future *ASHRAE Handbook—Fundamentals* chapter.

To meet the project objectives, a 1:50 scale model of a typical industrial type building was constructed and positioned in an atmospheric boundary layer wind tunnel. Tracer gases were then released from modeled exhausts and the resulting concentrations were measured on the building roof, on the side wall, and immediately downwind. Tests were conducted for various stack heights, screen heights, screen porosities, and screen positions relative to the stacks. The results were analyzed in order to develop a generalized technique for quantifying the effect of screens on exhaust concentration (or dilution).

EXPERIMENTAL METHODS

All testing was carried out in an atmospheric boundary layer wind tunnel with the following characteristics: 74.5 ft test section length; 12 ft test section width and 7 ft height; wind speed ranges from 1 mph to 15 mph. Flow straighteners and screens at the front end of the tunnel were used to create a

Ronald L. Petersen is vice president and **John J. Carter** is an engineer at Cermak Peterka Petersen, Inc., Wind Engineering Consultants, Fort Collins, Colo. **Michael A. Ratcliff** is president of Ratcliff and Associates, Middletown, Calif.

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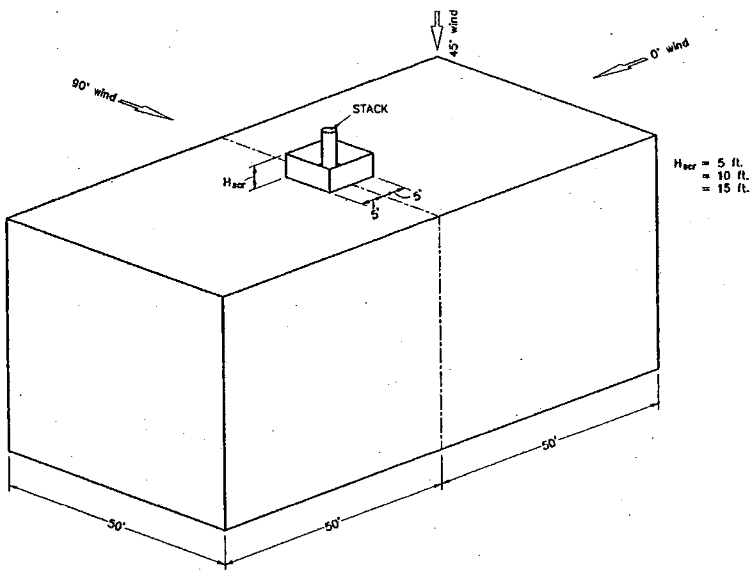

Figure 1 *Generic building—10 ft × 10 ft screen.*

homogeneous, low-turbulence entry flow. A 16 in. tall trip along with 4 in. and 8 in. tall roughness elements were used to develop and maintain the model atmospheric boundary layer upwind of the model building.

Figure 1 illustrates the 1:50 scale model of a 100 ft long by 50 ft wide by 50 ft tall typical laboratory-type building used in all tests. The screen depicted in the figure represents the screen size and location; however, neither the screen porosity nor the 1 ft gap at the bottom of each screen are shown. X_{scr} is the screen distance from the stack (5 ft in Figure 1), H_{scr} is the screen height. Table 1 lists all design parameters and their range of variability during the course of the study. These parameters were combined to form 581 tests.

The receptor grid for each wind direction included the receptors along the centerline of the stack parallel to the wind direction. The receptors started at the leading edge of the building, upwind of the stack, and ran the length of the building and the downwind wall, as seen in Figure 2. Six receptors were included on the stack centerline downwind of the building. The grid was expanded to include receptors off the stack centerline in the vicinity of the stack, especially inside the screen. Receptors were also included on the inside of the upwind, downwind, and one side of the screen at two or three elevations, depending on screen height.

Tests were run with no screen present to determine a baseline concentration at each receptor for every combination of wind and exhaust condition evaluated with screens present. These baseline tests were later used to select an equivalent stack height (ESH), as discussed below. Obviously, more than 581 combinations of the parameters in Table 1 are possible; however, some configurations proved to be of little interest. For example, the horizontal stack orientation allowed little effluent to escape the confines of the screen. Tests at 45° and 90° wind directions were used to validate the 0° wind direction results where most of the testing was conducted.

TABLE 1
Design Parameters and Range of Variability

Parameter	Units	Range
Wind Direction	Degrees	0; 45; 90
Anemometer Wind Speed*	mph	5.5; 16.6
Building Wind Speed	mph	6.6; 19.8
Stack Height, Base Tests	ft	0; 1; 3; 5; 7; 10; 12; 15; 20
Stack Height, Screen Tests	ft	5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15; 20
Stack Flow Rate†	cfm	519; 5,111; 19, 675
Stack Exit Velocity‡	fpm	481; 1,958; 3,052
Stack Orientation	–	Vertical; Horizontal
Screen Height**	ft	5; 10; 15
Screen Distance	ft	5; 10; 20
Screen Porosity	%	0; 35; 50; 66

* These are actual values; target values were 5 mph and 15 mph.
† These are actual values; target values were 500 cfm, 5,000 cfm, and 20,000 cfm.
‡ These are actual values; target values were 500 fpm, 2,000 fpm, and 3,000 fpm.
** This height includes a 1 ft gap between the bottom of the screen and the roof.

In order to document the wind characteristics approaching the model, a profile of mean velocity and longitudinal turbulence intensity was obtained upwind of the model test area. An analysis of the profile was conducted to determine whether the shape was characteristic of that expected in the atmosphere. Overall, the velocity profile results showed that wind and turbulence profiles approaching the model test area were characteristic of full-scale surfaces with roughness lengths of 28 cm. This is characteristic of a suburban roughness (Snyder 1981).

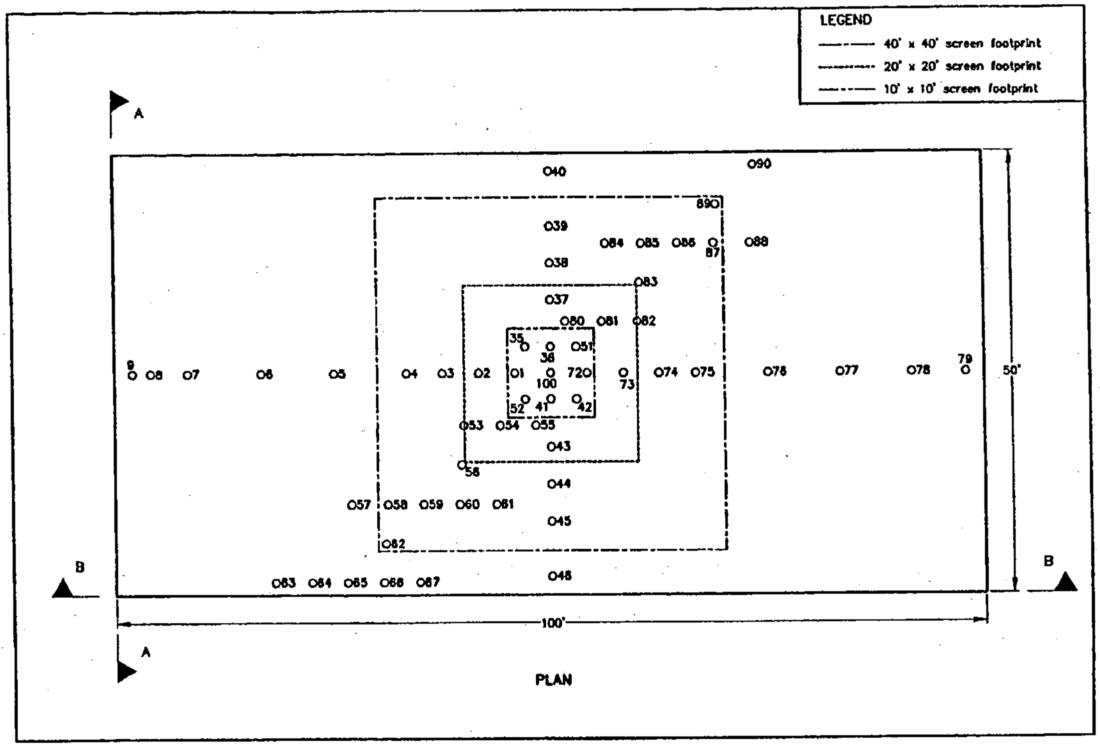

Figure 2   *Generic building receptor numbers: plan view.*

THEORETICAL CONSIDERATIONS

Wind Tunnel Simulation of Airflow and Dispersion

An accurate simulation of the boundary-layer winds and stack gas flow is an essential prerequisite to any wind-tunnel study of diffusion around buildings. The similarity requirements can be obtained from dimensional arguments derived from the equations governing fluid motion. A detailed discussion of these requirements is given in the EPA fluid modeling guideline (Snyder 1981). The basis-scaling parameters used during this study are outlined below.

Plume Trajectory Simulation Criteria.

- Match velocity ratio:

$$R = \frac{V_e}{U_h} \tag{1}$$

- Match density ratio:

$$\lambda = \frac{\rho_s}{\rho_a} \tag{2}$$

- A trip was used for these simulations to ensure a fully turbulent exhaust flow upon exiting the stack.

Airflow and Dispersion Simulation Criteria. Since this study was designed to be generic in nature, a rectangular building was placed in a uniform roughness configuration. The roughness was designed to simulate a suburban environment with a surface roughness length of 0.28 m. Reynolds number independence was ensured: the building Reynolds number ($Re_b = U_b H_b / \nu_a$, the product of the wind speed, U_b, at the building height, H_b, times the building height divided by the viscosity of air, ν_a) was greater than 11,000. A neutral atmospheric boundary layer was established.

Using the above criteria and the source characteristics listed in Table 2, the model test conditions were computed for three generic stack configurations designated 500 cfm, 5,000 cfm, and 20,000 cfm, or low to high momentum type exhausts.

Numerical Dilution Estimates

ASHRAE (1997) presents a series of equations for estimating the minimum dilution (i.e., maximum concentration) vs. distance from an exhaust stack. The equations are detailed in the *ASHRAE Handbook* (1997) and are summarized here.

The worst case dilution from an uncapped, vertical, non-buoyant exhaust jet from a raised stack with plume rise inversely proportional to wind speed (D_{crit}) is predicted using:

$$\frac{D_{crit}}{D_{crit,0}} = \left(\frac{U_{crit}}{U_{crit,0}}\right)\exp[Y + (\sqrt{Y})\sqrt{Y+1}] \tag{3}$$

where

$D_{crit,0}$ = absolute lowest dilution (dimensionless) from a stack of negligible height,

$U_{crit,0}$ = wind speed (mph) that produces absolute lowest dilution from a stack of negligible height,

U_{crit} = wind speed (mph) producing the lowest dilution for elevated stacks,

TABLE 2
Source Parameters for Stack Being Evaluated

IP Units								
Source Description	**Typical Building Height (ft)**	**Stack Height (ft)**	**Stack Base (ft, MSL)**	**Exit Diameter (ft)**	**Exit Temperature (°F)**	**Ambient Temperature (°F)**	**Volume Flow Rate (cfm)**	**Exit Velocity (fpm)**
500 cfm	50	60.0	0.0	1.17	70.0	70.0	519	481.3
5,000 cfm	50	60.0	0.0	1.82	70.0	70.0	5,111	1958.5
20,000 cfm	50	60.0	0.0	2.86	70.0	70.0	19,675	3052.8
SI Units								
Source Description	**Typical Building Height (m)**	**Stack Height (m)**	**Stack Base (m, MSL)**	**Exit Diameter (m)**	**Exit Temperature (K)**	**Ambient Temperature (K)**	**Volume Flow Rate (m^3/s)**	**Exit Velocity (m/s)**
500 cfm	15.24	18.3	0.0	0.36	294.3	294.3	0.24	2.4
5,000 cfm	15.24	18.3	0.0	0.56	294.3	294.3	2.41	9.9
20,000 cfm	15.24	18.3	0.0	0.87	294.3	294.3	9.29	15.5

Y = plume height to spread parameter (dimensionless) for 10-minute averages.

$$Y = 28.9\left(\frac{h_s}{S}\right)^2 \tag{4}$$

where

h_s = effective stack height (ft),

S = string distance (ft).

Y is limited to values $Y \leq 2.0$. It should be noted that in this study, the effective stack height is equal to the physical stack height H_s.

Equivalent Stack Height Concept

To quantify the effects of rooftop screens on exhaust concentration (or dilution), an equivalent stack height (ESH) concept was developed. An ESH is the stack height that would give similar concentrations if the screen were not present. To determine ESH values, wind tunnel tests were conducted to obtain a database of concentrations with and without the effect of screens. The data from each test with a screen present were compared to the cases without a screen, and the one giving similar concentrations defined the ESH. The criteria for selecting an ESH are presented in Table 3. An ESH was selected based on the location of the maximum concentration, either inside or outside the screen. The criteria (A, B, and C) were met as required by the location of the maximum concentration.

Figure 3 illustrates the method further. The figure shows the full-scale concentrations from several tests vs. string distance (S), where 0 ft string distance is the base of the stack. The wind and exhaust parameters are listed in the subtitle. The screen and stack parameters are listed in the first line in the legend. Stack heights for tests with the same wind and exhaust parameters are also listed in the legend. It is evident that the location of the maximum concentration is inside the screen at 0 ft string distance. Therefore, Criterion A from Table 3 must be met by any ESH inside the screen (-15 ft $\leq S \leq +15$ ft). The ESH selected inside the screen is the 1 ft stack. Criterion B must be met at every string distance outside the screen. Since this is a 0° wind direction test, the roof extends to $S \leq +50$ ft. The 3 ft stack is the ESH outside the screen. On the downwind wall, the 10 ft stack is the tallest stack that meets Criterion B at every string distance; therefore, it is the ESH.

A stack height reduction factor (SHR) was also obtained for each test, where an SHR is defined as

$$SHR = \frac{ESH}{H_s} \tag{5}$$

where H_s is the physical stack height in feet. The SHR factor is then used to reduce the actual stack height used in the Handbook (ASHRAE 1997) calculations.

RESULTS

Average concentrations were measured on and downwind of the building for 581 different test conditions. The model concentrations were converted to full-scale normalized concentrations (C/m). Plots of full-scale concentration vs. stretched-string distance (S) for each test were then made, as in Figure 3. These plots were used to select an ESH using the criteria in Table 3, as discussed earlier.

An analysis of the data showed the SHR factor could be directly related to the screen porosity such that a conservative estimate (i.e., one that would result in overestimating concentrations) could be developed. Correlations between SHR and other factors were sought (such as screen height, stack height, and screen distance) but no consistent pattern emerged (Carter 1997). The average SHR factor vs. screen porosity is summarized in Table 4. Figure 4 shows a plot of the results in Table 4 along with the following linear best fit equation:

TABLE 3
Criteria for Equivalent Stack Height (ESH) Selection

Location of Maximum Concentration	Description
1	If the screen test maximum concentration is located inside the screen, criterion A must be met by any one ESH concentration inside the screen (not necessarily at the same string distance as the screen test maximum concentration). Criterion B must be met by all ESH concentrations outside the screen.
2	If the screen test maximum concentration is located outside the screen, criterion A must be met by any ESH concentration outside the screen (not necessarily at the same string distance as the screen test maximum concentration). Criterion B must be met by all ESH concentrations outside the screen. Criterion C must be met by any ESH concentration inside the screen (not necessarily at the same string distance as the maximum screen test concentration).
Criteria	
A	The maximum concentration of the ESH must meet or exceed the maximum concentration of the screen test.
B	The ESH concentration must be greater than or equal to 80% of the screen test concentration.
C	The ESH concentration inside the screen must be greater than or equal to 80% of the maximum screen test concentration inside the screen.

$$\text{SHR} = (0.0081 \times \text{Porosity}) + 0.20 \qquad (6)$$

where porosity is in percent. Use of the above equation produces the calculated SHR factors in Table 4.

Now, with a general equation for estimating the SHR factor, the effect of an architectural screen on rooftop dilution can be estimated. First, the stack and screen design parameters are specified. Second, the SHR is calculated using Equation 6. Next, the height to spread parameter is modified as follows,

$$Y = 28.9\left(\frac{(SHR)h_s}{S}\right)^2, \qquad (7)$$

and is used in the Handbook (ASHRAE 1997) calculations.

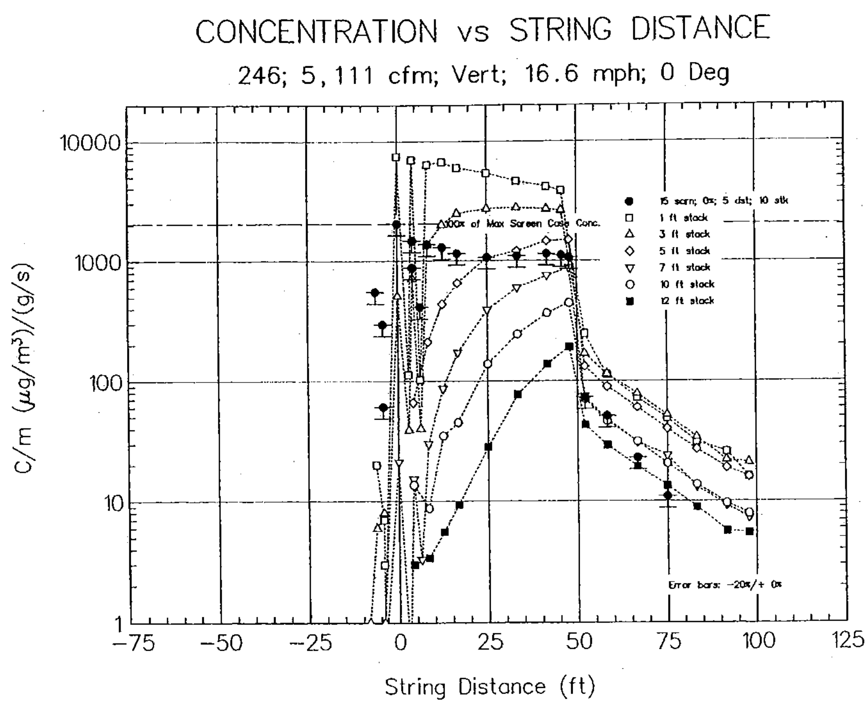

Figure 3 *Full-scale concentration vs. string distance (µg/m³ per g/s); run 246; 15 ft screen height; 0% screen porosity; 5 ft screen distance; 10 ft stack height; 5,111 cfm; vertical stack orientation; 16.6 mph wind speed; 0° wind direction.*

TABLE 4
Recommended* Stack Height Reduction (SHR) Factor as a Function of Screen Porosity

Wind Direction (°)	Porosity	Concentration Measurement Region	Mean SHR Factor	Calculated SHR† Factor
ALL	0%	Rooftop‡ Downwind Wall	0.23 0.23	0.20
ALL	35%	Rooftop‡ Downwind Wall	0.42 0.25	0.48
ALL	50%	Rooftop‡ Downwind Wall	0.59 0.42	0.60
ALL	66%	Rooftop‡ Downwind Wall	0.79 0.44	0.73
ALL	100%	Rooftop‡ Downwind Wall	1.00 1.00	1.00

* Recommendations based on 0° wind direction.
† SHR calculated using linear fit to rooftop SHR mean. SHR = (0.0081·Porosity) + 0.20.
‡ Rooftop SHR = (inside screen + outside screen)/2.

SHR factors were developed on the side of the building and are also presented in Table 4. A general equation or technique for estimating concentrations on the downwind wall was not developed and tested as part of this study but is an area of suggested additional research. It is expected that a similar method could be developed.

EVALUATION OF METHOD

The method discussed in Section 4 was tested using the concentration database developed in the wind tunnel. First, the minimum dilutions were calculated using an SHR = 1.00 (no stack height reduction) as well as the SHR calculated using Equation 6. Next, the computed values were compared with the observations from the wind tunnel. Figure 5 is an example plot of computed and observed dilution vs. stretched-string distance for all test cases with the following parameters: (1) 0% screen porosity, (2) 0° wind direction, (3) 10 ft stack height, and (4) 519 cfm stack flow rate. This figure shows that the computed values with SHR = 1.00 (no stack reduction) do not agree well with observations. In fact, dilutions are overestimated by an order of magnitude when a screen is present! The computed values with SHR = 0.20 (the SHR computed for 0% porosity screens using Equation 6) give a reasonable prediction of measured dilution except at small distances, as indicated by the hump in the curve for 0 ft $\leq S \leq \sim$12 ft. This

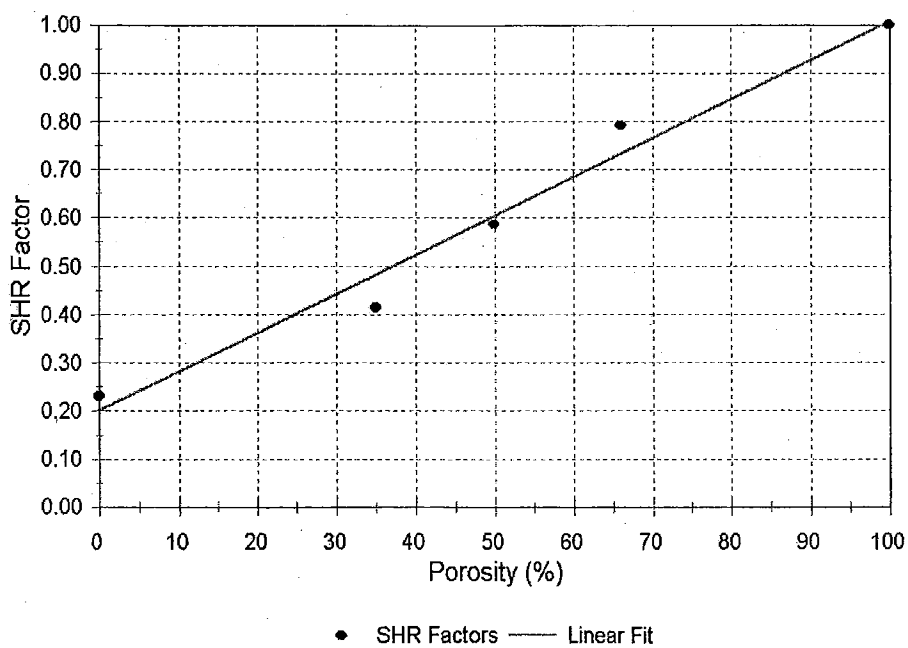

Figure 4 *SHR as a function of screen porosity with linear curve fit.*

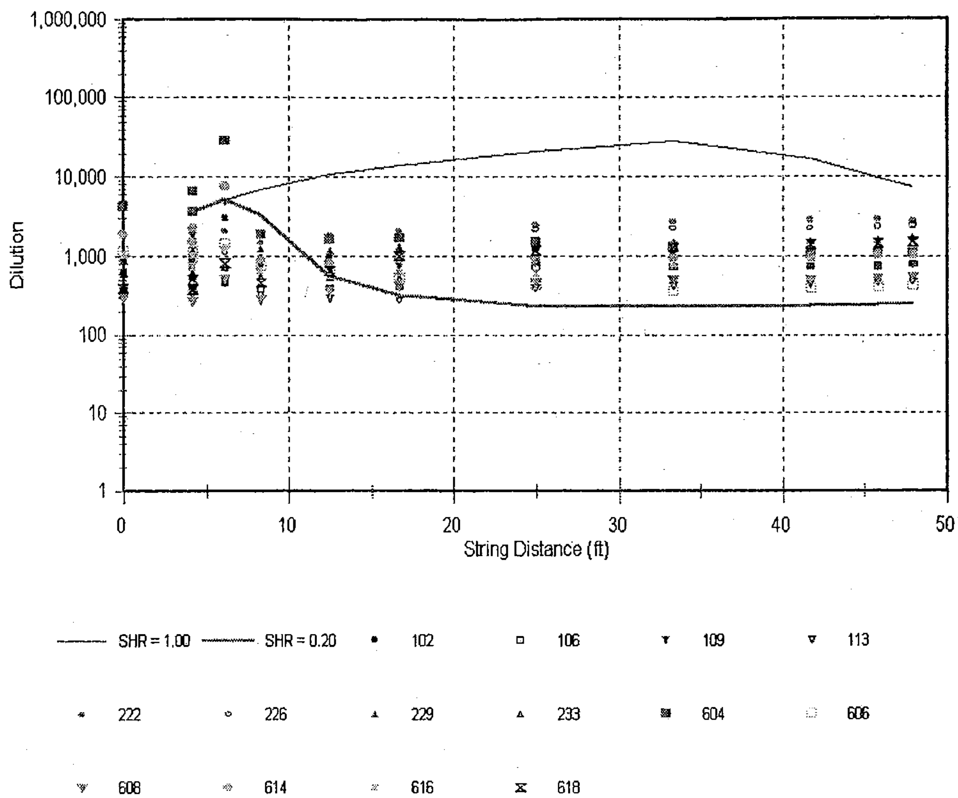

Figure 5 *Dilution vs. string distance with* Y $\leq$ *2.0; all tests with the following parameters: 0% screen porosity, 0°wind direction, 10 ft stack height, 519 cfm volume flow.*

hump is due to the plume height to spread parameter limiting value (Y $\leq$ 2.0), as previously discussed.

In order to determine a better limiting value for *Y*, additional analysis was undertaken. Tests from the concentration database were grouped by the same parameters indicated above, including tests with no screen present. Maximum values of *Y* were selected from these plots using the criterion that the curve must be a lower bound to the measured dilution at all stretched-string distances. Table 5 lists the selected values of *Y* as a function of stack height, stack exit velocity, and screen porosity for tests with a screen present. From this analysis, it became evident that *Y* depends strongly on screen porosity. A limiting value of $Y \leq 0.7$ was selected for use with all screen porosities. This value was selected in order to maintain conservatism in the predicted dilution results. Also, an in-depth study of *Y* was beyond the scope of this study.

This modified method was tested using the wind tunnel database. Dilution values for all combinations of exhaust, stack, and wind parameters were computed vs. string distance using the computed SHR factor and with SHR = 1 (i.e., no screen). The limiting value of $Y \leq 0.7$ was used in all calculations. Observed and computed dilution vs. stretched-string distance were then plotted for all relevant cases.

Figure 6 is a typical plot for the 0° direction cases. This figure shows that the new method provides a good estimate of the lower bound for dilution when the SHR factor is utilized. With SHR = 1 (the original equation in the ASHRAE Handbook), the dilution estimates are not lower bounds and would not provide conservative estimates.

This method does not extend to predicting dilution on the side walls of the building. However, a method similar to the one presented here could be developed and tested for dilution predictions on the downwind or side walls. Without further research, it is difficult to predict how the plume height to spread parameter (*Y*) would be affected in these locations.

CONCLUSIONS

The primary objective of this study was to quantify the effects of architectural screens on the dilution of effluent emitted from rooftop stacks. A secondary objective was to suggest a method whereby these effects can be accounted for in the design process. Regarding the first objective, general knowledge was obtained about the effect of screens on exhaust dilution, which is discussed in detail in Carter (1997).

With regard to the second objective (the main topic of this paper), it was found that the effect of architectural screens on rooftop dilution can be accounted for through the use of an equivalent stack height (ESH) method. An evaluation of the results showed that a stack height reduction factor (SHR) could be specified as a function of screen porosity. Using a computed SHR and existing equations in the ASHRAE Handbook (1997) to assess the effect of the screen on rooftop dilu-

TABLE 5
Height to Spread Parameter (y) as a Function of Stack Height and Exit Velocity: Tests with Screens

0°Wind Direction - 0% Porosity												
Exit Velocity	Stack Height (ft)											
	5	6*	7*	8*	9*	10	11*	12*	13*	14*	15	20
481 fpm	0.8	1.0	0.9	0.9	0.9	0.7	1.0	1.0	1.1	1.2	0.5	0.5
1,958 fpm	0.7	0.8	0.9	0.9	1.0	0.7	0.9	1.2	1.4	1.8	0.5	0.5
3,052 fpm	1.0					0.9					0.7	0.7

0°Wind Direction - 35% Porosity												
Exit Velocity	Stack Height (ft)											
	5	6*	7*	8*	9*	10	11*	12*	13*	14*	15	20
481 fpm						0.7						
1,958 fpm						0.7						
3,052 fpm						1.6						

0°Wind Direction - 50% Porosity												
Exit Velocity	Stack Height (ft)											
	5	6*	7*	8*	9*	10	11*	12*	13*	14*	15	20
481 fpm	1.5					1.5					2.0	2.0
1,958 fpm	2.0					2.0					2.0	2.0
3,052 fpm	2.0					2.0					2.0	2.0

0°Wind Direction - 66% Porosity												
Exit Velocity	Stack Height (ft)											
	5	6*	7*	8*	9*	10	11*	12*	13*	14*	15	20
481 fpm						2.0						
1,958 fpm						2.0						
3,052 fpm						2.0						

* Two data sets only.
Shaded area indicates no data.

tion, the resulting concentration at roof-mounted air intakes can be calculated. With this information, a laboratory designer can estimate whether acceptable concentrations will occur at the intake.

During the course of the work, several areas of additional research have also been identified. The study has shown that one of the parameters used in an existing method (ASHRAE 1997) for estimating rooftop dilution (i.e., *Y*) needs to be re-evaluated. This study found that a limiting value of 0.7 works better than the 2.0 value presently in use for cases when a screen is present. Another area of research is estimating the dilution on building sidewalls when screens are present. While these concentrations are not generally the highest, a method similar to that developed for the building roof could also be developed for the building side wall.

ACKNOWLEDGMENTS

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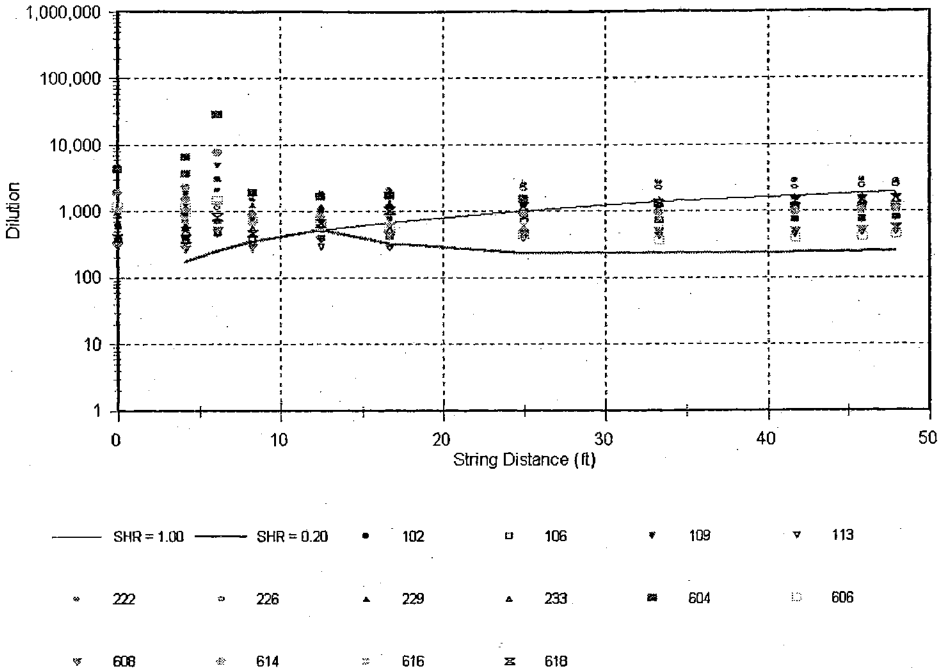

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Lattice Type Structure Building Height Determination for ISC Model Input

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INTRODUCTION

When running the ISCST model (Wackter and Foster, 1986) in Urban Mode 3 with the Schulman–Scire downwash algorithm, it was found that maximum concentration estimates for a source (referred to as FCU 6) in an oil refinery were in excess of the 24-hour National Ambient Air Quality Standard for SO_2 (365 $\mu g/m^3$). Currently, the ISCST model incorporates the Schulman–Scire downwash algorithm when the stack height is less than 1.5 times the building height, which is the case for FCU 6, and the Huber–Snyder downwash algorithm (Huber and Snyder, 1976) when the stack height is greater than 1.5 times the building height but less than 2.5 times the building height. These ISCST modeled concentrations for FCU 6 are approximately a factor of 3.5 times higher than estimates obtained using the previous version of ISCST (Bowers *et al.*, 1979) run in Urban Mode 3. The previous version of ISCST utilized the Huber–Snyder downwash algorithm for all stack heights less than 2.5 times the building height. In addition, the ISCST downwash algorithms (both the Schulman–Scire and Huber–Snyder) assume that the stacks are adjacent to the structure and that the structure is solid. Upon review of the stack and structure configuration for FCU 6, it was found that the stack is not adjacent to the structure and the structure is an open lattice structure. Hence, both of the downwash algorithm assumptions are not representative of the physical configuration and would lead to inaccurate model predictions for this source.

To address the above problem, fluid modeling was conducted to determine building dimensions based on similar concentration fields for a solid and lattice structure for use as input into the ISCST model. A test protocol for the study was developed and was reviewed by USEPA and Indiana Department of Environmental Management (IDEM). Thereafter, a 1:240 scale model of FCU 6 and surrounding structures within a 0.4 km radius of FCU 6 was constructed from facility drawings and placed in CPP's environmental wind tunnel. Tests were then conducted for various wind directions with all structures in place, with all nearby[1] structures removed, and with solid structures of varying heights positioned at the stack location (all nearby structures still removed). To determine wind direction specific building dimensions, the ratio of maximum concentration with and without the nearby structures for each wind direction was first evaluated. If this ratio was less than 1.4 (part of the definition of an excessive concentration as found in EPA, 1985), the ISCST building height input for that wind direction was specified as 0 m. If the ratio was greater than 1.4, a wind direction specific building height was specified by finding a solid structure height that produced similar maximum concentration fields as those produced for the simulation with all plant structures present.

Initial testing was conducted to determine the site specific building dimensions for 6 wind directions. A preliminary report was reviewed by IDEM and EPA, and approval was given to the test procedure and the use of the wind tunnel determined building dimensions for ISCST input. This paper discusses various technical issues, the experimental methods and building dimension results for the complete set of 36 wind directions for input into ISCST.

[1]Defined by EPA (1985) to be within five times the lesser of the building height or width.

TECHNICAL CONSIDERATIONS

Scaling Requirements

An accurate simulation of the boundary-layer winds and stack gas flow is an essential prerequisite to any wind-tunnel study of diffusion from an industrial stack. The similarity requirements can be obtained from dimensional arguments derived from the equations governing fluid motion. A detailed discussion on these requirements is given in the EPA fluid modeling guideline (Snyder, 1981) and will not be repeated here.

Model operating conditions were calculated for FCU 6 for a 9 m/s wind speed at a 10 m height using the appropriate scaling criteria. Table 1 provides the model and full scale parameters as well as similarity parameters. The table shows that all important similarity criteria are met. It should be noted that Reynolds number independence tests were conducted to determine the minimum acceptable operating speed in the wind tunnel.

Buoyancy effects were not modeled because their inclusion would have required a low wind tunnel operating speed with corresponding low building Reynolds numbers. To evaluate this effect, sensitivity tests including buoyancy were conducted and the resulting building heights were similar to those determined when buoyancy effects were not included.

Determination of Excessive Concentration Due to Building Wake Effects

The EPA stack height regulation (1984) defines an excessive concentration as:

> "a maximum ground-level concentration due to emissions from a stack due in part or whole to downwash, wakes, or eddy effects produced by nearby structures or terrain features which individually is at least 40 percent in excess of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects and which contributes to a total concentration due to emissions from all sources that is greater than an ambient air quality standard."

No comparison with NAAQS is required for complicated structures (see Table 3.1 on page 50 in EPA, 1985), such as lattice type structures, as long as the actual stack height is less than that obtained using the Equations 1 or 2 in the stack height regulation. Only the 40 percent test is required and was the only criteria used to define excessive concentrations.

Based on this definition, the maximum ground-level concentration from wind-tunnel testing with the structures present was compared to the maximum concentration without the structures present. If the ratio of these concentrations was 1.4 or less, downwash effects were considered insignificant and the ISCST model can be run with a building height equal to zero. If the ratio was greater than 1.4, the stack was less than GEP and downwash effects must be considered in ISCST modeling. For this case, additional tests were conducted to find the solid structure dimensions that produce similar concentrations as the lattice structure. The dimensions of the equivalent solid structure were then used for ISCST model input.

Emission Rate

An SO_2 emission rate of 110.25 g/s was used for the FCU 6 stack for the purpose of converting model concentrations to full scale concentrations.

Nearby Structures

To evaluate the effect of the nearby structures, tests were first conducted with all structures in place. It should be noted that the buildings in the vicinity of the FCU 6 stack are the FCU 5 and FCU 6 structures. Both of these structures are open lattice structures. These nearby structures were removed and the resulting concentrations compared to those measured with the structures in place. Structures are classified as nearby when the stack is closer than 5 times the lesser of the height or width of the structure. In order to find the equivalent solid building dimensions that produce similar concentrations as those produced by the lattice structures located on the site, tests were conducted with a solid structure located at the FCU 6 stack location and with the nearby structures removed.

Test Wind Speed

The EPA stack height guideline (EPA, 1981) requires that the design wind speed for GEP stack height evaluations be less than the 2 percent wind speed (speed that is exceeded less than 2 percent of the time) unless it can be demonstrated that higher speeds cause exceedances of NAAQS or PSD limits. ISCST modeling showed that the wind speeds ranged from 3 to 7 m/s when the highest 24-hour average SO_2 concentrations are predicted. The 2 percent wind speed as a function of wind direction was determined by analyzing meteorological data (10 m anemometer height) collected at the refinery. All wind-tunnel testing to determine site specific building heights was conducted at a wind speed of 9 m/s which was slightly lower than the 2 percent wind speed.

Evaluation of Simulated Boundary Layer

In order to document the wind characteristics approaching the model, profiles of mean velocity and longitudinal turbulence intensity were obtained upwind of the model test area. These profiles verified that the simulated surface roughness was 1.25 m and that the turbulence intensity profile was characteristic of an urban setting (turbulence intensity of 25 percent at a 30 m height).

EXPERIMENTAL METHODS

Scale Model and Wind Tunnel

A 1:240 scale model of FCU 6 and surrounding structures was designed and constructed. A plan view of the area modeled is depicted in Figure 1. The model included all significant structures within a 0.4 km radius of the FCU 6 stack. Upwind and downwind of the area modeled, roughness elements were installed to represent an urban area (z_0 = 1.25 m and a 0.25 power law exponent). The model was constructed so that nearby structures could be removed and so that a solid structure could be installed at the stack location. An isometric view of the solid structure is shown in Figure 2. Figure 3 shows a closeup view of the model of the FCU 6 lattice structure from one angle.

The solid structure (see Figure 2) was constructed with (full scale) plan dimensions of 18.3 by 39.6 m. These dimensions were estimated to be equivalent to the plan dimensions of the solid core of the tallest portion of the FCU 6 main lattice structure. The solid structure was fabricated so that the height could be varied from 12.2 to 48.8 m, in 3.1 m increments.

The stack parameters for all tests are provided in Table 1. Table 1 provides the model and full scale parameters for all tests modeled using momentum and density ratio scaling. The stacks were supplied with a gas mixture of the appropriate density. Gas flow meters were used to monitor and regulate the discharge velocity.

Concentration sampling taps were installed at numerous downwind locations, and sample locations were measured relative to a point centered on the FCU 6 stack. The measurement locations were selected so that the maximum concentration versus downwind distance could be defined. All testing was carried out in CPP's environmental wind tunnel.

Data Acquisition

Concentration measurements for each of the runs were obtained using a 50 port gas sampling system and flame ionization gas chromatograph. Volume flow and wind speed measurements were also obtained for documentation and to set wind tunnel operating conditions.

Quality Control

To ensure that accurate and reliable data were collected, certain quality control steps were taken. These included:

- multi-point calibration of hydrocarbon analyzer with certified standard gas;
- calibration of stack flow measuring device with soap bubble meter;
- calibration of velocity measuring device with mass flow meter;
- wind tunnel testing to show the Reynolds number independence of the concentration measurements; and
- comparison of wind tunnel diffusion and velocity characteristics with those observed in the atmosphere.

RESULTS

The maximum ground-level concentrations versus downwind distance were determined due to emissions from the FCU 6 stack for 18 wind directions with a 9 m/s wind speed at a 10 m height. For selected wind directions tests were also conducted at a 6 m/s wind speed to evaluate the sensitivity of the results to wind speed. The maximum concentrations were measured with and without the nearby structures present as described previously and with a solid structure of varying height present. Figure 4 shows plots of maximum SO_2 concentration versus downwind distance for one of the wind directions evaluated (135 degrees) for 6 and 9 m/s wind speeds. Similar plots were prepared for each of the wind directions evaluated. Included in each plot are the concentrations for cases with all structures in the model, cases with all nearby structures removed, and cases with solid structures of varying height located at the FCU 6 stack location. Inspection of Figure 4 shows a large difference in concentrations with and without the structure present and also shows the solid building case that agrees best with the lattice structure concentration predictions.

Table 2 provides the maximum concentration for each test summarized in Figure 4 and the ratio of observed concentrations (with and without the structures in place) to those observed with the lattice structure in place. By inspecting Figure 4 and Table 2, the appropriate building height for ISCST input was determined. The criteria for specifying the building height is to find a solid structure height that gives a maximum concentration that is within ±10 percent of the maximum concentration measured with the lattice structure present. For example, inspection of Table 2 shows that at 9 m/s with a 33.5 m solid structure height, the maximum concentration is 2 percent larger than the maximum concentration with the lattice structure present (concentration ratio of 0.98 in the table). Hence, for the 135 degree wind direction a 33.5 m building height and 42.3 m building width would be used for ISCST input. The width was computed by calculating the cross-wind width of the solid structure shown in Figure 2. The plan dimensions of the solid structure shown in Figure 2, 18.28 m × 39.62 m (60 ft × 130 ft), are the approximate plan dimensions of the tallest portion of the lattice structure which occupies most of the lattice structure volume.

The appropriate structure heights and widths for ISCST model input for all wind directions were determined in a similar manner and the results are summarized in Figure 5. The figure shows that the wind-tunnel determined heights are less than the actual lattice structure height for all wind directions. The figure also shows that for the wind direction sectors 160 through 200 degrees and 340 through 20 degrees, the building height input is zero. For these sectors, no significant structures are up or downwind of the FCU 6 stack and structure downwash effects are insignificant. This was evidenced by the concentration measurements that showed concentration ratios less than 1.4 for these wind sectors. Normally, a building height and width would be input into ISCST for some of these wind directions since the structures would be considered nearby (within the lesser of 5 times the height or width of the structure). This result shows that when the stack is offset from the structure by some distance and the wind direction is such that the building is not upwind, building downwash effects are insignificant.

Figure 5 shows that the largest heights for ISCST input (30 to 34 m) occur for the 135 and 225 degree wind directions. For these wind directions, the structures associated with FCU 5 or FCU 6 are upwind of the stack and the flow is oriented at an angle of 45 degrees from a building face. Wake effects on concentrations for solid structures have been shown to be greatest with a similar flow orientation (Robins and Castro, 1977).

Table 3 lists the recommended 36 wind-direction specific building heights and building widths for input into the ISCST dispersion model. The building heights were determined from interpolation of the wind-tunnel-determined values in Figure 5. Building widths were the computed cross-wind projected widths of the solid structure in Figure 2.

Figure 4 illustrates the effect of wind speed on the determination of the appropriate solid structure height for a 135 degree wind direction. Tests were first conducted at a 9 m/s wind speed to determine the appropriate solid structure height, and this height was found to be 33.5 m (110 ft). Tests were then conducted at a 6 m/s wind speed to determine if the concentrations with this height solid structure would agree with the concentrations observed with all structures in place. The figures show that good agreement was obtained. Table 2 shows the maximum concentration with the solid structure is 11 percent less than the concentration with the lattice structure present. Overall, this result suggests that the building height determination would be insensitive to the wind speed used for testing.

CONCLUSIONS

This evaluation has indicated that the previous ISCST approach of modeling FCU 6 as a solid structure at the stack with the dimensions of the lattice structure does not represent actual dispersion from the source. In addition, this study has demonstrated that the wind tunnel can be used to determine "equivalent solid structure" dimensions such that similar concentration fields occur from wind tunnel simulations with the FCU 6 lattice type structures in place or the "equivalent solid structure" in place of the lattice structure. This equivalent structure can then be used as a building input to the ISCST model. The study has also shown that this "equivalent solid structure" dimension determination is insensitive to the wind speed used for the evaluation.

"Equivalent solid structure" dimensions were determined for wind directions in approximately 20 degree increments. Since ISCST requires building dimension inputs for 36 wind directions, the remaining building dimension inputs were determined by interpolation. The building widths were calculated by computing the cross-wind dimension for the solid structure shown in Figure 2. Table 3 contains the "equivalent solid structure" dimensions for input into ISCST.

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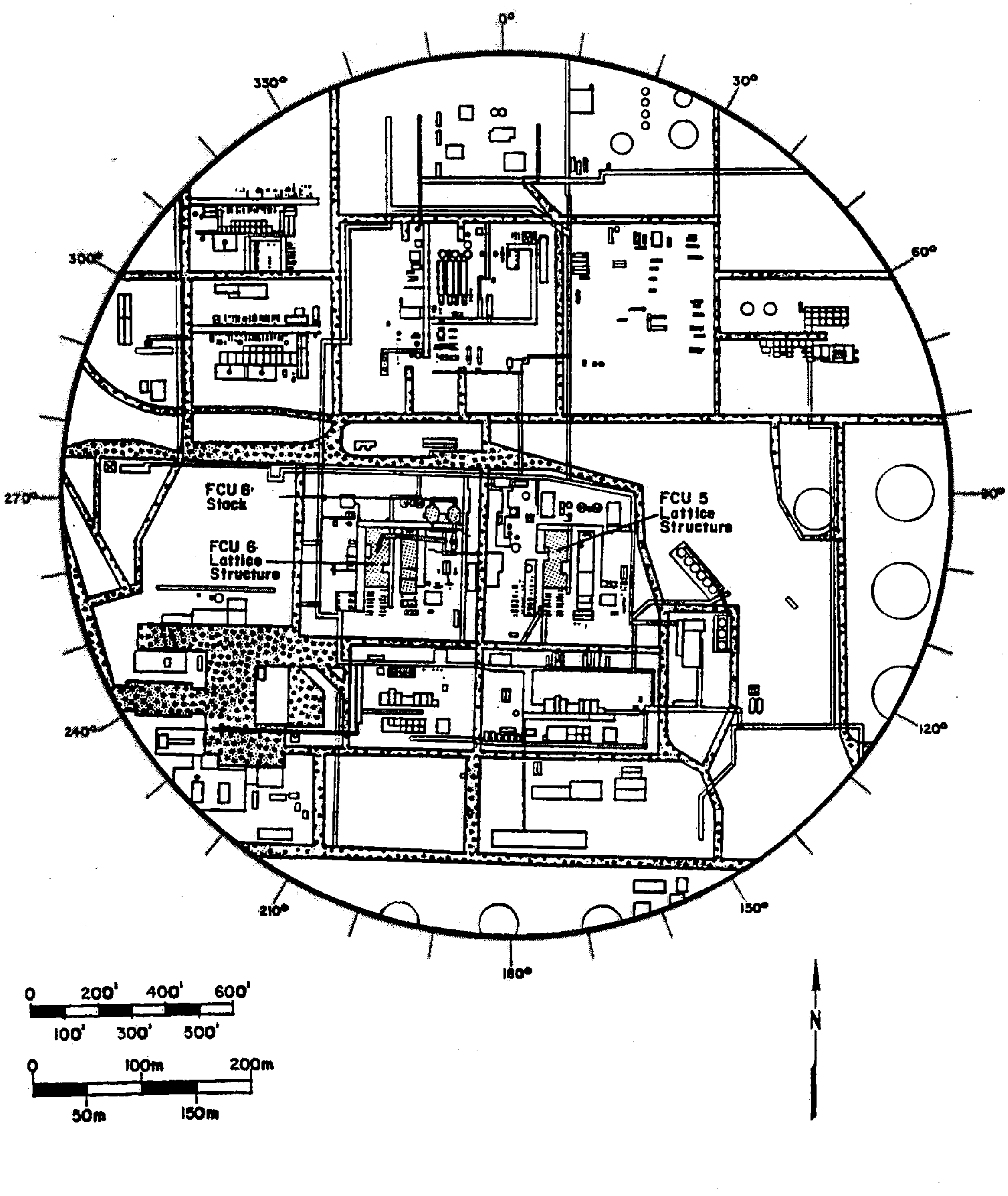


FIGURE 1. Plan view of Refinery model.

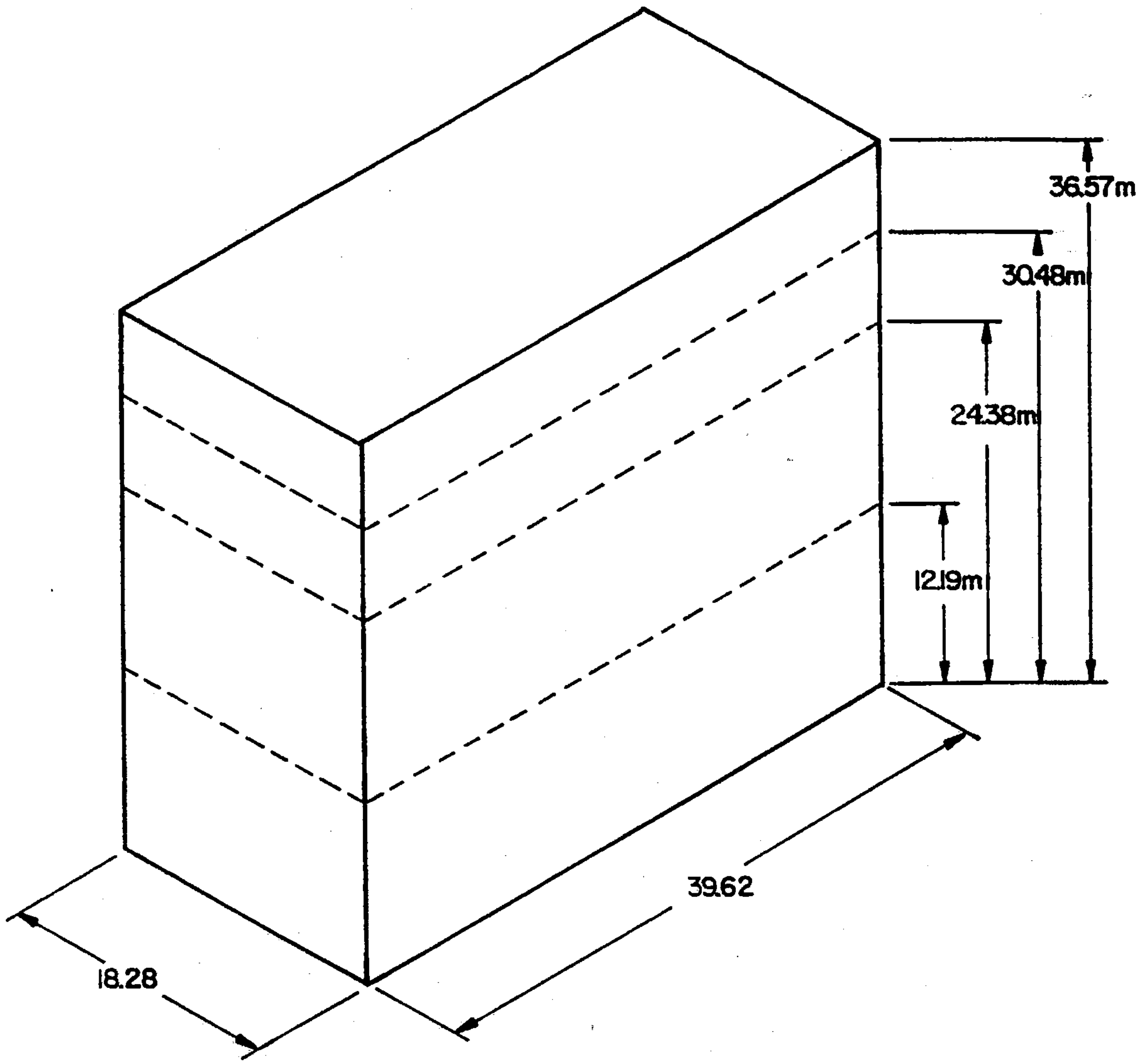


FIGURE 2. Isometric view of solid structure.

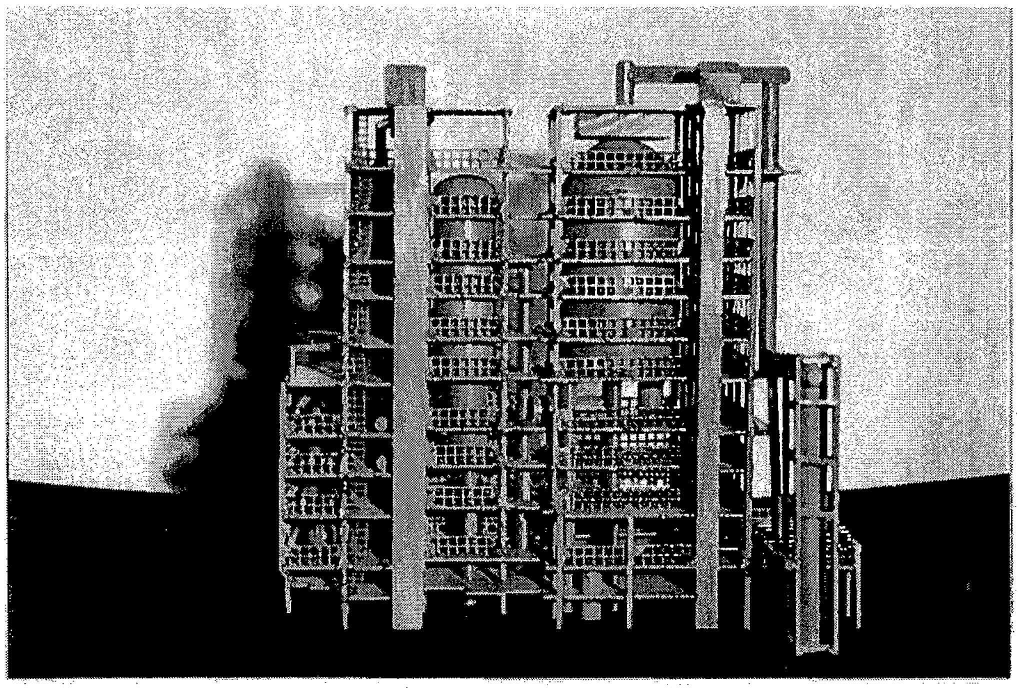
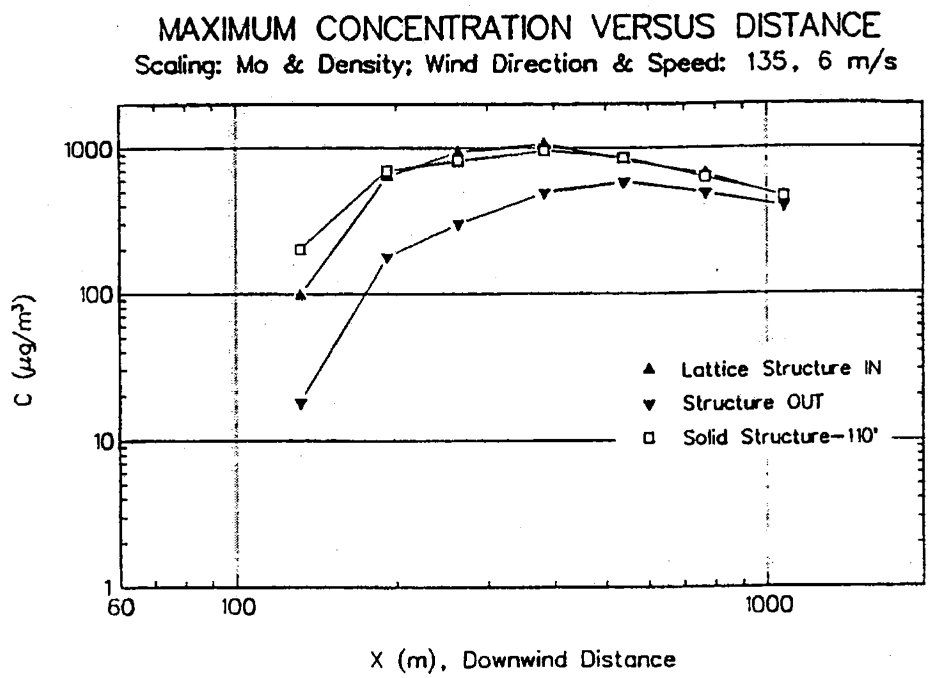


FIGURE 3. Photograph of FCU 6 model.



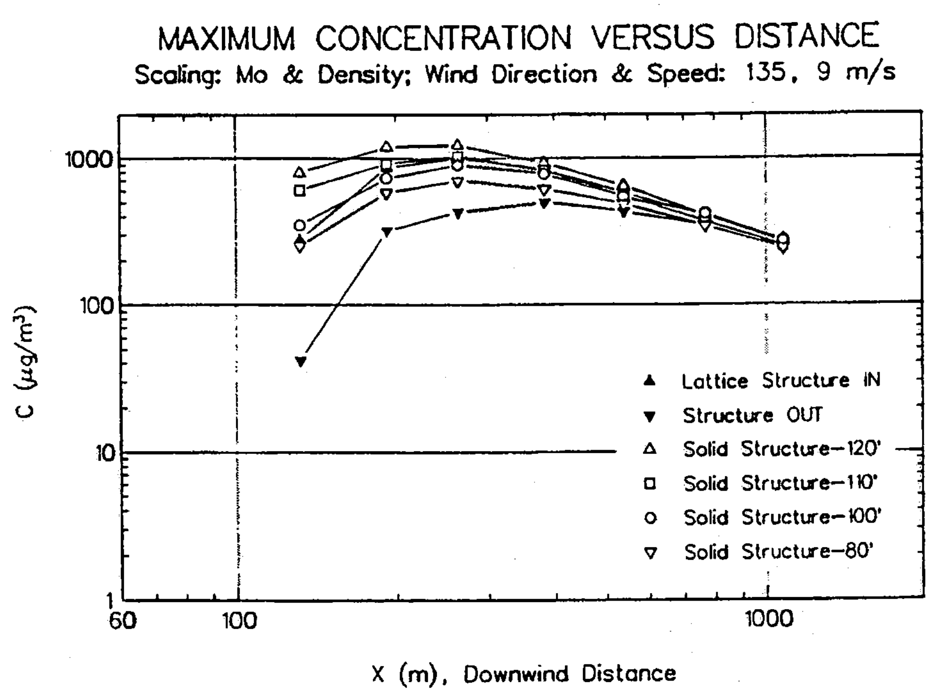


FIGURE 4. Maximum SO_2 concentration versus downwind distance with structures, without nearby structures and with various solid structures present for a 135 degree wind direction with 6 and 9 m/s wind speeds.

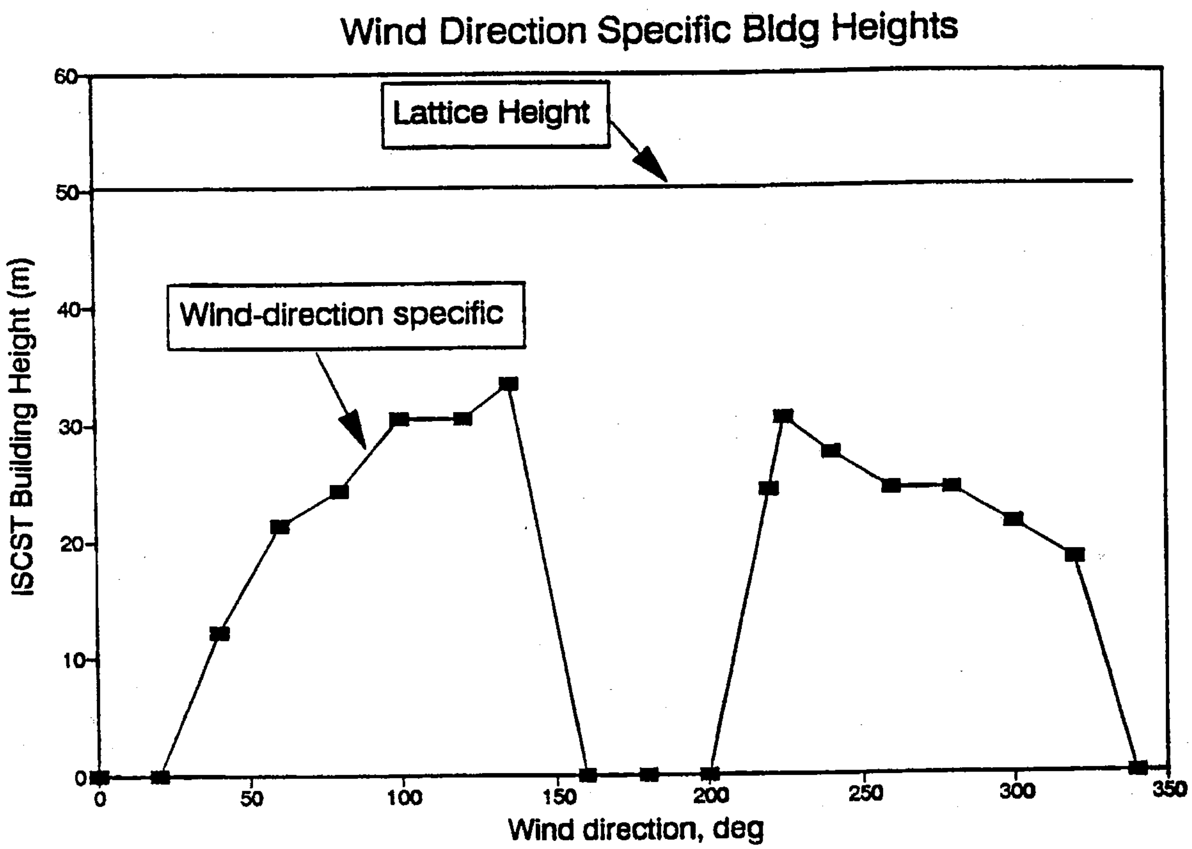


FIGURE 5. Wind direction specific building heights
as determined by wind-tunnel testing.

TABLE 1. Model and full scale parameters for FCU 6 stack.
9 m/s Cases; Scale Reduction = 240

Description	Full Scale English	Full Scale Metric	Model Metric
Dimensional Parameters			
1 . Building Height, H_b (ft—m)	165.0	50.3	0.210
2 . Stack Height, h (ft—m)	160.0	48.8	0.203
3 . Stack Inside Diameter, d (ft—m)	8.00	2.440	1.02E–02
4 . Ambient Pressure, P_a (Atm)	1.000	0.988	0.85
5 . Ambient Temperature, T_a (F—K)	49.3	282.6	293
6 . Exit Temperature, T_s (F—K)	675.1	630.3	293
7 . Exit Velocity, V_e (ft/min—m/s)	3954	20.09	2.668
8 . Volume Flow Rate, V (ft^3/min—m^3/s)	198894	93.94	2.166E–04
9 . Reference Wind Speed, U_r (mph—m/s)	50.5	22.6	3.00
10 . Reference Height, z_r (ft—m)	1312	400.0	1.67
11 . Anemometer Wind Speed, U_a (mph—m/s)	20.13	9.00	1.20
12 . Anemometer Height, z_a (ft—m)	32.8	10.00	0.042
13 . SO_2 Emission Rate, Q (lb/hr—g/s)	875	110.35	n/a
14 . Site Surface Roughness Factor, z_0 (ft—m)	4.10	1.25	5.21E–03
15 . Site Power Law Exponent, n	0.25	0.25	0.25
Dimensionless Parameters			
16 . Velocity Ratio	0.89	0.89	0.89
17 . Momentum Ratio	1.33E–05	1.33E –05	1.33E–05
18 . Density Ratio	0.448	0.4484	0.4484
19 . Froude Number	3.70	3.70	7.61
20 . Stack Reynolds Number	8.71E+05	8.71E+05	1.13E+03
21 . Building Reynolds Number	4.75E+07	4.76E+07	2.12E+04
22 . Surface Reynolds Number	1.06E+05	1.06E+05	46.80

TABLE 2. Summary of maximum concentrations for 135 degree wind direction.

Run No.	Building Type	Building Height (m)	Wind Direction	Wind Speed (m/s)	C_{max} ($\mu g/m^3$)	$(C_{max})_{ref}$[1)] / $(C_{max})_i$
25	Lattice	50.3	135	6.00	1070.1	1.00
27	Solid	33.5	135	6.00	961.9	1.11
26	NA	0.0	135	6.00	585.8	1.83
12	Lattice	50.3	135	9.00	1010.6	1.00
20	Solid	36.6	135	9.00	1235.9	0.82
23	Solid	33.5	135	9.00	1033.3	0.98
22	Solid	30.5	135	9.00	897.5	1.13
21	Solid	24.4	135	9.00	703.5	1.44
15	NA	0.0	135	9.00	500.7	2.02

[1)]The subscript $_{ref}$ refers to the lattice structure test. The subscript $_i$ refers to the indicated run.

TABLE 3. Site specific building dimensions for input into the ISCST model.

Wind Direction	Height (ft)	Height (m)	Width (ft)	Width (m)
0	0	0.0	60	18.3
10	0	0.0	82	24.9
20	0	0.0	101	30.7
30	20	6.1	117	35.6
40	40	12.2	130	39.5
50	55	16.8	138	42.1
60	70	21.3	143	43.5
70	75	22.9	143	43.5
80	80	24.4	138	42.2
90	90	27.4	130	39.6
100	100	30.5	138	42.2
110	100	30.5	143	43.5
120	100	30.5	143	43.5
130	107	32.5	138	42.1
140	88	26.8	130	39.5
150	44	13.4	117	35.6
160	0	0.0	101	30.7
170	0	0.0	82	24.9
180	0	0.0	60	18.3
190	0	0.0	82	24.9
200	0	0.0	101	30.7
210	40	12.2	117	35.6
220	80	24.4	130	39.5
230	97	29.5	138	42.1
240	90	27.4	143	43.5
250	85	25.9	143	43.5
260	80	24.4	138	42.2
270	80	24.4	130	39.6
280	80	24.4	138	42.2
290	75	22.9	143	43.5
300	70	21.3	143	43.5
310	65	19.8	138	42.1
320	60	18.3	130	39.5
330	30	9.1	11	35.6
340	0	0.0	101	30.7
350	0	0.0	82	24.9

*ISC-PRIME Versus Wind-Tunnel Observations For Multi-tiered, Sloped, Porous Structures

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Abstract

This paper evaluates the validity of ISC-PRIME for modeling multi-tiered, sloped, porous structures. ISC-PRIME was proposed for use to model a pair of such structures that were to be located near two proposed combustion turbines. The local agency questioned the use of BPIP determined building dimensions as inputs to the model due to the complexity of the surrounding structures. Hence, wind-tunnel testing was conducted to determine the equivalent building dimensions for ISC-PRIME input. During the course of the study, building dimensions were defined using both the BPIP analysis program and wind-tunnel determined "equivalent building dimensions" (EBD). ISC-PRIME was then run for 36 wind directions and one wind speed using both sets of building dimensions as input. The predicted concentrations were compared with wind-tunnel measurements obtained using a scale model of the facility. The results indicate that ISC-PRIME tends to over-predict maximum concentrations for this type of structure when BPIP generated building dimensions are used. ISC-PRIME with EBD inputs performed exceptionally well when compared to the wind-tunnel database and provided lower concentration estimates than ISC-PRIME/BPIP.

INTRODUCTION

The Industrial Source Complex model (ISC3)[1] has been the EPA approved model for estimating concentration levels when building wakes affect pollutant dispersion. The ISC3 model was developed largely based on data[2,3] for neutral stability, moderate to high wind speeds, winds perpendicular to the building face and for a building with height to width to length ratios of 1:2:1. Some of the main limitations of ISC3[4] are: 1) the location of the stack relative to the building is not considered; 2) the effect of streamline deflection on plume trajectories is not considered: 3) the effect of the velocity deficit in the building wake on plume rise is neglected; 4) no accounting for plume material captured by the near wake on far wake concentrations is not included; 5) there are discontinuities at the interface between two downwash algorithms; 6) wind direction effects are not properly considered for squat buildings; and 7) large concentrations are predicted during stable conditions with light wind speeds. A new model developed by Electric Power Research Institute (EPRI)[5,6] has been recommended as the new "EPA approved model"[7] for building downwash situations. This model is referred to as ISC-PRIME and addresses the shortcomings in ISC3 mentioned above. One independent evaluation of PRIME[8] showed that it provides overall better performance than ISC3 and has a better scientific basis. Another evaluation[9] showed that ISC-PRIME performed better for cubical building shapes while ISC3 performed better for buildings with height to width to length ratios of 1:2:1. A more recent evaluation[10] showed that ISC-PRIME provides reasonable concentration estimates for cases when stacks are one to six building heights upwind, directly downwind and one building height downwind of the building under certain restricted conditions.

* As presented at the Air & Waste Management Association's Guideline on Air Quality Models Conference, Newport, RI, 2001

The past performance evaluations of ISC-PRIME considered field and wind-tunnel databases with the stack located near the building[8, 9] and at various distances from the simple building shape for which ISC3 was designed,[10] but no evaluation has been presented to date, that the authors are aware of, showing how well ISC-PRIME performs for unusual building shapes. It seems this would be an important area to investigate, since many facilities using the model have unusually shaped and/or porous structures in close proximity to the stack (i.e., lattice support structures, architectural shrouds to hide the stacks, etc.). In some cases, the porous structure may be neglected by BPIP even though this structure may be the dominant feature affecting plume downwash. In other cases it may be valid to neglect the effect of the porous feature. Since ISC-PRIME provides good estimates for simple building shapes,[8,9] the Equivalent Building Dimension technique[11,12] may be an appropriate method for improving the predictive capability of the ISC-PRIME model for complex sites, complex structures or porous structures for which ISC-PRIME was not designed.

This study was carried out to provide limited evidence regarding the validity of ISC-PRIME for multi-tiered, sloped, porous structures. To carry out the evaluation, a database of ground-level concentrations was obtained due to plume dispersion from a single stack located: 1) near a multi-tiered, sloped porous structure, and 2) near various buildings of simple geometric shape (i.e., 1:2:1 height to width to length ratio) to determine the EBD. The ISC-PRIME model was run, using building dimensions generated using the Building Profile Input Program (BPIP)[13] as well as the EBD, for the exhaust parameters simulated in the wind tunnel. Comparisons between the ISC-PRIME/BPIP model predictions, the ISC-PRIME/EBD model predictions and the wind-tunnel observations were made. The database, the evaluation methods and results are discussed below.

WHY USE WIND-TUNNEL MODELING

There are several reasons why wind-tunnel modeling should be used as the primary tool for evaluating the validity of dispersion models like ISC-PRIME: theoretical, dispersion comparability, controlled conditions and expense. The first and most important reason is theoretical. A wind-tunnel simulation is, in effect, a solution to the basic equations of motion.[14] The basic equations are solved by simulating the flow at a reduced scale and then the desired quantity (i.e., concentration) is measured. This solution to the basic equations (i.e., the wind-tunnel simulation) is a steady state solution with a complete record of the time varying velocity and concentration fields. It should be noted that the Gaussian dispersion model also predicts steady-state average concentrations. Another way of looking at the wind tunnel is that it is an analog computer with near infinitesimal resolution and near infinite memory. As stated in EPA,[14] "if a mathematical model cannot simulate the results of an idealized laboratory experiment, how can it possibly be applicable to the atmosphere?"

A second reason relates to dispersion comparability. With the passage of the EPA "good engineering practice" (GEP) stack height regulation, wind-tunnel modeling has been required to determine the GEP stack height for many facilities.[15, 16, 17] As part of a GEP stack height evaluation, the wind-tunnel modeler must perform what is referred to as an "atmospheric dispersion comparability test." For this test, wind profiles and dispersion measurements are made in the wind tunnel without the presence of structures. A flat, uniform, grassland type roughness is simulated. These tests have demonstrated that wind-tunnel velocity profiles match profile shapes observed in the atmosphere and the profiles fit similarity theory. The tests have also shown that the horizontal and vertical dispersion coefficients are consistent with the dispersion coefficients used in the ISC-PRIME model for urban and rural dispersion. The horizontal and vertical dispersion coefficients are also consistent with similarity theory and consequently reflect the character of the underlying surface roughness.

The third reason relates to the ability to control and monitor the meteorological and source conditions. When comparing dispersion models against field observations, the errors in the model inputs give one little hope in assessing the real validity of the model. In the field, wind profiles are frequently not available and the wind characteristics at the stack location are often assumed the same as the anemometer. Quite often, the hourly source characteristics are also unknown in the field. You may get good agreement with field observations but often the agreement is fortuitous. When using a wind-tunnel database, these input problems are minimized. The wind direction and wind speed are set and remain constant during a given simulation. The source parameters are also fixed and known. Hence, model input errors are minimized and the true performance of the model can be assessed.

Another good reason for using the wind tunnel is the cost. A high quality data set can be obtained for wide variety of source and building configurations for a fraction of the cost for the same data set collected in the field.

WIND-TUNNEL DATABASE

A series of 36 wind-tunnel tests (i.e., 10 degree wind vector increments) were conducted to obtain profiles of maximum ground level concentrations versus downwind distance due to emissions from a 45.7 m stack with the site structures in place. Figure 1 shows the multi-tiered, porous, sloped site structures. Eight additional tests were conducted to obtain maximum ground level concentrations versus downwind distance for buildings with height/width/length ratios of 1:2:1 (i.e., the "equivalent buildings") with the significant site structures removed, as shown in Figure 2. The simulated source parameters and building dimensions for all tests are provided in Table 1.

Wind-tunnel model operating conditions were set by matching the following parameters in model and full scale:

- momentum ratio, M_0

Equation 1.

$$M_0 = \frac{\rho_s}{\rho_a}\left(\frac{V_e}{U_h}\right)^2 \left(\frac{d}{z_r}\right)^2 \quad ;$$

- buoyancy ratio, B_0

Equation 2.

$$B_0 = \frac{g\, d^2\, V_e\, (\rho_a - \rho_s)}{4\, z_r\, \rho_a\, U_h^3} = \left(\frac{\rho_s}{\rho_a}\right)\left(\frac{R^3}{Fr_s^2}\right)\left(\frac{d}{z_r}\right) \;;$$

- Reynolds number independence was ensured with a building Reynolds number in excess of 11,000;
- a neutral atmospheric boundary layer was established (Pasquill-Gifford C or D stability);

where

Equation 3.

$$Fr_s^2 = \frac{\rho_s\, V_e^2}{g\, (\rho_a - \rho_s)\, d} \;;$$

and

ρ_s	=	stack gas density (kg/m^3);
ρ_a	=	ambient air density (kg/m^3).
V_e	=	stack gas exit velocity (m/s);
U_h	=	wind velocity at stack top (m/s);
d	=	stack diameter (m);
z_r	=	reference height (m); and
g	=	gravitational acceleration (m/s^2).

Ground-level sampling taps were installed downwind of the stack so that up to 48 locations were sampled simultaneously for each simulation. A typical sampling grid pattern is shown in Figure 3. The measured concentrations were converted to full-scale normalized concentrations (i.e., *C/Q*). The maximum concentration in each horizontal row was then selected to generate a database of maximum concentration versus downwind distance. The overall maximum concentration for each wind vector was also selected to generate a database of maximum concentration versus wind vector.

To determine "equivalent building dimensions" (EBD), the maximum ground level concentration profiles with the site structures in place are compared to those for the various simple geometry buildings. The criteria for defining whether or not two concentration profiles are similar is to determine the smallest simple geometry building which: 1) produces an overall maximum concentration exceeding 90 percent of the overall maximum concentration observed with all site structures in place; 2) at all other longitudinal distances, produces ground level concentrations which exceed the ground level concentration observed with all site structures in place less 20 percent of the overall maximum ground level concentration with all structures in place.[11]

ISC-PRIME/BPIP AND ISC-PRIME/EBD VERSUS WIND-TUNNEL OBSERVATIONS

Building Dimension Inputs

Building dimensions for input into the ISC-PRIME model were determined using both BPIP and the EBD method. It should be noted that due to the complexity of the site structures, particularly the cooling tower seen in the background of Figure 1, the maximum number of tiers allowed in BPIP was changed to 11 and the source code was re-complied.

Figure 4 shows the simplification of the multi-tiered, sloped, porous, structure used as input for the BPIP program. Note that both the porous shroud surrounding the stack (Tier 1) and the porous parts of each "wing" (see Figure 1) were assumed to be solid in the simplification. The "wings" were simplified as multiple tiers of decreasing height. The building parameters generated by BPIP indicated that Tier 2 was the dominant structure affecting plume downwash, not the stack shroud (Tier 1). The building parameters were all based on Tier 2.

EBD were determined by plotting the maximum observed C/Q in each receptor row versus downwind distance for the site structures as well as each equivalent building. Based on the criteria discussed above, an equivalent building was selected for each of the 36 wind vectors. Figure 6 is a typical plot used to make an EBD determination.

Figure 7 shows the variation in building height, *H*, versus wind vector for the various methods. Note that the BPIP determined height is identical to the actual height of Tier 2 for all wind vectors. Several of the EBD determined building heights are slightly higher than the Tier 2 height. This is probably due to the criteria required for the EBD selection and does not suggest that the stack shroud is the dominant feature affecting plume dispersion. If the stack shroud were the dominant feature, the EBD heights would be greater than the Tier 2 height for all directions.

Concentration Results and Discussion

The ISC-PRIME model was run using building parameters generated using both the BPIP program (ISC-PRIME/BPIP) and the EBD technique (ISC-PRIME/BPIP). The exhaust and ambient parameters simulated are listed in Table 1. In both model runs, a polar receptor grid with rings of receptors corresponding to each receptor row used in the wind tunnel (i.e., downwind distances of 100 m, 144m, 208 m, 300 m, 433 m, 624 m and 900m) was used. As discussed above, a database of concentrations measured in the wind tunnel with the site structures present was compiled prior to the EBD analysis.

Figures 7 through 12 present the concentration results in various forms. In order to compare the results of the various techniques, graphs of the maximum concentration in each receptor row versus downwind distance were generated. Figure 8 shows two typical graphs of the maximum concentration in each receptor row versus downwind distance at a specific wind vector. In Figure 8a, the maximum predicted C/Q for both methods matches that observed in the wind tunnel for distances less than about approximately 400 m. At greater distances, both ISC-PRIME/BPIP and ISC-PRIME/EBD tend to under-predict the maximum concentration. Figure 8b shows that ISC-PRIME/BPIP tends to over-predict the maximum C/Q for some wind directions, while still under-predicting at far downwind distances. This under-prediction at far downwind distances is most likely due to the limitation of "Urban" or "Rural" approach roughnesses.

Figure 9 and Figure 10 show the relative performance of ISC-PRIME using two building dimension generation methods. In Figure 9, the maximum concentration predicted for each wind vector is plotted versus the maximum concentration observed in the wind tunnel. All of the maximum predicted concentrations are within a factor of two of those observed in the wind tunnel. In general, ISC-PRIME/BPIP tends to over-predict when compared to both ISC-PRIME/EBD and the wind-tunnel observations. Figure 10 shows the maximum concentrations versus wind vector, normalized by the observed concentration for that wind vector, for each method. Again, ISC-PRIME/BPIP tends to over-predict for most wind vectors. This over-prediction is amplified for several wind vectors, including 30 degrees and approximately 290 through 350 degrees. The models slightly under-predict the maximum observed concentration for wind vectors 100 through 180 degrees. This is likely due to the orientation of the two complex structures, as shown in Figure 5. There are no significant structures upwind of the stack, but the "wing" of the complex structure may be acting as a "trip" that increases the vertical dispersion of the plume. Finally, an apparent wind vector shift between the ISC-PRIME/BPIP and ISC-PRIME/EBD is apparent in the ranges 80 through 110 degrees and 180 through 220 degrees. This may be due to a "bug" in the ISC program or the PRIME algorithm, discussed later.

In practice, a selected number of maximum concentrations (i.e., the 50 greatest concentrations) are used as an assessment of the environmental impact of a given facility. Figure 10 shows the maximum predicted and observed concentrations in increasing rank order. This figure shows that an environmental impact assessment using ISC-PRIME/BPIP for complex structures such as the multi-tiered, sloped, porous structure evaluated here, may needlessly over-predict the maximum concentration actually produced by the facility.

Figure 12 presents the maximum predicted and observed concentrations versus wind vector. The wind vector shift mentioned in the discussion of Figure 10 is quite obvious here. Since the EBD for each wind vector is determined based on wind-tunnel observations for that wind vector, the curve of maximum concentration for the ISC-PRIME/EBD model should match the wind-tunnel observed concentration curve. Note that in Figure 12, the ISC-PRIME/EBD curve is shifted slightly right for wind vectors from 0 through 210 degrees and slightly left from 230 through 250 degrees. To this point, both the ISC-PRIME/BPIP and ISC-PRIME/EBD models were run with the receptor grid origin at the center between the two units shown in Figure 1 (also see Figure 5). Based on these observations, several more ISC-PRIME/EBD model simulations were run with the stack location and receptor grid origin varied as indicated in Figure 13.

Figure 13a is the same as Figure 12, but with the ISC-PRIME/BPIP data removed. The stack was located at coordinates (-35.26, -80.45) and the receptor grid origin was located at (0, 0). Note that the ISC-PRIME/BPIP data was not included in this analysis due to the lack of exact correlation between the ISC-PRIME/BPIP and wind-tunnel observed results. In Figure 13b, the stack location and receptor grid origin were co-located at coordinates (0, 0). In Figure 13c, the stack location and receptor grid origin were co-located at coordinates (-35.26, -80.45). The curves of ISC-PRIME/EBD and wind-tunnel observed results match quite well in both of these figures. In Figure 13d, the original stack location and receptor grid origin were switched. The stack was located at coordinates (0, 0) and the receptor grid origin was located at (-35.26, -80.45). The results discussed for Figure 13a are exactly reversed. This suggests an error in the translation of the building dimensions as the wind vector is rotated through its' full range. This error may be either in the original ISC program or in the newer PRIME algorithm. This inconsistency could produce results significantly different from the "true" results when "real" meteorological data is used. Alternatively, the results may show a limitation in the polar receptor grid such that a polar grid should not be used if the source is not located at the origin of the receptor grid. Additional testing is required to determine the source of the error.

CONCLUSIONS

The results of this study show that the ISC-PRIME model using BPIP generated building dimensions tends to over-predict concentrations for complex structures such as the multi-tiered, sloped, porous structure evaluated. When "Equivalent Building Dimensions" (EBD) are used, the ISC-PRIME model performed exceptionally well in predicting the overall maximum concentrations for the complex structure evaluated. However, the ISC-PRIME model tends to under-predict concentrations at distances far downwind no matter the technique used to generate the building dimensions. This under-prediction at downwind distances is most likely due to the limitation to "Urban" or "Rural" approach roughnesses. It is expected that this limitation will not be present when the PRIME algorithm is incorporated in the AERMOD[18] model.

When comparing the maximum concentration at each wind vector, a possible "bug" in either the ISC-PRIME program was identified. Specifically, the wind vector producing the maximum concentration depends on the relative location of the source and receptor origin. This inconsistency could produce results significantly different from the "true" results when "real" meteorological data is used. This possible "bug" may also be an artifact of the polar grid selected and may suggest that polar grids should not be used when the source is not located at the origin of the receptor grid.

In general, this study shows that the ISC-PRIME model performs exceptionally well for complex structures if the building parameters are first determined using the EBD method. If BPIP generated dimensions are used, the model tends to over-predict the maximum concentration for this particular structure. However, this study was limited in scope and additional testing is needed before general conclusions can be drawn.

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KEY WORDS

Dispersion Modeling, wind tunnel, building wake effects, model validation, ISC, PRIME

FIGURES

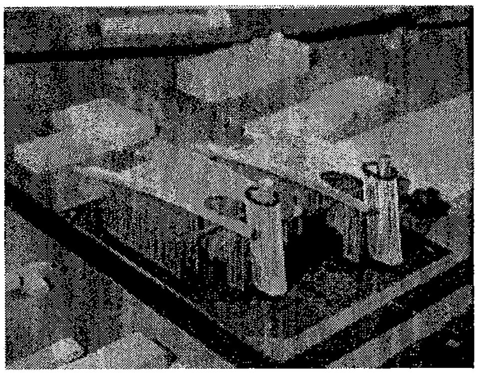


Figure 1. Close-up view of the multi-tiered, sloped porous structures in the wind tunnel.

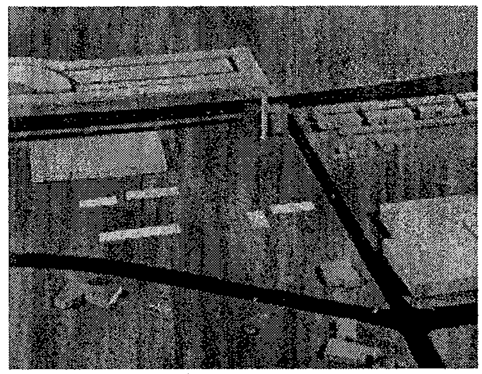


Figure 2. Close-up view of a typical equivalent building setup in the wind tunnel.

Figure 3. Wind-tunnel schematic showing a typical equivalent building setup in the wind tunnel.

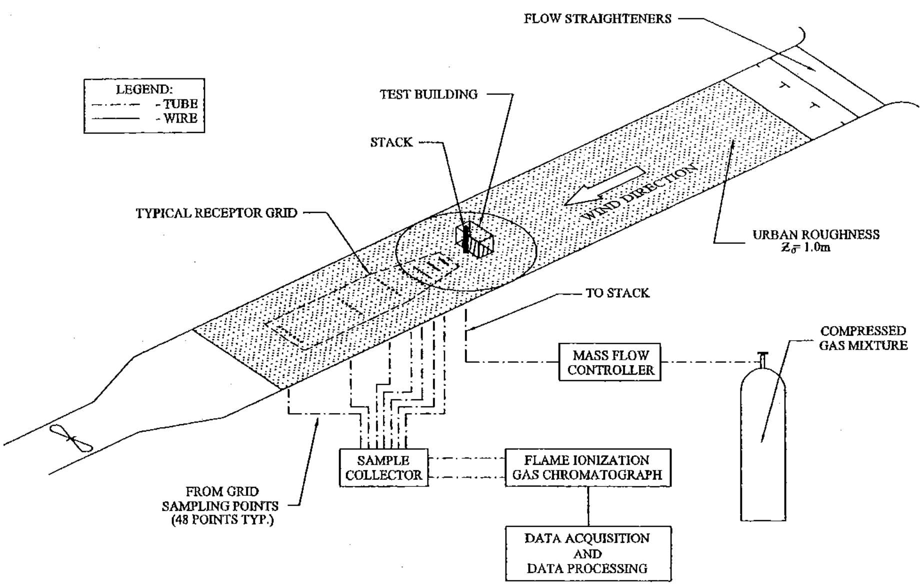


Figure 4. Simplification of the multi-tiered, porous, sloped structure for input into the BPIP program.

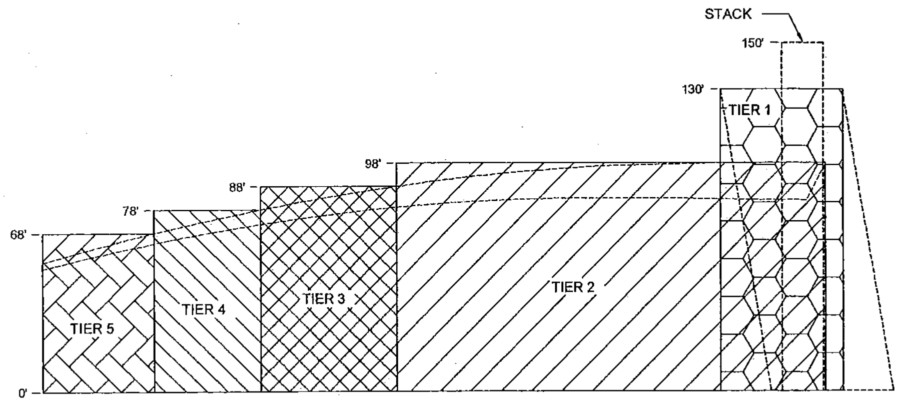


Figure 5. Plan view of area and buildings model on the wind-tunnel turntable.

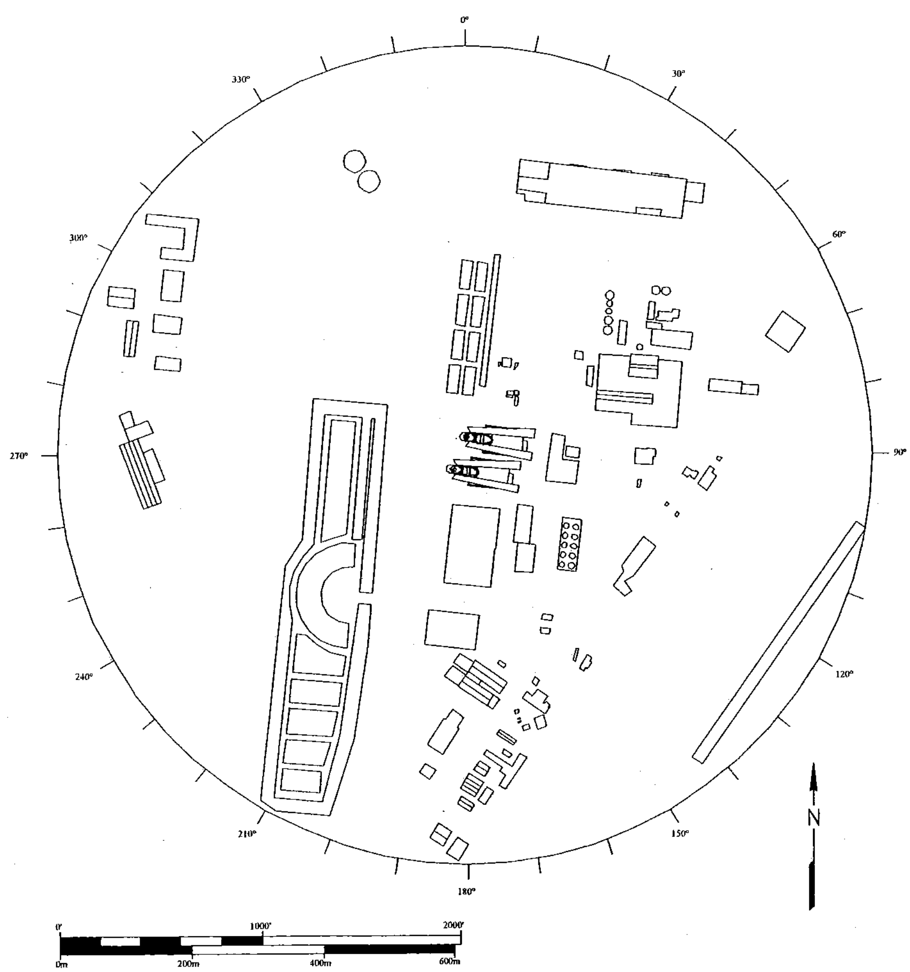


Figure 6. Typical EBD selection plot showing the maximum concentration versus downwind distance for the actual site structures and the various equivalent buildings.

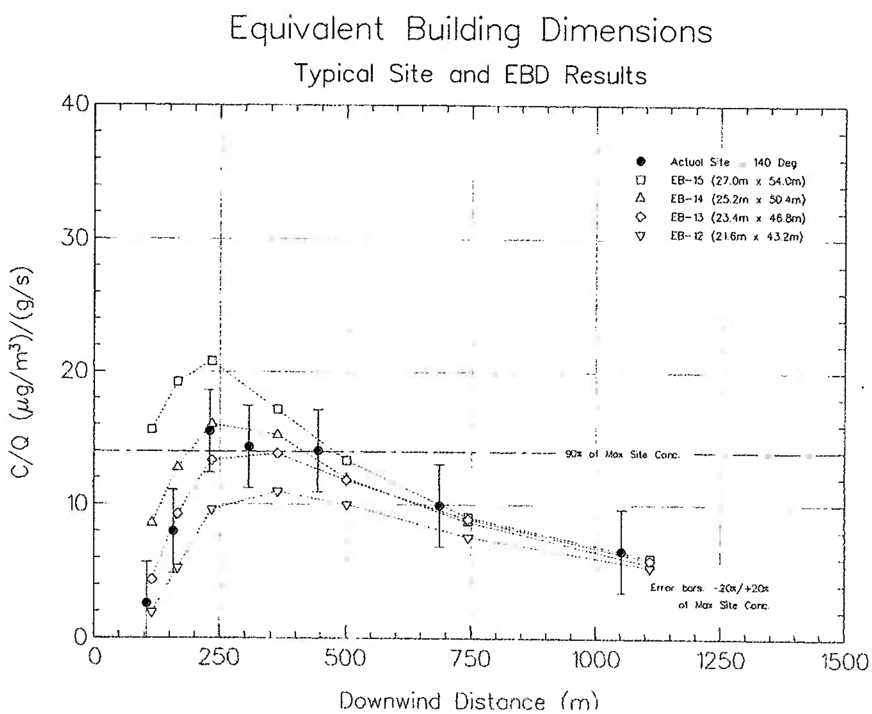


Figure 7. Building Height, *H*, predicted using the EBD technique, the BPIP program and the actual heights versus wind vector.

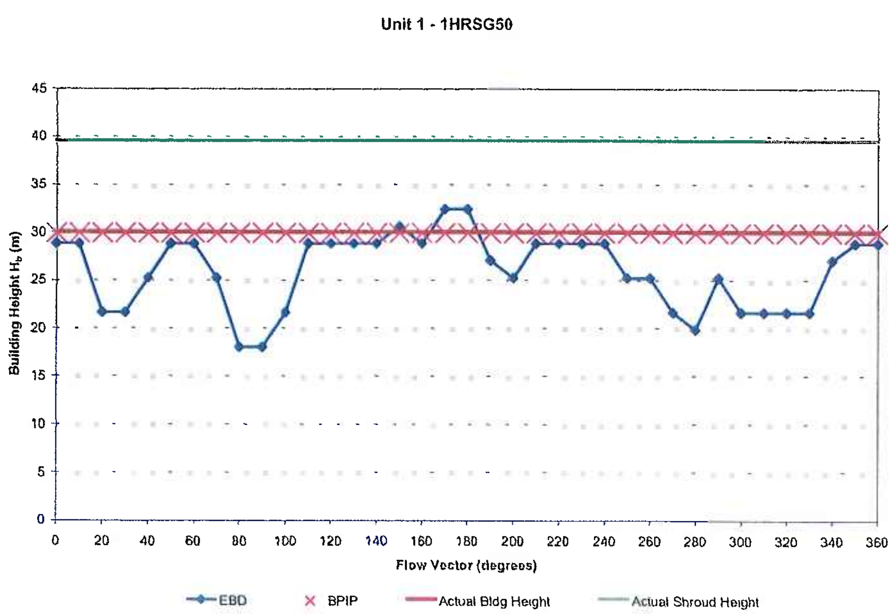


Figure 8. Maximum concentration versus downwind distance predicted using ISC-PRIME/BPIP, ISC-PRIME/EBD and observed in the wind tunnel for selected wind vectors.

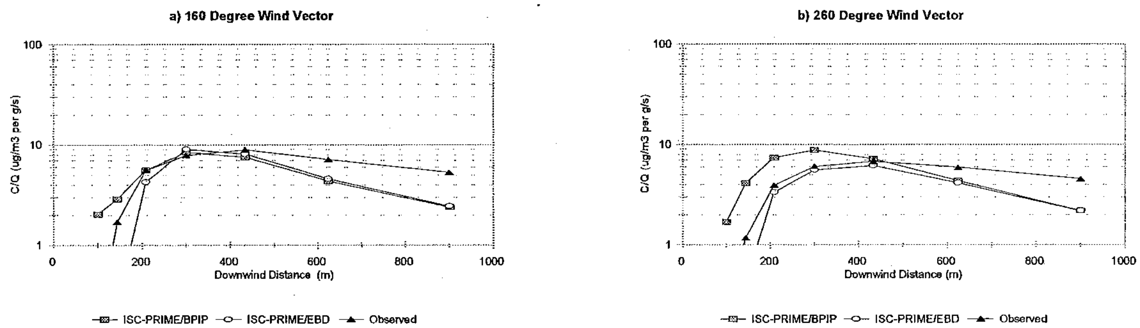


Figure 9. Maximum predicted concentrations versus those observed in the wind tunnel for each wind vector.

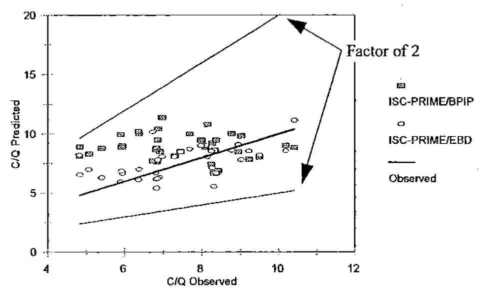


Figure 10. Maximum predicted and observed concentrations in increasing rank order.

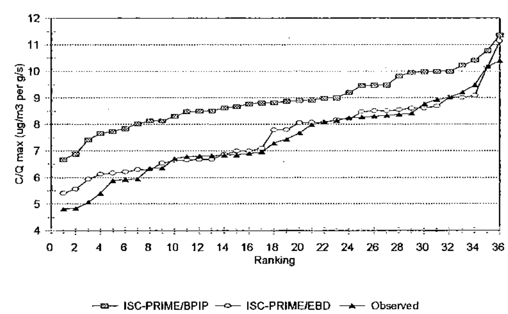


Figure 11. Maximum predicted and observed C/Q normalized by the C/Q observed in the wind tunnel versus wind vector.

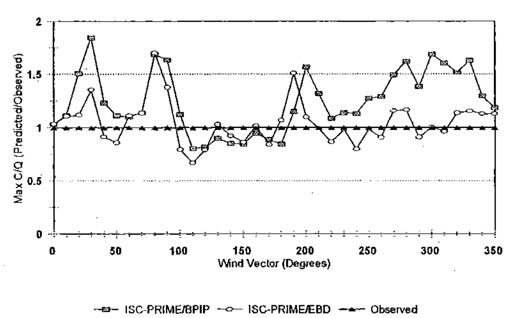


Figure 12. Maximum predicted and observed concentrations versus wind vector.

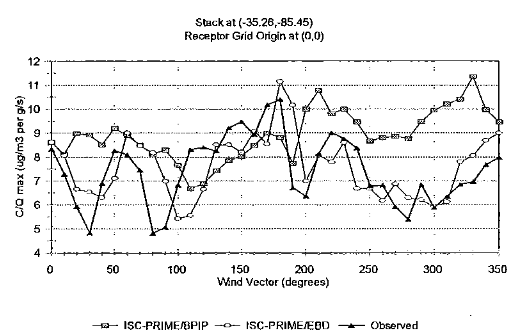
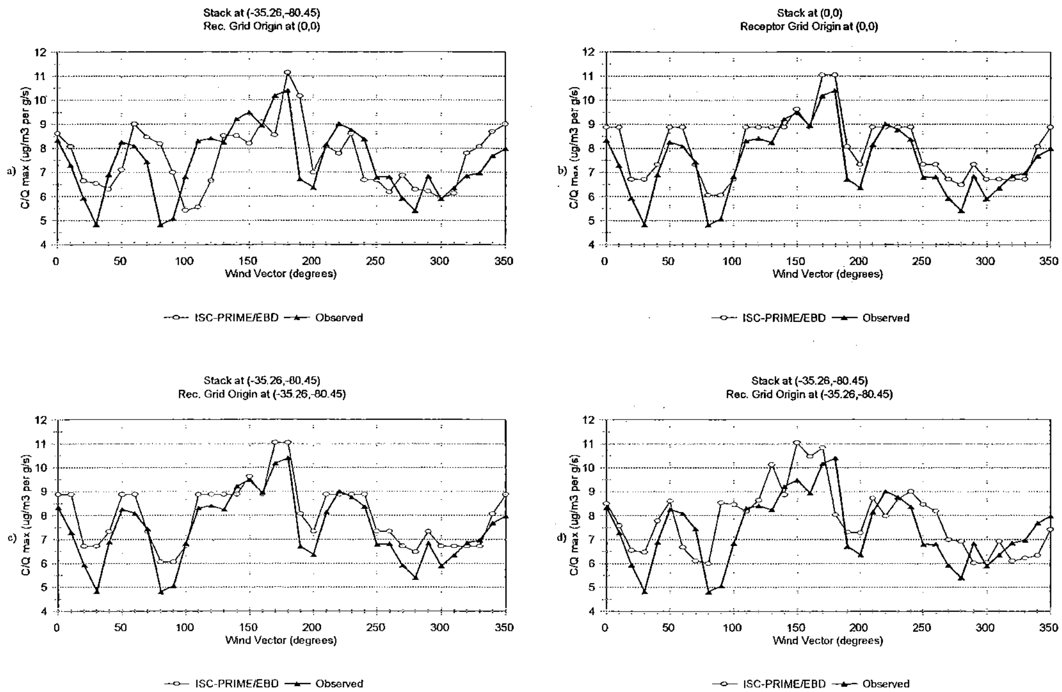


Figure 13. Maximum normalized concentrations predicted for ISC-PRIME/EBD and observed in the wind tunnel versus wind vector for various stack-location/receptor-grid-origin combinations.



TABLES

Table 1. Model Inputs

Exhaust Stack Parameters

Exit Diameter	5.49 m
Stack Height	45.7 m
Exit Temperature	294.4 K
Volume Flow Rate	872.9 m^3/s
Exit Velocity	36.875 m/s

Ambient Parameters

Wind vector	Varies
Stack Height Wind Speed	28.91 m/s
Approach Roughness	Urban
Ambient Temperature	291.5 m/s

Building Parameters

Run Number	Structure Type	Wind Vector (degrees)	Building Height (m)	Building Width (m)	Building Length (m)
101-136	Site	0-350	N/A	N/A	N/A
301	EBD	N/A	14.4	28.8	14.4
302	EBD	N/A	18.0	36.0	18.0
303	EBD	N/A	21.6	43.2	21.6
304	EBD	N/A	25.2	50.4	25.2
305	EBD	N/A	28.8	57.6	28.8
306	EBD	N/A	32.4	64.8	32.4
307	EBD	N/A	36.0	72.0	36.0
308	EBD	N/A	39.6	79.2	39.6

Appendix D

- Existing Plan Approval 1B-02-043
- Existing Plan Approval 1B-07-018
- Existing Plan Approval 1B-07-19

PSD Permit

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor

STEPHEN R. PRITCHARD
Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

August 9, 2005

Mr. David J. MacKenzie, Executive Director
University of Massachusetts Building Authority
One Beacon Street, 26th Floor
Boston, MA 02108

Re: PVAPCD–Amherst
[Regulation 310 CMR 7.02(5)(a)
Appl. #1-B-02-043; Trans. # W029312]
Univ. of Massachusetts–Amherst Campus
Central Heating Plant
Amended to include PSD permit provisions

Approval to Construct (AMENDED)

Dear Mr. MacKenzie:

The Department of Environmental Protection, Bureau of Waste Prevention, Western Regional Office ("Department") received on November 26, 2002 a Major Comprehensive Plan Application from the University of Massachusetts Building Authority, One Beacon Street, 26th Floor, Boston, Massachusetts ("UMASS") for the replacement of the existing steam plant and the installation and operation of a new Central Heating Plant ("CHP") at the University of Massachusetts, Amherst, Massachusetts ("UMASS–Amherst"). A revised plan application addressing several issues raised by the Department in its review of the original application and incorporating changes in boiler configuration was received by the Department on August 22, 2003. Additional updates and revisions were received on September 29, October 24, November 4, 19 and 20, and on December 16 and 22, 2003. This Approval to Construct (Amended) incorporates elements of the USEPA Region 1 PSD Permit Number 046-026-MA07 issued FINAL on July 25, 2005 (see the Appendix on page 41 for additional details).

The plans bear the seal and signature of Ian B. Thomson, Massachusetts Registered Professional Engineer No. 29690.

In accordance with the Massachusetts Environmental Policy Act, UMASS submitted an Expanded Environmental Notification Form for the new plant to the Executive Office of Environmental Affairs on August 15, 2002 (EOEA No. 12864). The Secretary of Environmental Affairs subsequently certified the Expanded Environmental Notification Form on September 23, 2002 without requiring an Environmental Impact Report.

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD Service - 1-800-298-2207.

DEP on the World Wide Web: http://www.mass.gov/dep
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Overview

The CHP will be located in an area currently used for athletic fields just west of the Mullins Center on Campus Center Way. The existing steam plant, consisting of seven boilers fired with coal, natural gas, and/or fuel oil, as well as the coal handling and storage facilities located elsewhere on campus, will be decommissioned upon startup of the CHP.

The proposed plant is classified as a "major modification" of an existing major source since there will be a "significant" increase in emissions of particulate matter with a mean diameter of $\leq$ 10 microns ("PM_{10}"). Hence, the CHP is subject to the requirements of the Prevention of Significant Deterioration ("PSD") regulations for PM_{10} as set forth in 40 CFR Part 52.21. Because the plant is not classified as a major modification of either NO_x or volatile organic compounds ("VOC"), it is not subject to the requirements of Nonattainment New Source Review ("NSR") as set forth in 310 CMR 7.00, Appendix A.

Project Description

CTG, HRSG, Duct Burner

The proposed combustion turbine/generator ("CTG") will be a Solar Mars 100 series machine with a nominal rating of 10 MW and a heat input rating of approximately 120 MMBtu/hr. The CTG exhaust will be discharged to an HRSG with a rated steam output of 100,000 lb/hr equipped with a duct burner rated at 77.4 MMBtu/hr. Because of the limited availability of natural gas, the CTG will have the capability of firing either natural gas or motor vehicle diesel fuel; the duct burner will be fired exclusively with natural gas. More detailed specifications and performance data for the proposed CTG/HRSG are provided in Table A in the Appendix.

The CTG will utilize a dry low-NO_x (DLN) combustor to control the formation of NO_x. To further reduce NO_x emissions, the CTG will be equipped with a selective catalytic reduction (SCR) system. The CTG will also be equipped with an oxidation catalyst system to control carbon monoxide (CO) emissions, while the design of the combustion installations, implementation of good operating practices, and the use of natural gas or motor vehicle diesel fuel will serve to control emissions of particulate matter, sulfur dioxide ("SO_2"), and VOC.

Package Boilers

The proposed four package boilers will be each rated at approximately 131,250 lb/hr steam flow with a maximum heat input rate of approximately 170 MMBtu/hr. Due to the limited availability of natural gas, the boilers will burn primarily motor vehicle diesel fuel with natural gas use based on availability, typically only when the CTG is offline. More detailed specifications and performance data for the proposed package boilers are listed in Table B in the Appendix.

Each boiler will utilize low-NO_x burners ("LNB") in combination with an SCR system. To control CO emissions, each of the boilers will be equipped with an oxidation catalyst, while the design of the combustion installations, implementation of good operating practices, and the use of natural gas or motor vehicle diesel fuel will serve to control particulate matter, SO_2, and VOC. The exhaust gases from each of the boilers will be discharged via dedicated flues encased within a common 125-foot stack.

Emergency Generator & Diesel Fire Pump
The proposed reciprocating engine emergency generator will supply electrical power in the event of a power outage at the CHP. It will have a maximum heat input rate of 7.7 MMBtu/hr and a maximum power output of 750 kilowatts ("kW"), burning either natural gas or motor vehicle diesel fuel. It will operate ≤ 300 hours during any consecutive 12-month period.

An emergency diesel fire pump will provide sufficient water pressure in case of a fire at the plant. The emergency fire pump will be driven by a diesel engine burning motor vehicle diesel fuel, have a maximum heat input rating of 1.2 MMBtu/hr. It will operate ≤ 300 hours during any consecutive 12-month period.

Petroleum & Chemical Storage Tanks
The CHP will include two 190,000 gallon storage tanks for fuel oil and two 5,000 gallon storage tanks containing 19.5% aqueous ammonia. The ammonia tank will be single wall steel, horizontal fixed-roof storage tank located inside separate impervious concrete secondary containment dikes. These and the other new storage tanks needed for various chemicals required for air pollution control, boiler feedwater treatment, and process wastewater treatment are summarized in Table C in the Appendix.

Source Emissions

The potential emissions from the CHP is based on the CTG burning natural gas with 90 days oil backup, the duct burner burning natural gas only, three package boilers burning oil only and one boiler on standby (50% load) (assuming all oil burned at the CHP contains 0.05% sulfur by wt.) from October 1 through April 30 (non-ozone season), and one boiler on standby (50% load) burning oil from May 1 through September 30 (ozone season). Also figured in the potential emission calculation are the emergency generator and fire pump engine operating with oil for 300 hours per year, and VOC emissions from the oil storage tanks. The CHP potential emissions are summarized in Table 1 below:

Table 1
Proposed CHP Potential Emissions

Pollutant	CTG, HRSG, Duct Burner (tons per year)	Package Boilers (tons per year)	Generator, Fire Pump & Fuel Oil Storage (tons per year)	Total (tons per year)
PM_{10}	6.3	24.8	0.2	31.3
SO_2	9.0	116.0	0.1	125.1
NO_x	11.7	24.8	7.6	44.1
CO	5.8	42.9	0.5	49.2
VOC	2.1	11.3	0.1	13.5
NH_3	2.5	3.9	0.0	6.4

More detailed emission and performance data for the CTG/duct burner, package boilers, emergency generator and diesel fire pump are listed in Tables D, E, and F (respectively) in the Appendix.

Net Change in Emissions

The net change in potential emissions associated with the proposed project is based upon the future potential emissions from the proposed sources minus the actual emissions from existing sources being retired.

The actual emissions from the existing boilers are based upon the average emissions over calendar years 2001 and 2002. Table 2 documents the net change in PM_{10}, SO_2, NO_x, CO, and VOC emissions associated with the CHP.

Table 2
Net Change in Emissions

Pollutant	Proposed CHP Potential Emissions (tons per year)	Existing Plant Actual Emissions (tons per year)[a]	Net Change in Emissions (tons per year)	Significant Increase (tons per year)
PM_{10}	31	4	+27	15[b]
SO_2	125	389	-264	40[b]
NO_x	44	174	-130	40[b]/25[c]
CO	49	44	+5	100[b]
VOC	14	23	-9	25[c]

[a] Based on actual emissions from the existing boilers averaged over calendar years 2001 and 2002.
[b] Significant emission rates triggering PSD review
[c] Significant emission rates triggering non-attainment review

Non-criteria pollutant emissions from the CTG/duct burner and package boilers are summarized in Tables G and H (respectively) in the Appendix.

Regulatory Applicability

The applicable regulations include:

- *National Ambient Air Quality Standards ("NAAQS");*
- *Department Plan Approval Requirements;*
- *Department Noise Requirements*
- *Prevention of Significant Deterioration Review ("PSD");*
- *New Source Performance Standards ("NSPS"); and*
- *National Emission Standards for Hazardous Air Pollutants ("NESHAPS")*
- *Accidental Release Program.*

The regulations that are not triggered by the CHP include *Nonattainment New Source Review*, and *Maximum Achievable Control Technology* ("MACT").

The applicable regulatory programs are discussed below in the context of the proposed CHP.

National Ambient Air Quality Standards (NAAQS)

The USEPA promulgated National Ambient Air Quality Standards for six air contaminants, known as criteria pollutants, for the protection of public health and welfare (40 CFR Part 50). The Massachusetts DEP has adopted these same standards in Regulation 310 CMR 6.00. These criteria pollutants are particulate matter with a mean diameter of less than 10 microns (PM_{10}), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are presented in Table I in the Appendix.

The Town of Amherst is located in a region currently classified as either an attainment or unclassifiable area for PM_{10}, SO_2, NO_2, CO, and Pb. The region is also currently classified as a "serious" nonattainment area for O_3.

To identify those new sources with the potential to violate or contribute to a violation of an ambient air quality standard, the USEPA has adopted significant impact levels (SILs) for PM_{10}, NO_2, SO_2, and CO. If the modeled impacts of a new source are found to be below the SILs, no further modeling analysis is required to assess compliance with ambient air quality standards. If the modeled impacts are found to exceed the SILs, a more detailed dispersion modeling analysis is required to assess compliance with ambient air quality standards. This analysis must consider the impacts associated not only with the new source, but also with existing sources in the region.

Department Plan Approval Regulations

Since the proposed CHP is classified as a major modification for PM_{10} and as a major source for SO_2, UMASS is required to file an application for a major comprehensive plan approval. The application must demonstrate that the combustion turbine and package boilers will incorporate air pollution control technologies representative of BACT and that the resulting emissions will not cause or contribute to a violation of applicable ambient air quality standards and PSD allowable increments. The application must also demonstrate that the plant will comply with noise criteria established by the Department.

Since the proposed CHP will not result in a "significant increase" (25 tpy or more) in emissions of VOC or NO_x, the project is not subject to Nonattainment New Source Review as detailed in 310 CMR 7.00 Appendix A. The data presented in Table 2 shows that VOC and NO_x emissions will actually decrease significantly compared to the present heating plant.

The emergency engines and the fuel oil storage tanks are exempt from plan approval requirements, in accordance with Regulation 310 CMR 7.02(2)(b)(29)/7.03(10), and 310 CMR 7.02(2)(b)(7) and (11), respectively.

Department Noise Regulations

The Department promulgated regulations governing noise from new and existing equipment under 310 CMR 7.10 and Policy 90-001. According to the Department Policy 90-001, new equipment is not permitted to increase ambient sound levels by more than ten (10) decibels above the lowest measured community sound level at both the property boundaries and the nearest inhabited structures. In addition, new equipment is not permitted to emit tonal noise. Tonal noise occurs when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.

Prevention of Significant Deterioration Review (PSD)

The existing steam plant is classified as a major source and is located in attainment or unclassified areas for PM_{10}, SO_2, NO_2, and CO. A modification to an existing major source is subject to PSD review if the net change in the potential emissions of any regulated pollutant is equal to or greater than the corresponding significant emission rates. Table 2 presents data regarding the change in emissions resulting from this project. Based on this information, the CHP project will be considered a major modification for PM_{10} and thus will be subject to PSD review only for that pollutant. Also, an assessment of air quality impacts is required to demonstrate compliance with National Ambient Air Quality Standards (NAAQS), PSD increment limits, and impacts on soils, visibility and secondary growth.

New Source Performance Standards (NSPS)

The proposed combustion turbine will be subject to the NSPS for stationary combustion turbines (Subpart GG) which limits NO_X emissions to a nominal value of 75 parts per million by volume on a dry basis (ppmvd) corrected to 15 percent O_2, and SO_2 emissions to 150 ppmvd corrected to 15 percent O_2 or the fuel sulfur content to 0.8 percent by weight. The proposed unit will meet the NO_X limits through the use of dry low NO_x combustion and SCR add-on control equipment. The SO_2 limits will be met by combusting only natural gas or low sulfur fuel oil (≤ 0.05% by wt.).

The duct burner serving the HRSG will be subject to the standards for small industrial boilers (Subpart Dc). Since it will be fired exclusively with natural gas and has a rated capacity of 77.4 MMBtu/hr, it will be subject only to the notification requirements under Subpart Dc.

The new package boilers will be subject to the standards for large industrial boilers (Subpart Db), which limits particulate emissions firing oil alone or in combination with other fuels to 0.1 pounds per million Btu (lb/MMBtu) and NO_x emissions firing natural gas or distillate oil to 0.20 lb/MMBtu. Because the package boilers will burn a very low sulfur oil (≤ 0.05% by wt.), they will not be subject to the SO_2 standards under Subpart Db.

The fuel oil storage tanks will be subject only to the notification and recordkeeping requirements of the standards for volatile organic liquid storage vessels (Subpart Kb).

National Emission Standards for Hazardous Air Pollutants
Pursuant to Section 112(b), the USEPA has promulgated the National Emission Standards for Hazardous Air Pollutants (NESHAP) under 40 CFR Parts 61 and 63. These regulations have been incorporated by reference into the Department's Air Pollution Control Regulations. The only NESHAP that may affect the combustion installations at the CHP are those recently proposed for stationary combustion turbines (Subpart YYYY) and for industrial, commercial, and institutional boilers (Subpart DDDDD). The USEPA could promulgate final standards as early as November 2003. New CTGs will be required to comply with the standards upon startup or the effective date of the standards, whichever is later. The proposed NESHAP are intended to control those HAPs potentially emitted from stationary combustion turbines including trace metals (e.g., lead, mercury, and chromium) and volatile or semi-volatile organic compounds (e.g., benzene, formaldehyde, and PAHs). To control these HAPs, the USEPA has established standards for the surrogate pollutants: CO and formaldehyde. According to the proposed standards, the CTG, which will be equipped with an oxidation catalyst for CO, must achieve at least a 95-percent reduction in CO emissions.

On January 13, 2003, the USEPA proposed NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters to be codified under 40 CFR 63, Subpart DDDDD. New boilers will be required to comply with the standards upon startup or the effective date of the standards, whichever is later. Existing boilers will be required to comply within three years of the promulgation date of the standards.

The proposed NESHAP are intended to control those HAPs potentially emitted from these boilers including acid gases, select trace metals, and volatile or semi-volatile organic compounds. To control these HAPs, the USEPA has established standards for the surrogate pollutants: particulate matter or select trace metals, hydrogen chloride, mercury, and carbon monoxide.

Because the existing boilers have the potential to emit more than 10 tpy of HCl, the University would be classified as a major HAP source potentially subject to the requirements of the proposed NESHAPs. Depending on the promulgation date of these standards, the proposed combustion turbine may have to comply with the required CO reduction under Subpart YYYY. Similarly, the proposed package boilers may have to comply with the emission limits for particulate, HCl, and CO under Subpart DDDDD. The proposed combustion turbine and package boilers will be designed to comply with the emission limits ultimately promulgated by the USEPA. Based upon the current project schedule, the existing boilers will be retired within three years of the anticipated promulgation date of the NESHAP under Subpart DDDDD.

Accidental Release Program

Because SCR will be employed to control NO_x emissions from the cogeneration unit and package boilers at the proposed CHP, it will be necessary to store aqueous ammonia on-site. The proposed CHP will use aqueous ammonia at concentrations of less than 19.5 percent and thus the ammonia storage facilities will not be subject to the EPA's Accidental Release Program under 40 CFR Part 68. However, the provisions of Section 112(r) of the Clean Air Act include a "general duty clause" that requires such facilities to be designed and operated in a manner that prevents the release of ammonia and that minimizes the consequences of an accidental release.

The aqueous ammonia will be stored on-site in two 5,000 gallon, single-wall steel, vertical fixed-roof storage tanks located inside separate impervious concrete secondary containment dikes. Each containment dike will have sufficient volume to contain 110 percent of the liquid from each tank plus rain water from a 25-year storm. A concrete dike also serves as a physical barrier that will prevent accidental contact of vehicles or other equipment with the storage tanks. Each tank will be approximately 8.5 feet in diameter and 12.7 feet in length.

In the highly unlikely event of an aqueous ammonia release, the area within the dike will be equipped with evaporative controls (ball-like baffles) to reduce the potentially exposed area to less than 10 percent of the total available surface area.

Ammonia transfer from the delivery truck to the storage tanks will be conducted within a fully contained unloading area. Interconnecting piping will be designed to enable spills to be directly routed to the tank containment areas. A hose from off the top of the tank will be connected back to the truck to contain fumes displaced by filling operations.

Off-Site Consequences Analysis

To assess the potential for off-site impacts resulting from a hypothetical worst-case release scenario (i.e., a rupture of the tank wall that contains the aqueous ammonia), an off-site consequences analysis was performed using the protocols established in the regulations implementing the USEPA's Risk Management Program (40 CFR Part 68).

The potential worst-case release impact distance was calculated using the recommended 112(r) RMP protocols presented by USEPA in its' guidance documents. The potential worst-case impact distance was predicted using the Areal Locations of Hazardous Atmospheres (ALOHA) Model.

The ALOHA model results predict that the ground-level concentrations of neutrally buoyant aqueous ammonia vapors beyond 90 feet will be 144 ppm, below the recently revised ERPG-2 concentration of 150 ppm. Therefore, the worst-case accidental release scenario (5,000 gallons consisting of 19.5 percent aqueous ammonia solution in an impervious, diked area with evaporative controls) will not result in an excursion of the ERPG-2 guideline of 150 ppm at the operational boundary of the plant.

Best Available Control Technology (BACT) Analysis

A top-down BACT analysis was conducted, consisting of the evaluation of options and the selection of options for the following BACT components:

- ***A. Combustion Turbine Technology***
- ***B. Combustion Controls***
- ***C. Natural Gas Availability***
- ***D. Distillate Oil Sulfur Content***
- ***E. Add-on Controls***

A. Combustion Turbine Technology

There are three commercially available CTGs in the 10 MW size range needed by UMASS–Amherst, as follows:

- the Solar Mars 100 rated at 10.685 MW;
- the General Electric (GE) 10 rated at 11.250 MW; and
- the Alstom Cyclone rated at 12.895 MW.

A comparison of the three technologies is provided in Table 3, below.

Table 3
Comparison of Alternative Combustion Turbine Technology

Option	Mars 100	General Electric 10B	Alstom Cyclone
Design Layout	Two Shaft Hot End Drive	Single Shaft Cold End Drive	Two Shaft Hot End Drive
Commercially Available	1980	1997	1997
Units Sold U.S./Worldwide	169 / 715	6 / 35	0 / 22
Units with DLN Combustor	180	5	22
Units in Operation	700	4	4
Units w/ Dual Fuel Capability	103	2	0
Country of packaging/parts supply	United States/United States	Italy/Italy	England/United States

The Solar Mars 100 is manufactured and packaged in the United States. Replacement parts are available within 24 hours, and service support, within four hours. Replacement engines are stocked domestically and are available within 24 hours.

The General Electric 10B is manufactured and packaged by Nuovo Pigone (a wholly owned subsidiary of GE) in Italy. Although GE claims that these units will be soon packaged in the United States, all engineering support, spare parts, commissioning, and service are currently supplied from Italy.

The Alstom Cyclone is manufactured and traditionally packaged in England. To date, Alstom has sold no units in the United States. Although Alstom has begun to package the units here, their packaging experience will not be demonstrated until a unit is sold in the United States. Currently, all exchange units are still shipped from England.

Given that the DLN combustors all work comparably well at reducing NO_x emissions before control, UMASS accordingly has proposed the Solar Mars 100 machine as BACT based upon its leading position in operating experience and maintainability.

B. Combustion Controls

1. NO_x Control – CTG/HRSG

Catalytic Combustor

The combustion control technology with the lowest reported NO_x emissions is a catalytic-lined combustor that burns the fuel at a temperature below that promoting thermal NO_x formation. Although the technology has been applied successfully to small turbines burning natural gas in the testing stages of its development, it is not at this time commercially available for cogeneration projects of this size.

Dry Low-NO_x Combustor

Dry low-NO_x combustors (DLN) pre-mix the fuel and compressed air to prevent local zones of high temperatures that promote thermal NO_x formation. Solar offers a DLN combustor, known as SoLoNO$_x$, capable of reducing emitted NO_x concentrations, for a dual-fuel firing configuration, to 38 ppmvd when firing natural gas and 96 ppmvd when firing motor vehicle diesel fuel, both @15% O_2. Accordingly, UMASS will propose for combustion controls the use of SoLoNOx with the Solar Mars 100 CTG.

Water or Steam Injection

Water and steam are diluents that can quench hot spots in the flame reducing thermal NO_x formation. Although water or steam injection reduces NO_x emissions to levels equivalent to that achieved with DLN combustors when firing natural gas, NO_x emissions are not significantly reduced when firing oil. On the other hand, water or steam injection increases CO emissions appreciably due to the lower temperatures in the burnout zone. Since the CTG will burn oil for up to 90 days a year or more, water or steam injection was given no further consideration in the BACT analysis.

2. NO_x Control – Boilers

To control NO_x emissions from the dual-fuel boilers, one can use low-NO_x burners (LNB) that use flame geometry control and fuel/air mixing to reduce the formation of thermal NO_x, either alone or in combination with flue gas recirculation (FGR).

Burners have been recently developed with sophisticated control systems and FGR to result in very low NO_x emissions (~9 ppmvd). These configurations are effective while firing natural gas but not oil. Since the proposed boilers will burn mainly oil, UMASS accordingly proposes to use LNB and FGR as combustion controls for NO_x on the package boilers, with the add-on control technology SCR used for final NO_x reduction.

3. CO / PM_{10} / VOC / SO_2 Control – Boilers & CTG/HRSG

Carbon monoxide (CO), particulate matter (PM_{10}), and volatile organic compounds (VOC) are all products of incomplete combustion. These emissions can be minimized by the application of good combustion practices and the use of very low ash fuel. Both natural gas and motor vehicle diesel fuel are inherently very low in ash. Accordingly, UMASS proposes to use good combustion practices and the use of very low ash fuels on both the CTG/HRSG and package boilers for the control of CO, PM_{10}, and VOC.

Emissions of sulfur dioxide (SO_2) are determined by the sulfur content of the fuel being combusted, and will be discussed in Sections C & D following.

C. Natural Gas Availability

The University of Massachusetts is located in a relatively remote, low population density area of Western Massachusetts. Because of the low population density and lack of large industrial complexes, natural gas supplies have not yet been extended to the area to support continuous availability for both residential customers and industrial/ institutional end users.

Currently, there is insufficient gas available in the area to operate both the combustion turbine and duct burner in the heat recovery steam generator (HRSG). To ensure firm gas supplies to the University in the quantities necessary to fire the combustion turbine and duct burner, it will be necessary to upgrade the capacity of the existing natural gas pipeline of the local distribution company, Berkshire Gas.

For the proposed CHP, UMASS–Amherst is negotiating with Berkshire Gas to upgrade 25,500 feet of its distribution pipeline at a cost ranging from $3,500,000 to $5,000,000. A traditional BACT analysis, based on the annualized cost of the pipeline upgrades versus the reduction in NO_x due to burning natural gas instead of oil, results in costs far in excess of what has been historically approved as BACT.

UMASS–Amherst also evaluated the potential economic consequences associated with increases in gas prices, and proposed that when the incremental cost of natural gas vs. motor vehicle diesel fuel exceeds $2.88/MMBtu that they be allowed to burn motor vehicle diesel fuel since at that 'cut-point' the firing of natural gas would be an economically ineffective means of reducing NO_x emissions from the CTG.

In determining that economic threshold, a "top-down" BACT analysis was conducted. The base case in the BACT analysis assumes that the combustion turbine is fired exclusively with 0.05% sulfur motor vehicle diesel fuel, and the HRSG duct burner with natural gas for 365 days per year. In the base case, the NOx emissions are assumed to comply with the Massachusetts DEP Reasonably Available Control Technology (RACT), which is equivalent to an outlet concentration of 65 ppmvd @ 15% O_2. The future case assumes that the duct burner is fired with natural gas and the CTG is fired with natural gas except for 90 days per year. In the future case, the NOx emissions are assumed to be controlled by selective catalytic reduction (SCR) designed to limit the outlet concentration to 6.0 ppmvd when firing fuel oil and 2.5 ppmvd when firing natural gas. Table J in the Appendix summarizes the results of this fuel cost 'cut-point' BACT analysis.

D. Distillate Oil Sulfur Content

Assuming that natural gas is available at a cost of less than or equal to $2.88 per MMBtu, the CTG will burn predominantly natural gas with 90 days of low sulfur oil for backup (motor vehicle diesel fuel containing either 500 ppm sulfur or 15 ppm sulfur). If natural gas is not available or if the cost of natural gas is greater than $2.88 per MMBtu, the CTG will burn predominantly low sulfur diesel fuel. The duct burner will be fired exclusively with natural gas. The package boilers will burn predominantly motor vehicle diesel fuel.
In December 2000, the USEPA issued a final rulemaking on Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements. The new rule requires refiners and importers to produce highway diesel with a maximum sulfur

content of 15 ppm starting June 1, 2006. The Department anticipates that the cost effectiveness of using 15 ppm sulfur oil vs. 500 ppm sulfur oil will improve dramatically as the June 1, 2006 date approaches and 15 ppm sulfur fuel use becomes widespread. At that time and prior to startup, the Department is requiring as part of ~~this Conditional~~ Approval that UMASS submit an updated BACT analysis evaluating fuel cost vs. fuel sulfur content. Based on the results of this BACT analysis, UMASS will use either 15 ppm *ultra-low-sulfur (ULS)* motor vehicle diesel fuel, 'red-dye' motor vehicle diesel fuel oil containing 500 ppm sulfur, or (possibly) a fuel with an intermediate sulfur content.xxx

E. Add-On Controls

The two flue gas treatment systems capable of achieving the most stringent level of NO_x control currently available for combustion turbines are selective catalytic reduction (SCR) and SCONOx™.

1. CTG/HRSG

SCONOx is a pollution control technology that utilizes a single catalyst for the reduction of CO and NO_x. The system uses no ammonia (as does SCR) and has been demonstrated to achieve the same NO_x reductions as SCR (≈ 85%) during its trials on a General Electric LM2500. More recently, a SCONOx system has been in service for the past two years on a Solar Taurus CTG at Genetics Institute in Andover, Massachusetts. This system reportedly has not been able to consistently meet the emission limits nor demonstrate steady-state operation while firing oil. Because SCONOx has not been demonstrated as commercially available for a combustion turbine firing oil, it is considered to be technically infeasible for the proposed CHP.

Selective catalytic reduction (SCR) is the most effective add-on control technology for reducing NO_x emissions from combustion turbines. SCR has been successfully installed and operated for over ten years on similar types of combustion turbine installations. The technology uses ammonia to reduce NO_x to N_2 and H_2O in the presence of a catalyst. An SCR system significantly reduces NO_x emissions (typically 90%). Accordingly, UMASS proposes to use SCR for control of NO_x emissions.

Oxidation catalysts are the only available add-on controls for the reduction of CO from CTGs. Accordingly, UMASS will use an oxidation catalyst and good combustion practices for the control of CO from the CTG.

2. Boilers

For add-on controls, selective catalytic reduction (SCR) represents the most stringent level of NO_x control available for boilers. Accordingly, UMASS proposes to use LNB and FGR prior to SCR to control NO_x emissions from the boilers.

Oxidation catalysts are the only available add-on controls for the reduction of CO from boilers. Accordingly, UMASS will use an oxidation catalyst and good combustion practices for the control of CO from the boilers..
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Conclusions

CTG/HRSG

UMASS proposes as BACT the use of the Mars Solar 100 CTG with SoLoNO$_x$ dry low-NO$_x$ technology, burning natural gas with up to 90 days of 15/500 ppm sulfur motor vehicle diesel fuel as backup.

SCR add-on controls will be designed to reduce NO$_x$ to 2.5 ppmvd firing natural gas and 6.0 ppmvd firing motor vehicle diesel fuel, both @15% O_2 (including the duct burner emissions), and to keep ammonia slip to less than 2.0 ppmvd @ 15% O_2 with either fuel. An oxidation catalyst will control CO emissions to 2.0 ppmvd on natural gas and 5.0 ppmvd while burning motor vehicle diesel fuel, both @ 15% O_2.

These emission limits for NO$_x$ and NH_3 have not been demonstrated in practice on the Solar Model 100 combustion turbine. Currently, Solar will guarantee NO$_x$ outlet concentrations from its Mars 100 dual-fuel combustion turbine at 38 parts per million by volume on a dry basis (ppmvd) firing natural gas and 96 ppmvd firing fuel oil, both @15% O_2. Solar has indicated that it intends to modify the Mars 100 combustor in the future to reduce the NO$_x$ outlet concentrations to 25 ppmvd firing natural gas and 60 ppmvd firing fuel oil, both @15% O_2. Solar has further indicated that the modified combustion turbine will be available by the delivery date in 2006, but cannot guarantee the reduced NO$_x$ levels at this time.

Since the emission limits of NO$_x$ and NH_3 have not been demonstrated in practice with the Solar Mars 100 CTG, UMASS will conduct an optimization program during the commissioning of the combustion turbine that is designed to minimize NO$_x$ and NH_3 emissions. If the combustion turbine cannot meet the NO$_x$ and NH_3 limits on a sustainable basis over the life of the catalyst, UMASS will propose revised NO$_x$ and NH_3 emission limits that can be sustained on a consistent basis, subject to Department review and written approval. If the revised emission rates exceed those used in the original modeling analysis, UMASS will perform additional ambient air quality modeling to demonstrate compliance with the NAAQS.

Package Boilers

UMASS proposes as BACT the use of natural gas and 15/500 ppm sulfur motor vehicle diesel fuel in the package boilers, which will employ LNB and FGR in combination with SCR to limit NO$_x$ emissions to 5.0 ppmvd during gas firing and 9.0 ppmvd during oil firing, both @ 3% O_2. Ammonia slip will be maintained below 2.0 ppmvd @ 3% O_2 with either fuel. An oxidation catalyst will control CO emissions to 20.0 ppmvd on natural gas and 25.0 ppmvd while burning oil, both @ 3% O_2.

Ambient Air Quality Impact Analysis

This section documents the results an air quality modeling analysis performed for the proposed CHP to demonstrate that the predicted air quality impacts associated with the CHP will comply with applicable ambient air quality standards, PSD allowable increments, and the Department's air toxics limits. Modeling was performed assuming oil firing exclusively, except for the duct burner combusting natural gas only.

Data Used

Based on a land use determination, rural dispersion coefficients were used in the air quality modeling analysis. Five years of meteorological data (1996 through 2000) from the nearest National Weather Service weather station located at Westover Air Force Base in Chicopee Falls, Massachusetts (located approximately 13 miles south of the site) were used in the air quality modeling analysis. The nearest upper air soundings collected during the same period are from Albany, New York. These soundings were used in conjunction with the surface observations from Westover AFB to develop the mixing heights used in the modeling analysis.

Background Air Quality

The CHP will be located in Hampshire County, which is currently designated as an attainment area for PM_{10}, SO_2, NO_2, CO, and Pb, and as a serious nonattainment area for O_3. If the projected impacts of the proposed CHP are less than the significant impact levels ("SILs"), ambient background concentrations need not be considered in determining the project's compliance with ambient air quality standards. If the projected impacts are greater than the SILs the projected impacts of the proposed plant combined with background concentrations must be considered in determining compliance with the standards.

GEP Stack Height Analysis

The Turbine and Boiler Building are the "controlling buildings" in determining the GEP formula height. Based on the building's height of 40 feet, the GEP formula height is 100 feet above grade. UMASS proposes to construct two 125-foot stacks, one serving the CTG/HRSG and the other serving the four package boilers.

Source Parameters

The stack parameters for the CTG/HRSG under the alternative fuel firing configurations, with and without the duct burner in operation, and for each of the four package boilers under the alternative fuel firing configurations, are provided in Tables K and L respectively in the Appendix.

Simple Terrain Modeling Analysis

A refined modeling analysis was conducted to assess the potential impacts of the proposed CHP. The Industrial Source Complex Short-term (ISCST3) model was selected to assess receptors representative of simple terrain (terrain below stack top elevation).

Modeling Scenarios

The CTG/HRSG and the four package boilers were first evaluated individually using ISCST3 to determine the worst-case operating conditions for each of the installations. Using ISCST3, the combustion installations operating under worst-case conditions were then evaluated together to determine their compliance with applicable ambient air quality standards and PSD allowable increments.

The maximum pollutant concentrations predicted by ISCST3 were initially compared to the SILs for criteria pollutants. For the purposes of this analysis, a conservative NO_x to NO_2 conversion of 100 percent was used for predicting annual NO_2 concentrations.

If the predicted maximum concentrations were less than the corresponding SILs, no additional modeling considering background sources was conducted for the proposed CHP. If the predicted maximum concentrations were greater than the SILs, additional modeling considering background sources was conducted to demonstrate the plant's compliance with applicable ambient air quality standards and PSD increments.

ISCST3 Model Results

As shown in Table 5 below, the maximum projected impacts of PM_{10}, NO_2, and CO are less than the corresponding SILs. By definition, the proposed units will neither cause nor contribute to a violation of the NAAQS for these pollutants. Furthermore, the proposed units will comply with the PSD allowable increments for PM_{10}.

The maximum projected concentrations of SO_2, on the other hand, are above the corresponding SILs. Consequently, a more refined modeling analysis was performed for SO_2 to demonstrate compliance with the corresponding NAAQS.

Table 5
Maximum ISCST3 Predicted Impacts Compared with the SILs

Pollutant	Averaging Period	Maximum Concentration ($\mu g/m^3$)[1]	SILs ($\mu g/m^3$)
NO_2	Annual[2]	0.4	1
PM_{10}	24-hour	3.4	5
	Annual[2]	0.4	1
SO_2	3-hour	33.2	25
	24-hour	14.8	5
	Annual[2]	1.5	1
CO	1-hour	15.4	2,000
	8-hour	7.6	500

The maximum concentrations associated with the CHP combined with the background SO_2 concentration (see Table M in the Appendix) are compared with the NAAQS in Table 6 below. As shown in Table 6, the maximum projected impacts are well below the corresponding NAAQS.

Table 6
Maximum ISCST3 Predicted Impacts & Background Concentrations

Pollutant	Averaging Period	Maximum Concentration ($\mu g/m^3$) Plant	Background	Total	NAAQS ($\mu g/m^3$)	Percent of NAAQS
SO_2	3-hour	33.2	115.3	148.5	1,300	11.4
	24-hour	14.8	68.1	82.9	365	22.7
	Annual[2]	1.5	13.1	14.6	80	18.3

Conclusion
The proposed CHP will neither cause nor contribute to a violation of the NAAQS in simple terrain surrounding the site. Therefore the plant will not have an adverse effect on public health or welfare in the area. Furthermore, the plant's impact will not exceed the PSD allowable increment for PM_{10} and thus will not have a significant effect on existing air quality.

Complex Terrain Modeling Analysis
The potential impacts of the proposed CHP in areas of complex terrain (terrain at or above stack top elevation) were evaluated using the SCREEN3 Model in VALLEY mode. The analysis assumed rural dispersion coefficients, ground-level receptors, and ambient temperatures equal to each combustion turbine operating case. The VALLEY model results were then compared to the SILs to determine if more refined modeling was necessary.

Because VALLEY is a single source model, the CTG/HRSG and package boilers were run separately with the predicted concentrations summed to determine total plant impacts. The worst-case operating conditions for the two installations were used in the modeling runs. Because the four flues for the boilers are encased in a common stack, the plumes were assumed to merge upon discharge to the atmosphere. To simulate the merging of the plumes, an effective diameter of 2.28 meters was used in the analysis, rather than the actual diameter of 1.14 meters.

Table 7 below shows that the maximum projected impacts of PM_{10} and CO emitted from the CTG/HRSG and package boilers as predicted by VALLEY, are less than corresponding SILs. By definition, the proposed units will neither cause nor contribute to a violation of the NAAQS for these pollutants and will comply with the PSD allowable increments for PM_{10}. The maximum projected concentrations of SO_2 and NO_2, on the other hand, are above the corresponding SILs. Consequently, a more refined modeling analysis was performed for SO_2 and NO_2 to demonstrate compliance with the NAAQS.

The refined modeling analysis must consider the projected impacts of the proposed plant and background levels derived from ambient monitoring data. The maximum SO_2 and NO_2 concentrations associated with the proposed plant and background sources are compared with the NAAQS in Table 8 below. As shown in Table8, the maximum projected SO_2 and NO_2 impacts are well below the corresponding NAAQS.

Table 7
Maximum VALLEY Predicted Impacts Compared with the SILs

Pollutant	Averaging Period	Maximum Concentration (µg/m³)[a]	SILs (µg/m³)
NO_2	Annual[2]	1.4	1
PM_{10}	24-hour	3.1	5
	Annual[2]	0.6	1
SO_2	3-hour	43.6	25
	24-hour	12.1	5
	Annual[2]	3.9	1
CO	1-hour	16.5	2,000
	8-hour	3.9	500

[a] The maximum impacts occurred approximately 1.3 km east-northeast of the CHP site on the University of Massachusetts Amherst Campus.

Table 8
Maximum VALLEY Predicted Impacts & Background Concentrations

Pollutant	Averaging Period	Maximum Concentration (µg/m³)			NAAQS (µg/m³)	Percent of NAAQS
		Plant	Background	Total		
NO_2	Annual[2]	1.4	24.4	25.8	100	25.8
SO_2	3-hour	43.6	115.3	158.9	1,300	12.2
	24-hour	12.1	68.1	80.2	365	22.0
	Annual[2]	3.9	13.1	17.0	80	21.3

Conclusion
The proposed CHP will neither cause nor contribute to a violation of the NAAQS in complex terrain surrounding the site. By definition, therefore, the plant will not have an adverse effect on public health or welfare in the area. Furthermore, the plant's impact will not exceed the PSD allowable increments for PM_{10} and thus will not cause a significant effect on existing air quality.

Air Toxics Analysis
To assess the potential health effects of air toxics emitted from the combustion installations, the projected ground-level concentrations of non-criteria pollutants were compared with the corresponding Threshold Effects Exposure Limits (TELs) and Allowable Ambient Limits (AALs) established by the Department. As shown in Table N in the Appendix, the projected 24-hour and annual concentrations of non-criteria pollutants are well below the TELs and AALs, respectively. Therefore, the proposed CHP will not pose a significant threat to public health.

Class I Area Analysis
The proposed CHP is considered a major modification for PM_{10} and thus is subject to the PSD review only for that pollutant. The PSD regulations include the requirement to assess the plant's potential impacts on air quality and visibility in Class I Areas. The closest Class I Area is the Lye Brook Wilderness Area in Vermont, which is approximately 86 kilometers north-northwest of the Amherst Campus.

The replacement of the existing steam plant with the CHP would result in a significant net increase of PM_{10}. On the other hand, the project would result in dramatic reductions in the potential emissions of both SO_2 and NO_x.

Since the reductions in SO_2 and NO_x would likely have a far greater impact on visibility than the increase in fine particulate, UMASS requested assistance from the U.S. Forest Service (USFS) in establishing the need to assess the impacts of the proposed project on air quality and visibility in the Lye Brook Wilderness Area. In the USFS's response of June 12, 2002, the agency determined that "there will be no adverse impacts, and possibly a net benefit, to the Lye Brook Wilderness connected to the proposed modifications to the University of Massachusetts Central Heating Plant" (USFS 2002). Accordingly, the USFS stated that no air quality or visibility analysis would be required for the Lye Brook Wilderness Area.

Additional Impact Analyses

The PSD regulations require that additional impact analyses be conducted to consider the project's effects on soils and vegetation and the potential impact of secondary growth. Because the project is classified as a major modification for PM_{10}, these analyses address project's effects on soils and vegetation and the potential impact of secondary growth for PM_{10} only.

The screening analysis conducted by UMASS demonstrates that the proposed plant will not have an adverse impact on vegetation or soils in the region. In particular, because the screening levels are based upon the lowest concentrations having an adverse effect on the most sensitive vegetation, the plant will not adversely affect agricultural crops in the area, including produce and tobacco. Again, no credit was taken for the reduction in emissions resulting from the decommissioning of the existing steam plant.

Noise Impact Analysis

The CHP is located in the western quadrant of the University of Massachusetts Amherst Campus. The Southwest Dormitories, located approximately 2,500 feet southeast of the site, are the nearest University dwellings to the proposed plant. The nearest off-site residences are located approximately 1,600 feet to the west along Stockbridge Road. Additional residences are found to the north along North Pleasant Street. The nearest off-site location that has the potential for commercial or residential development is located approximately 900 feet away at the east end of Stockbridge Street.

A noise impact assessment was conducted to demonstrate that the proposed CHP will comply with requirements under 310 CMR 7.10, the Department Policy 90-001, and Best Available Control Technology ("BACT"). The noise impact assessment was conducted in accordance with an approved protocol submitted to the Department on April 18, 2002 and comments received from the Department on the impact assessment in the original application.

The noise surveys were intended to acoustically characterize the environment near the site and within the community. Because the CHP will operate 24-hours per day, and because ambient levels are typically lowest during late evening to early morning hours, sound level measurements were collected throughout the early morning hours of both surveys.

Six noise monitoring locations were selected to provide adequate spatial representation of noise-sensitive receptors during the original survey, conducted from May 15 through May 16, 2002. Weather conditions during daytime measurements consisted of cloudy skies, calm winds and ambient temperatures of about 50° F. Weather conditions during early morning measurements consisted of clear skies, calm winds and ambient temperatures of about 42° F.

Based upon a review of the initial noise survey in the original application, the Department requested a second noise survey to be conducted during the winter season. The Department also requested that a seventh monitoring location be included in the winter survey to account for potential residential or commercial development at the easternmost end of Stockbridge Street. This second noise survey was conducted from January 29 through January 30, 2003. Weather conditions during daytime measurements consisted of cloudy skies, calm winds and ambient temperatures of about 30° F. During early morning measurements, skies were clear, winds were calm and ambient temperatures were about 13° F. Table 9 below summarizes the noise monitoring locations.

Table 9
Noise Monitoring Locations

Position	Description
Location 1	Northern Residences along North Pleasant Street
Location 2	Site Property Boundary
Location 3	University Baseball Field/Mullins Center
Location 4	University Southwest Dormitories (Southeast of Site)
Location 5	Nearest Western Residences along Stockbridge Street
Location 6	Additional Western Residences along Roosevelt Street
Location 7	Easternmost End of Stockbridge Street

Instrumentation

All sound level measurements during both noise surveys were collected with a sound meter that complies with Type 1 tolerance requirements of the American National Standards Institute (ANSI) and was field calibrated before and after each measurement set. A calibration laboratory certified the equipment within the preceding 12-month period using references traceable to the National Institute of Standards and Technology.

Ambient Survey Results

It was observed during both noise surveys that community ambient sound levels were generally controlled by noise from local traffic on Route 116 and University campus roadways. In addition, natural sounds such as birdcalls and wind-induced vegetation rustle were also audible during the spring survey. Table 10 below summarizes the short-term background sound levels (L_{90}) measured during daytime and early morning periods in both May 2002 and January 2003, with the lowest level at each measurement location highlighted with bold type.

Table 10
Summary of Short-Term Background Measurement Results (L_{90})

Position	Daytime (5/15/02)	Daytime (1/29/03)	Early Morning (5/16/02)	Early Morning (1/30/03)
Location 1	48	41	38	41
Location 2	52	51	43	46
Location 3	51	46	44	44
Location 4	58	51	47	45
Location 5	46	44	41	39
Location 6	50	51	34	37
Location 7	N/A	51	N/A	39
Spatial Average	*51*	*48*	*41*	*42*

Acoustical Modeling

A three-dimensional acoustical model of the CHP was developed using SoundPLAN Version 5.6 to predict noise levels at the property boundary of the site, off-site nearby residences, and on-campus noise sensitive receptors.

The results of the ***broadband (A-weighted) compliance assessment*** are summarized in Table 11 below. Future ambient levels at the nearest receivers are predicted to be no more than 3.0 dBA higher than the lowest ambient levels (L_{90}) obtained during either the May 2002 or January 2003 surveys. The results of the ***octave band (tonal) compliance assessment*** showed that no octave band level exceeds adjacent octave band levels by 3 decibels at either nearby receptors or at the property line. Therefore, noise emissions produced during operation of the CHP are expected to fully comply with the broadband and tonal limits of Policy 90-001 and BACT.

Table 11
Expected Future Sound Levels at Various Receivers

A-Weighted Sound Level (dBA)	Position						
	Location 1	*Location 2*	*Location 3*	*Location 4*	*Location 5*	*Location 6*	*Location 7*
Lowest Measured Ambient Noise Level (L_{90})	38.1	43.2	43.6	45.0	38.9	34.2	39.4
Predicted Noise Level from New Equipment (L_{EQ})	28.0	51.1	43.2	28.9	35.4	29.5	39.4
Future Projected Ambient Noise Level	38.5	51.8	46.4	45.1	40.5	35.5	42.4
Broadband (A-Weighted) Ambient Increase	+0.4	+8.6	+2.8	+0.1	+1.6	+1.3	+3.0

Conceptual Noise Controls

In order to comply with Department noise policy and BACT, acoustical controls are incorporated into the design of the proposed CHP. Although the specific type and amount of mitigation will be selected during the detailed design phase of the project, a successful noise control program will include, at a minimum, the following components:

- Dual-stage silencers providing approximately 70 decibels (A-weighted) of attenuation for combustion turbine air intake noise.
- HRSG and catalytic converters providing approximately 43 decibels (A-weighted) of attenuation for combustion turbine exhaust noise.
- A thermal generation building enclosing major pieces of equipment and providing a Sound Transmission Class rating of 35 dB.
- Low-noise generation building ventilation fans and acoustically treated air intake and discharge ventilation louvers.
- Gas compressor located within an acoustically designed enclosure with minimal ventilation openings.
- High performance boiler steam vent silencers providing approximately 68 decibels of attenuation (A-weighted).

PROVISIONS OF APPROVAL

It is the opinion of the Department that the Central Heating Plant proposed by UMASS is consistent with modern air pollution control technology and Best Available Control Technology. The Department hereby proposes to grant a Conditional Approval for the installations described herein and in the submittal pursuant to Regulation 310 CMR 7.02(5)(a) of the "Regulations for the Control of Air Pollution in the Pioneer Valley Air Pollution Control District", subject to the following provisions:

Additional Approvals Needed

1. UMASS shall submit to the Department, in accordance with the provisions of Regulation 310 CMR 7.02(5)(a), **two (2) non-major comprehensive plan applications** for written Department approval, once the system specific information has been determined, but in any case not later than 180 days prior to the CHP start-up, for each of the following:

   For the package boilers:
   - Parametric/Continuous emissions monitoring Systems (PEMS/CEMS), opacity monitoring system, SCR control system, ammonia handling & storage system, and CO catalyst control systems.

   For the combustion turbine/HRSG
   - CEMS, SCR control system, ammonia handling & storage system, and CO catalyst control systems.

   UMASS shall not commence installation of any of these system components prior to written Department approval.

2. UMASS shall submit to the Department, in accordance with the provisions of Regulation 310 CMR 7.02(4), **one (1) Limited Plan Application** for written Department approval evaluating BACT for motor vehicle diesel fuel sulfur content. This BACT analysis shall be submitted to the Department for review and written approval approximately 120 days prior to UMASS executing a fuel purchase agreement with the fuel oil supplier for the new Central Heating Plant. In no event will the Department approve the use of motor vehicle diesel fuel with a sulfur content > 0.05%.

3. UMASS shall submit to the Department before startup, in accordance with the provisions of Regulation 310 CMR 7.02(4), **one (1) Limited Plan Application** for written Department approval detailing a quality control/quality assurance (QA/QC) program for the long term operation of the CEMS, PEMS, and temperature monitoring systems. The CEMS program must conform to 40 CFR Part 60, Appendix F. The PEMS programs must include provisions for adjusting parametric monitoring settings based on the annual tune-up and optimization cited in provision 6 in **SPECIAL TERMS AND CONDITIONS**.

Emission Limits & Restrictions

4. UMASS–Amherst shall keep emission rates at the lowest practical level at all times, but shall not exceed the emission limits specified in Tables 12a and 12b as follows:

Table 12a

EU #	Fuel or Raw Material	Pollutant	Stack Emission Limit / Standards(1)(2)(3)(4)				Restrictions motor vehicle diesel fuel
			natural gas		motor vehicle diesel fuel		
CTG/HRSG and duct burner	natural gas or motor vehicle diesel fuel	Particulate Matter(5)	1.29 lb/hr	0.010 lb/MMBtu	2.14 lb/hr	0.010 lb/MMBtu	≤ 2,106,926 gallons(6) (combustion turbine only; rolling 12 month total)
		Particulate Matter(5a) < 10 microns (PM_{10})	6.45 lb/hr 4.12 lb/hr w/o duct burner	0.030 lb/MMBtu 0.030 lb/MMBtu w/o duct burner	8.56 lb/hr 5.46 lb/hr w/o duct burner	0.040 lb/MMBtu 0.040 lb/MMBtu w/o duct burner	
		VOC	0.44 lb/hr	—	0.71 lb/hr	—	
		Sulfur Dioxide	0.49 lb/hr	—	0.38 lb/hr(7) 6.91 lb/hr(8)	—	
		Sulfuric Acid Mist	0.08 lb/hr	—	0.06 lb/hr(7) 1.06 lb/hr(8)	—	
		Carbon Monoxide	1.02 lb/hr	2.0 ppmvd(9)	2.50 lb/hr	5.0 ppmvd(9)	
		Nitrogen Oxides	2.09 lb/hr	2.5 ppmvd(9)	4.92 lb/hr	6.0 ppmvd(9)	
		Ammonia	0.62 lb/hr	2.0 ppmvd(9) 10.0 ppmvd(12)	0.61 lb/hr	2.0 ppmvd(9) 10.0 ppmvd(12)	

(1) The emission rates for the CTG/Duct burner are based on worst case emission rate (100% load, duct burner on except where noted, and 0°F ambient temp.),
(2) The "Package Boilers" emission limits are for single boiler units operating at 100% load.
(3) The lb/hr and lb/MMBtu emission rates are based on a 1-hour block average.
(4) Emission limits during startup/shutdown will be established during initial compliance testing.
(5) Particulate matter measured as filterable particulate (front-half catch) using applicable procedures specified in 40 CFR Part 60 Appendix A, Method 5.
(5a) Particulate matter as measured by 40 CFR 51, Appendix M, Test Method 201 or 201A and Test Method 202.
(6) Additional oil may be burned if the price differential of natural gas to oil > $2.88/MMBtu or if natural gas is unavailable. See Provision 3 in "Special Terms and Conditions".
(7) Based on 15 ppm sulfur motor vehicle diesel fuel (0.0015% sulfur by weight).
(8) Based on 500 ppm sulfur motor vehicle diesel fuel (0.05% sulfur by weight).
(9) "ppmvd" emission limits are corrected to 15% O_2 for CTG/Duct burner and corrected to 3% O_2 for the package boilers.
(10) Based on four (4) boilers at full load.
(11) Based on one (1) boiler on standby (at ½ load) and one (1) boiler at full load.
(12) Upper limit ammonia slip in accordance with EPA Region 1 PSD Permit Number 046-026-MA07. See provision 4 in SPECIAL TERMS AND CONDITIONS.

Table 12b

EU #	Fuel or Raw Material	Pollutant	Stack Emission Limit / Standards(2)(3)(4)				Restrictions
			natural gas		motor vehicle diesel fuel		motor vehicle diesel fuel
Package Boilers	natural gas or motor vehicle diesel fuel	Particulate Matter(5)	1.70 lb/hr	0.010 lb/MMBtu	1.78 lb/hr	0.011 lb/MMBtu	Oct. 1st – April 30th ≤ 23,468,023 gallons(10) May 1st – Sept. 30th ≤ 6,423,120 gallons(11)
		Particulate Matter(5a) < 10 microns (PM_{10})	3.40 lb/hr	0.020 lb/MMBtu	6.49 lb/hr	0.040 lb/MMBtu 0.030 lb/MMBtu(12)	
		VOC	0.17 lb/hr	–	0.81 lb/hr	–	
		Sulfur Dioxide	0.18 lb/hr	–	0.25 lb/hr(7) 8.33 lb/hr(8)	–	
		Sulfuric Acid Mist	0.03 lb/hr	–	0.04 lb/hr(7) 1.28 lb/hr(8)	–	
		Carbon Monoxide	2.55 lb/hr	20.0 ppmvd(9)	3.08 lb/hr	25.0 ppmvd(9)	
		Nitrogen Oxides	1.04 lb/hr	5.0 ppmvd(9)	1.78 lb/hr	9.0 ppmvd(9)	
		Ammonia	0.50 lb/hr	2.0 ppmvd(9)	0.40 lb/hr	2.0 ppmvd(9)	
CHP Facility-Wide	natural gas or motor vehicle diesel fuel	Sulfur in fuel	≤ 0.8 grains / $100ft^3$		≤ 15 ppm / ≤ 500 ppm by wt.		≤ 31,998,068 gallons (rolling 12-month total)
		Opacity	≤ 10%				

(2) The "Package Boilers" emission limits are for single boiler units operating at 100% load.
(3) The lb/hr and lb/MMBtu emission rates are based on a 1-hour block average.
(4) Emission limits during startup/shutdown will be established during initial compliance testing.
(5) Particulate matter measured as filterable particulate (front-half catch) using applicable procedures specified in 40 CFR Part 60 Appendix A, Method 5.
(5a) Particulate matter as measured by 40 CFR 51, Appendix M, Test Method 201 or 201A and Test Method 202 (except as noted).
(6) Additional oil may be burned if the price differential of natural gas to oil > $2.88/MMBtu or if natural gas is unavailable. See Provision 3 in "Special Terms and Conditions".
(7) Based on 15 ppm sulfur motor vehicle diesel fuel (0.0015% sulfur by weight).
(8) Based on 500 ppm sulfur motor vehicle diesel fuel (0.05% sulfur by weight).
(9) "ppmvd" emission limits are corrected to 15% O_2 for CTG/Duct burner and corrected to 3% O_2 for the package boilers.
(10) Based on four (4) boilers at full load.
(11) Based on one (1) boiler on standby (at ½ load) and one (1) boiler at full load.
(12) Filterable emissions as measured by 40 CFR 51, Appendix M, Test Method 201 or 201A.

5. UMASS–Amherst is subject to the monitoring, testing, record-keeping, and reporting requirements as contained in Tables 13a-d, 14, and 15 and the applicable requirements as contained in Table 12, unless otherwise specified below.

Table 13a

Emission Unit	Testing Requirements
CTG & Duct Burner & Package Boilers	<u>STACK EMISSIONS TESTING</u> UMASS–Amherst shall 1. Ensure that all stacks are constructed so as to accommodate the emissions testing requirements as stipulated in 40 CFR Part 60, Appendix A. The two outlet sampling ports (90 degrees apart from each other) for each stack must be located at a minimum of one duct diameter upstream and two duct diameters downstream of any flow disturbance. All emissions testing will be conducted in accordance with the Department's "Guidelines for Source Emission Testing" and in accordance with the Environmental Protection Agency tests as specified in the 40 CFR Part 60, Appendix A, 40 CFR Part 60 Subpart GG, 40 CFR Part 60 Subpart Db (package boilers), and 40 CFR Part 60 Subpart Dc (duct burner), or by a methodology approved by the Department. All ammonia testing shall be conducted in accordance with EPA Conditional Test Method 27 or an equivalent test method approved by EPA – New England. 2. Ensure that all package boiler emissions tests are completed within 180 days after initial start-up of the boilers. 3. Ensure that all CTG/Duct Burner emissions tests are completed within 180 days after initial start-up of the CTG/Duct Burner. 4. Submit emission test protocol(s) (including testing for startup and shutdown emissions) for review and written Department approval at least 30 days prior to the date of actual testing. The test protocol(s) must be submitted in accordance with the Department's guideline for "Stack Test Protocol Development and Submittal." 5. Submit the final emission test report(s) / noise test report(s) to the Department within 60 days after the completion of each of the tests. 6. Conduct initial compliance emission tests at 100% of maximum load and at 'typical' load conditions, to determine compliance with the emission limits (lb/hr, lb/MMBtu, ppmvd, and opacity) established in Table 12 for the following: Oil: NO_x, CO, VOC, NH_3, PM/PM_{10}, Opacity, Sulfuric Acid Mist Natural Gas: NO_x, CO, VOC, NH_3 7. Conduct initial compliance tests for the duration of start-up and shut down periods for the CTG/Duct Burner and the package boilers. Emission data generated from this testing shall be made available for review by the Department prior to determining and approving the maximum allowable emission rate limits (lb/hr, lb/MMBtu, ppmvd), including opacity limits, for these periods of time. The Department shall incorporate the emission limits into the Final Approval for the CTG/Duct Burner and the package boilers upon issuance and such limits shall be considered enforceable. This testing shall be for NO_x, CO, VOC, PM-10, and opacity. 8. In accordance with EPA Region 1 PSD Permit Number 046-026-MA07, conduct a second emissions test for PM_{10} while burning motor vehicle diesel fuel one year after the initial stack tests for the combustion turbine/HRSG and package boilers are completed. If the second stack tests show that the emissions unit is in compliance, additional stack testing shall be required only when requested by the EPA Region I.

Table 13b	
Emission Unit	**Testing Requirements**
CHP Plant-Wide	<u>NOISE TESTING</u> UMASS–Amherst shall 8. Ensure that all noise compliance tests are conducted within 180 days after initial start-up of the (entire) facility. 9. Ensure that noise testing is conducted in a manner that is substantially identical to the background noise testing and reflects worst case noise testing conditions. 10. Ensure that the Department is notified of compliance noise testing no less than 3 days in advance of the testing. 11. Conduct noise testing to document facility noise levels with the new CTG and boilers operating at full load, or at another load point agreed to by the Department in writing. 12. Conduct noise testing to document any changes in noise generated by the facility with the new CTG and boilers in operation, and to determine if UMASS–Amherst can operate the facility in compliance with the noise limits specified in Table 11. 13. If the test results indicate a condition of non-compliance with Table 11, work in full cooperation with the Department to implement changes to the facility to bring it into compliance with the noise levels specified in Table 11 within 90 days of measuring the non-compliant noise situation. The Department shall be notified in advance of any physical changes at the facility to reduce noise, and of the times any noise measurements will be made to determine the effect of the changes made. 14. Ensure that the facility is designed, constructed, operated and maintained such that at all times: a) No condition of air pollution will be caused by emissions of sound as provided in 310 CMR 7.01; b) No sound emissions resulting in noise will occur as provided in 310 CMR 7.10 and the Department's Policy 90-001 other than approved herein; and c) Sound emissions from the facility will not exceed the levels set forth in Table 11 at the locations identified in Table 10 and in the Application. 15. The Department reserves the right to require additional measurement periods, locations, or events if in the opinion of the Department such additional measurements are necessary to determine compliance with the Air Pollution Control Regulations.

Table 13c	
Emission Unit	Monitoring Requirements
CTG & Duct Burner & Package Boilers	OPACITY MONITOR UMASS–Amherst shall 16. Install, calibrate, operate, and maintain a Data Acquisition and Handling System(s) (DAHS) and opacity monitor to continuously monitor and record opacity from the subject emission unit stack(s). 17. Equip the opacity monitor with audible and visible alarms which activate when opacity exceeds the limits established herein. 18. Operate the opacity monitor at all times the subject emission unit is operating, except for periods of calibration checks, zero and span adjustments, and preventive maintenance. 19. Obtain and record emission data from each opacity monitor for at least 75% of the hours per calendar day, 75% of the days (whole 24-hour days) per calendar month, and 95% of the hours per calendar quarter that the subject emission unit operates, except for periods of calibration checks, zero and span adjustments, and preventive maintenance. 20. Maintain on-site for the opacity monitor an adequate supply of spare parts to maintain the on-line availability and data capture requirements contained herein. 21. Use and maintain the opacity monitor as a "direct-compliance" monitor to measure compliance with the opacity limit contained herein. A "Direct-compliance" monitor generates data that legally documents the compliance status of a source. The Department may also use the opacity monitor or any credible evidence in its determination of compliance with the limits and conditions specified in this approval. 22. Ensure that the opacity monitor equipment complies with Department approved performance and location specifications, and conforms with the EPA monitoring specifications in 40 CFR Part 60. TEMPERATURE MONITORING SYSTEM UMASS–Amherst shall 23. Install, calibrate, operate, and maintain a temperature monitoring system to continuously monitor and record the inlet temperatures to the SCR and the CO catalysts for the CTG/HRSG and the package boilers. 24. Equip each temperature monitoring system with audible and visible alarms which activate when these temperatures deviate from normal operating temperatures. 25. Operate all temperature monitoring equipment at all times the CTG or a package boiler is operating, except for periods of calibration checks, zero and span adjustments, and preventive maintenance. 26. Obtain and record temperature data from each temperature monitor specified herein for at least 75% of the hours per calendar day, 75% of the days (whole 24-hour days) per calendar month, and 95% of the hours per calendar quarter that the CTG or package boiler operates, except for periods of calibration checks, zero and span adjustments, and preventive maintenance. 27. Maintain on-site for the temperature monitoring equipment an adequate supply of spare parts to maintain the on-line availability and data capture requirements contained herein. 28. Ensure that all temperature monitors and recording equipment comply with Department approved performance and location specifications.

Table 13d	
Emission Unit	**Monitoring Requirements**
CTG & Duct Burner	UMASS–Amherst shall 29. Monitor and record the sulfur and nitrogen content in natural gas on a daily basis during any day when the CTG/Duct Burner is in active operation, or pursuant to any alternative fuel monitoring schedule issued for the facility in accordance with 40 CFR Part 60, Subpart GG 60.334(b)(2). 30. Comply with the CEMS monitoring requirements specified in Table I.
Package Boilers	UMASS–Amherst shall 31. Comply with the CEMS monitoring requirements specified in Table I *or* comply with the PEMS monitoring requirements specified in ~~Table II, or use a combination of CEMS and PEMS requirements.~~ 31a. In accordance with EPA Region 1 PSD Permit Number 046-026-MA07, as an alternative to an ammonia CEMS, UMASS–Amherst may install, operate and maintain a nitrogen oxides CEMS with an ammonia injection rate monitor to calculate ammonia emissions. The CEMS shall satisfy the requirements of Performance Specification 2 (PS-2) of 40 CFR Part 60, Appendix B and Appendix F.
Emergency Engine & Diesel Fire Pump	UMASS–Amherst shall 32. Monitor the hours of operation for each engine to ensure the engine operation does not exceed 300 hours per rolling 12-month period.
CHP Plant-Wide	UMASS–Amherst shall 33. Monitor sulfur content of each new shipment of motor vehicle diesel fuel received. Compliance with % sulfur-in-fuel requirement can be demonstrated through testing (<u>testing certification</u>) or by maintaining a shipping receipt from the fuel supplier (<u>shipping receipt certification</u>). The <u>testing certification</u> or <u>shipping receipt certification</u> of % sulfur-in-fuel shall document that sulfur testing has been done in accordance with the applicable ASTM test methods (D4294-90), or any other method approved by the Department and EPA.

Table I – CEMS Monitoring Requirements

Required for CTG & Duct Burner; Optional for Package Boilers	UMASS–Amherst shall
	34. Install, calibrate, operate, and maintain a data acquisition and handling system(s) (DAHS) and stack CEMs to continuously monitor and record flue gas emissions of NO_x, CO, NH_3, and diluent gas from the subject emission unit stack.
	35. Equip each CEMs with audible and visible alarms which activate when emissions exceed the limits established herein.
	36. Operate all CEMs at all times the subject emission unit is operating, except for periods of CEMs calibration checks, zero and span adjustments, and preventive maintenance.
	37. Obtain and record emission data from each CEMs for at least 75% of the hours per calendar day, 75% of the days (whole 24-hour days) per calendar month, and 95% of the hours per calendar quarter that the subject emission unit operates, except for periods of calibration checks, zero and span adjustments, and preventive maintenance.
	38. Maintain on-site for the CEMs equipment an adequate supply of spare parts to maintain the on-line availability and data capture requirements contained herein.
	39. Use and maintain all its CEMs systems as "direct-compliance" monitors to measure compliance with the emission limits contained herein. "Direct-compliance" monitors generate data that legally documents the compliance status of a source. The Department may also use the CEMs or any credible evidence in its determination of compliance with the limits and conditions specified in this approval.
	40. Ensure that the CEMS equipment complies with Department approved performance and location specifications, and conforms with the EPA monitoring specifications specified in 40 CFR Part 60.
	41. Ensure that all ammonia CEMs satisfy the requirements of Performance Specification 2 (PS-2) of 40 CFR Part 60, Appendix B and Appendix F.
	42. Ensure that, if a differential NO_x/ammonia CEMs is installed, that these units meet the NO_x CEMS QA requirements.

Table II – PEMS Monitoring Requirements

Required for Package Boilers if CEMs not installed	UMASS–Amherst shall
	43. Install, calibrate, operate and maintain a Data Acquisition and Handling System(s) (DAHS) and PEMS to continuously monitor and record emissions of NO_x, CO, NH_3, and O_2 from the subject emission unit.
	44. Equip each PEMS with audible and visible alarms to activate whenever emissions from the subject emission units exceed the limits established herein. A portable emissions analyzer shall be utilized to measure NO_x, CO, and O_2 during the investigation of any alarm condition and necessary corrective action shall be taken to bring the subject emission unit to within approved levels.
	45. Operate all PEMS at all times the subject emission unit is operating, except for periods of PEMS calibration checks and preventive maintenance.
	46. Obtain and record emission data from each PEMS for at least 75% of the hours per calendar day, 75% of the days (whole 24-hour days) per calendar month, and 95% of the hours per calendar quarter that each subject emission unit operates, except for periods of preventive maintenance and calibration checks.
	47. Maintain on-site for the PEMS equipment an adequate supply of spare parts to maintain the on-line availability and data capture requirements contained herein.
	48. Use and maintain the PEMS system as "direct-compliance" monitors to measure compliance with the emission limits contained herein. "Direct-compliance" monitors generate data that legally documents the compliance status of a source. The Department may also use the PEMs or any credible evidence in its determination of compliance with the limits and conditions specified herein.
	49. If the PEMS becomes inoperative for any reason, ensure that a portable emissions analyzer(s) is used to measure NO_x, CO, and O_2 once per shift during any PEMS downtime.

Table 14

Emission Unit	Recordkeeping Requirements
CHP Plant-Wide	UMASS–Amherst shall 1. Maintain a log to record problems, upsets or failures associated with the emission control system, CEMs, temperature monitors, or ammonia handling system. 2. Maintain records of all periods of excess emissions, even if attributable to an emergency/malfunction or startup/shutdown, and shall quantify these emissions and include them in the determination of annual emissions. 3. Maintain records of all measurements, performance evaluations, calibration checks, maintenance, and adjustments for each CEMS, PEMS, and temperature monitoring system device. 4. Maintain on-site permanent records of output from CEMS, PEMS, and temperature monitoring systems, and make these records available to the Department on request. 5. Maintain on-site for a minimum of five years records of all portable emissions analyzer measurements taken during any PEMS downtime, and make these records available to the Department on request. 6. Record for each unit on a daily basis the type(s) of fuel burned, heat content of each fuel, total heating value of the fuel consumed, and the actual emission rate for each pollutant for emission units demonstrating compliance with CEMS. 7. Demonstrate compliance for each new shipment of motor vehicle diesel fuel received with the % sulfur-in-fuel requirement specified herein by testing certification or shipping receipt certification, either of which must certify that the shipment complies with the ASTM specifications for motor vehicle diesel fuel and the specified % sulfur-in-fuel requirement. 8. Maintain for the life of the facility all operating and monitoring records and logs. UMASS–Amherst shall make available to the Department for inspection upon request the five most recent years' data.
Oil Storage Tanks	UMASS–Amherst shall 9. Comply with all applicable NSPS requirements (notification and record-keeping) found in 40 CFR Part 60, Subpart Kb for the two 190,000 gallon fuel oil storage tanks.
Emergency Generator & diesel fire pump	UMASS–Amherst shall 10. Establish a recordkeeping system of sufficient detail that documents that the emergency generator and diesel fire pump do not exceed 300 hours operation each per rolling 12-month period.

<table>
<tr><th colspan="2">Table 15</th></tr>
<tr><th>Emission Unit</th><th>Reporting Requirements</th></tr>
<tr><td>CHP Plant-Wide</td><td>UMASS–Amherst shall
1. Submit to the Department, in a format acceptable to the Department, a semi-annual report postmarked by January 30th and July 30th of each year, which minimally contains for the prior calendar 6-month period the following information:
a) Reports from the facility CEMS, PEMS, and temperature monitors, containing summary data, and
b) For each period of excess emissions or excursions from allowable operating conditions, UMASS–Amherst shall list the duration, cause (including whether it is attributable to a malfunction or emergency), the response taken, and the amount of excess emissions. Periods of excess emissions shall include malfunctions, emergency, and upsets or failures associated with the emission control system, CEMS, PEMS, or temperature monitors.
c) A tabulation of periods of oil use.

<u>EMERGENCY / MALFUNCTION</u>
UMASS–Amherst shall
2. Notify the Department in writing within three (3) business days of any emergency or malfunction, when the emergency or malfunction may cause emissions to the ambient air that exceed any emission limits including noise limits contained herein; or cause a condition of air pollution, or otherwise violate a term or condition of this approval.

The written notice must contain a description of the emergency or malfunction, any steps taken to mitigate emissions, an estimate of the quantity of emissions released as a result of the emergency or malfunction and any corrective actions taken.

3. Notify the Department immediately by telephone and in writing within three (3) business days, following the release or the threat of a release of ammonia, and/or upsets or malfunctions to the ammonia handling or delivery systems, and comply with all notification procedures required under M.G.L. c. 21 E - Spill Notification Regulations, and the Massachusetts Contingency Plan, 310 CMR 40.000.

4. If the initial notice was not provided within three (3) business days, then UMASS–Amherst shall have the burden of establishing that the initial notice was provided as soon as reasonably practical in any subsequent enforcement action.

5. The reporting requirements of this Conditional Approval for an emergency or malfunction do not supersede, limit, or make inapplicable any reporting obligation under federal law, including but not limited to 42 U.S.C. sections 9603 or 11004.

6. An emergency and/or malfunction may constitute an affirmative defense to an action brought for noncompliance with emission limitations if UMASS–Amherst demonstrates the affirmative defense of emergency or malfunction through properly signed, contemporaneous operating logs and other relevant evidence that shows that:
a) an emergency or malfunction occurred and that the cause(s) of the emergency or malfunction can be identified;
b) UMASS–Amherst was, at that time, operating the facility in a correct manner;
c) during the period of the emergency or malfunction, UMASS–Amherst took all reasonable steps as expeditiously as possible to minimize levels of emissions that exceeded the emission standards, or other requirements in this approval; and
d) UMASS–Amherst submitted notice of the emergency or malfunction to the Department in writing within three (3) business days of the emergency or malfunction. The written notice must contain a description of the emergency or malfunction, any steps taken to mitigate emissions, an estimate of the quantity of emissions released as a result of the emergency or malfunction and any corrective actions taken.</td></tr>
<tr><td>Emergency generator & diesel fire pump</td><td>UMASS–Amherst shall
7. Report the emergency generator and diesel fire pump construction / installation on the next required source registration as specified in Regulation 310 CMR 7.12.</td></tr>
</table>

6. Special Terms and Conditions

CTG/Duct Burner
Operational Requirements / Restrictions

1. UMASS–Amherst shall only burn natural gas or motor vehicle diesel fuel in the CTG , and only natural gas in the duct burner.

2. UMASS–Amherst shall burn natural gas in the CTG to the full extent of its availability, except as provided in provision 3 below.

3. UMASS–Amherst may burn oil in the CTG (and may burn oil in excess of the allotment specified in Table 12) only if the price differential of natural gas to oil exceeds $2.88/MMBtu or if natural gas is unavailable.

4. UMASS–Amherst will conduct an optimization program during the commissioning of the combustion turbine that is designed to minimize NO_x and NH_3 emissions. If the combustion turbine cannot meet the NO_x emission limits and the 2.0 ppmvd NH_3 emission limits in Table 12a on a sustainable basis over the life of the catalyst, UMASS will propose revised NO_x and NH_3 emission limits that can be sustained on a consistent basis, subject to Department review and written approval. In no event shall the Department approve an NH_3 emission limit >10.0 ppmvd @ 15% O_2 as specified in the EPA Region 1 PSD Permit Number 046-026-MA07.

Package Boilers
Operational Requirements

5. UMASS–Amherst shall only burn natural gas or motor vehicle diesel fuel in the package boilers.

6. UMASS–Amherst shall tune each package boiler annually in accordance with procedures contained in EPA 340/1-83-023 "Combustion Efficiency Optimization Manual for Operators of Oil and Gas Fired Boilers" (or equivalent) with the goal of reducing air pollutant emissions, including NO_x and CO, to optimum levels.

Emergency Engine & Diesel Fire Pump
Operational Requirements

7. UMASS–Amherst shall ensure that the sulfur content at the time of purchase of oil to be used as fuel in the emergency generator and the engine for the fire suppression water pump(s) conforms with the then current sulfur limit applied to on-road specification oil as defined in the Code of Federal Regulations (at the time of issuance of this permit, defined in 40 CFR § 80.29(a)(i)).

8. UMASS–Amherst shall ensure that the emergency generator and diesel fire pump be equipped with exhaust silencers so that sound emissions will not cause or contribute to a condition of air pollution

9. UMASS–Amherst shall ensure that the emergency generator and diesel fire pump utilize exhaust stacks that discharge so as to not cause or contribute to a condition of air pollution.

Central Heating Plant-Wide
Other Requirements

10. UMASS–Amherst shall comply with all applicable NSPS requirements for CTG found in 40 CFR Part 60, Subpart GG.

11. UMASS–Amherst shall comply with all applicable NSPS requirements found in 40 CFR Part 60, Subpart Dc for the duct burner serving the HRSG.

12. UMASS–Amherst shall comply with all applicable NSPS requirements found in 40 CFR Part 60, Subpart Db for each of the four package boilers.

13. UMASS–Amherst shall properly train all personnel to operate the facility monitoring and control equipment in accordance with vendor specifications and all applicable regulations. This training shall be updated at least once annually.

    Department personnel shall be informed of scheduled training sessions at least 30 days in advance and Department personnel shall be allowed access to attend these training sessions.

14. UMASS–Amherst, upon startup and certification of the new CHP plant, shall decommission and disable the existing oil/coal-fired boilers.

General Requirements

15. Suspension: This Conditional Approval may be suspended, modified, or revoked by the Department if, at any time, the Department determines that UMASS–Amherst is violating any condition or part of the approval.

16. Other Regulations: This Conditional Approval does not negate the responsibility of UMASS–Amherst to comply with this or any other applicable federal, state, or local regulations now or in the future. This Conditional Approval does not imply compliance with any other applicable federal, state or local regulation now or in the future.

17. Fuel Utilization Facility Testing: In accordance with 310 CMR 7.04(4)(a), UMASS–Amherst shall have the fuel utilization facility (all combustion units) inspected and maintained in accordance with the manufacturer's recommendations and tested for efficient operation at least once in each calendar year. The results of said inspection, maintenance and testing and the date upon which it was performed shall be recorded and posted conspicuously on or near the permitted equipment.

18. Compliance Determination: Compliance with the emission limits contained herein shall be determined by data collected by CEMS, PEMS, and temperature monitoring system, as specified within this Conditional Approval and/or by stack emission test methods as approved by the Department. The Department may also use any credible evidence in its determination of compliance with the limits and conditions specified in these approvals.

This Conditional Approval consists of the application materials and this Approval letter. If conflicting information is found between these two documents, then the requirements of the Approval letter shall take precedence over the documentation in the application materials.

This Conditional Approval pertains only to the air quality control aspect of the proposal and does not negate the responsibility of the owners or operators to comply with other applicable state, local, or federal laws and regulations.

This Conditional Approval is an action of the Department. There are limited rights of appeal. For a description of these rights, read the enclosure "Appeal Rights".

If you have any questions regarding this Conditional Approval, please do not hesitate to contact John Kirzec of the Western Regional Office at 755-2225.

Sincerely,

Craig Goff
Permit Chief
Bureau of Waste Prevention
Western Region

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APPENDIX

Table A
Solar 100 Combustion Turbine Performance Data

Solar 100 Performance Data	100% Load											
	Natural Gas						Oil					
Ambient Temperature (°F)	0	0	60	60	100	100	0	0	60	60	100	100
Relative Humidity (%)	60	60	60	60	60	60	60	60	60	60	60	60
Duct Burner (Off/On)	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Output (kW)	11,835	11,835	10,250	10,250	8,575	8,676	11,711	11,711	9,582	9,582	7,715	7,715
Gas Consumption (lb/hr)	6,314	9,869	5,600	9,155	4,936	8,550	0	3,555	0	3,555	0	3,555
Oil Consumption (lb/hr) [a]	0	0	0	0	0	0	6,731	6,731	5,690	5,690	4,931	4,931
Heat Input (MMBtu/hr)	137.45	214.85	121.90	199.30	107.46	186.12	136.56	213.96	115.45	192.85	100.04	177.44

[a] The fuel consumption is based upon higher heating values of 1,000 Btu/scf for natural gas and 138,000 Btu/gal for motor vehicle diesel fuel.

Table B
Package Boiler Performance Data

Package Boiler Performance Data	100% Load	
	Natural Gas	Oil
Ambient Temperature (°F)	80	80
Steam Flow Rate (lb/hr)	131,250	131,250
Steam Temperature (°F)	460	460
Steam Pressure (psig)	175	175
Fuel Consumption (lb/hr) [a]	7,803	8,332
Heat Input (MMBtu/hr)	170.1	162.2

[a] The fuel consumption is based upon higher heating values of 1,000 Btu/scf for natural gas and 138,000 Btu/gal for motor vehicle diesel fuel.

Table C
Design Data for Petroleum and Chemical Storage Tanks

Description	Number	Type [a]	Capacity [b] (gallons)	Height/Length (ft.)	Diameter (ft.)
Condensate Storage	1	Vertical	650,000	32	60
Raw Water Storage	1	Vertical	200,000	26	36
Oil Storage	2	Vertical	115,000	20	32
Ammonia Storage	2	Horiz.	5,000	12.7	8.5
Waste Neutralization	1	Vertical	7,000	12	10
Bulk H_2SO_4 Storage	1	Vertical	1,000	8	6
Bulk NaOH Storage	1	Vertical	1,000	8	6
Bulk Sodium Phosphate Storage	1	Vertical	1,000	8	6
Bulk Amine Storage	1	Vertical	1,000	8	6
Bulk O_2 Scavenger Storage	1	Vertical	1,000	8	6
Brine Storage	3	Vertical	1,000	8	6
Water Treatment Chemicals	4	Drums	50	N.A.	N.A.

[a] The storage tanks are either horizontal or vertical fixed-roof tanks.
[b] The capacity is for each storage tank.

Table D
Criteria Pollutant Emissions from Combustion Turbine / Duct Burner

Pollutant/Parameter	Fuel Type: Natural Gas (100% load)						Oil (100% load)					
Ambient Temperature (°F)	0	0	60	60	100	100	0	0	60	60	100	100
Relative Humidity (%)	60	60	60	60	60	60	60	60	60	60	60	60
Duct Burner (Off/On)	Off	On	Off	On	Off	On	Off	On	Off	On	Off	On
NO_x (ppmvd)	2.5	2.5	2.5	2.5	2.5	2.5	6.0	6.0	6.0	6.0	6.0	6.0
NO_x (lb/hr)	1.36	2.09	1.20	1.93	1.06	1.79	3.13	4.92	2.64	4.42	2.28	4.08
CO (ppmvd)	2.00	2.00	2.00	2.00	2.00	2.00	5.00	5.00	5.00	5.00	5.00	5.00
Controlled CO (lb/hr)	0.66	1.02	0.58	0.94	0.51	0.87	1.59	2.50	1.34	2.24	1.16	2.07
PM_{10} (lb/hr)	0.82	1.29	0.73	1.20	0.64	1.12	1.37	2.14	1.15	1.93	1.00	1.77
SO_2 (lb/hr)	0.31	0.49	0.28	0.45	0.25	0.42	6.73	6.91	5.69	5.87	4.93	5.11
VOC (lb/hr)	0.28	0.44	0.25	0.40	0.22	0.37	0.27	0.71	0.23	0.64	0.20	0.59
H_2SO_4 (lb/hr)	0.05	0.08	0.04	0.07	0.04	0.07	1.03	1.06	0.87	0.90	0.76	0.78
NH_3 (ppmvd)	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
NH_3 (lb/hr)	0.40	0.62	0.35	0.57	0.31	0.53	0.39	0.61	0.32	0.55	0.28	0.50

Table E
Criteria Pollutant Emissions from the Package Boilers (each unit)

Pollutant	Fuel Type: Natural Gas (100% load)			Oil (100% load)		
	ppmvd[a]	lb/hr	lb/MMBtu	ppmvd	lb/hr	lb/MMBtu
NO_x	5.00	1.38	0.0061	9.00	2.38	0.011
CO	20.00	3.40	0.015	25.00	4.11	0.0190
PM_{10}		2.27	0.010		2.38	0.011
SO_2		0.24	0.0011		11.11	0.0514
VOC		0.23	0.0010		1.08	0.0050
H_2SO_4		0.04			1.70	
NH_3	2.00	0.60		2.00	0.70	

[a] Exhaust gas concentrations reported in terms of parts per million by volume on a dry basis (ppmvd) corrected to 3 percent O_2.

Table F
Emergency Generator & Diesel Fire Pump Performance Data [a]

Unit	Emergency Generator				Fire Pump Engine	
Fuel Type	Natural Gas		Oil		Oil	
Heat Input (MMBtu/hr)	7.70		7.70		1.20	
NO_x (lb/hr) / (lb/MMBtu)	45.50	5.90	45.50	5.90	5.29	4.41
CO (lb/hr) / (lb/MMBtu)	2.26	0.29	2.26	0.29	1.14	0.95
PM_{10} (lb/hr) / (lb/MMBtu)	0.77	0.10	0.77	0.10	0.37	0.31
SO_2 (lb/hr) / (lb/MMBtu)	0.02	< 0.01	0.39	0.05	0.20	0.17
VOC (lb/hr) / (lb/MMBtu)	0.45	0.06	0.45	0.06	0.42	0.35

[a] Based on manufacturer's data or emission factors cited in USEPA Document No. AP-42.

Table G
Non-Criteria Pollutant Emissions from Combustion Turbine/HRSG

Pollutant	Emission Factors [a]		Maximum Emission Rate [b]			
	Gas (lb/MMcf)	Oil (lb/Mgal)	Gas (w/o DB)	Gas (w/ DB)	Oil (w/o DB)	Oil (w/ DB)
Formaldehyde	7.10E-04	2.80E-04	9.76E-02	1.53E-01	3.82E-02	9.32E-02
1,3 Butadiene	2.15E-07	8.00E-06	2.96E-05	4.62E-05	1.09E-03	1.11E-03
Acetaldehyde	4.00E-05	0.00E+00	5.50E-03	8.59E-03	0.00E+00	3.10E-03
Benzene	1.20E-05	5.50E-05	1.65E-03	2.58E-03	7.51E-03	8.44E-03
Ethylbenzene	3.20E-05	0.00E+00	4.40E-03	6.88E-03	0.00E+00	2.48E-03
Naphthalene	1.30E-06	3.50E-05	1.79E-04	2.79E-04	4.78E-03	4.88E-03
PAH	2.20E-06	4.00E-04	3.02E-04	4.73E-04	5.46E-02	5.48E-02
Propylene Oxide	1.45E-05	0.00E+00	1.99E-03	3.12E-03	0.00E+00	1.12E-03
Toluene	1.30E-04	0.00E+00	1.79E-02	2.79E-02	0.00E+00	1.01E-02
Xylenes	6.40E-05	0.00E+00	8.80E-03	1.38E-02	0.00E+00	4.95E-03
Arsenic	0.00E+00	2.59E-07 [c]	0.00E+00	0.00E+00	3.54E-05	3.54E-05
Beryllium	0.00E+00	2.59E-07 [c]	0.00E+00	0.00E+00	3.54E-05	3.54E-05
Cadmium	0.00E+00	2.59E-07 [c]	0.00E+00	0.00E+00	3.54E-05	3.54E-05
Chromium	0.00E+00	7.77E-07 [c]	0.00E+00	0.00E+00	1.06E-04	1.06E-04
Lead	0.00E+00	5.18E-06 [c]	0.00E+00	0.00E+00	7.07E-04	7.07E-04
Manganese	0.00E+00	6.00E-06	0.00E+00	0.00E+00	8.19E-04	8.19E-04
Mercury	0.00E+00	2.59E-07 [c]	0.00E+00	0.00E+00	3.54E-05	3.54E-05
Nickel	0.00E+00	5.18E-06 [c]	0.00E+00	0.00E+00	7.07E-04	7.07E-04
Selenium	0.00E+00	1.50E-05	0.00E+00	0.00E+00	2.05E-03	2.05E-03

[a] Based on emission factors cited in USEPA Document No. AP-42.

[b] Based on the combustion turbine firing natural gas at 137.5 MMBtu/hr or oil at 136.6 MMBtu/hr, and the duct burner firing natural gas at 77.4 MMBtu.

[c] Based on typical analysis of 500 ppm motor vehicle diesel fuel.

Table H
Non-Criteria Pollutant Emissions from Package Boilers (per unit)

Pollutant	Emissions Factor [a]		Maximum Emission Rate [b]	
	Gas (lb/MMcf)	Oil (lb/Mgal)	Gas (lb/hr)	Oil (lb/hr)
Lead	0.00E+00	7.20E-04 [c]	0.00E+00	8.33E-04
Benzene	1.05E-03	2.14E-04	1.78E-04	2.48E-04
Dichlorobenzene	1.20E-03	0.00E+00	2.04E-04	0.00E+00
7,12-Dimethylbenz(a)anthracene	8.00E-06	0.00E+00	1.36E-06	0.00E+00
Ethyl Benzene	0.00E+00	6.36E-05	0.00E+00	7.36E-05
Formaldehyde	7.50E-02	3.30E-02	1.27E-02	3.82E-02
Hexane	1.80E+00	0.00E+00	3.05E-01	0.00E+00
2-Methylnapthalene	2.40E-05	0.00E+00	4.07E-06	0.00E+00
3-Methylchloranthene	9.00E-07	0.00E+00	1.53E-07	0.00E+00
Naphthalene	6.10E-04	1.13E-03	1.03E-04	1.31E-03
1,1,1-Trichloroethane	0.00E+00	2.36E-04	0.00E+00	2.73E-04
Toluene	3.40E-03	6.20E-03	5.77E-04	7.18E-03
o-Xylene	0.00E+00	1.09E-04	0.00E+00	1.26E-04
Acenapthene	9.00E-07	2.11E-05	1.53E-07	2.44E-05
Acenapthylene	9.00E-07	2.53E-07	1.53E-07	2.93E-07
Anthracene	1.20E-06	1.22E-06	2.04E-07	1.41E-06
Benz(a)anthracene	9.00E-07	4.01E-06	1.53E-07	4.64E-06
Benzo(a)pyrene	6.00E-07	0.00E+00	1.02E-07	0.00E+00
Benzo(b)fluoranthene	9.00E-07	0.00E+00	1.53E-07	0.00E+00
Benzo(b,k)fluoranthene	0.00E+00	1.48E-06	0.00E+00	1.71E-06
Benzo(k)fluoranthene	9.00E-07	0.00E+00	1.53E-07	0.00E+00
Benzo(g,h,i)perylene	6.00E-07	2.26E-06	1.02E-07	2.62E-06
Chrysene	9.00E-07	2.38E-06	1.53E-07	2.75E-06
Dibenzo(a,h)anthracene	6.00E-07	1.67E-06	1.02E-07	1.93E-06
Fluoranthene	3.00E-06	4.84E-06	5.09E-07	5.60E-06
Fluorene	2.80E-06	4.47E-06	4.75E-07	5.17E-06
Indo(1,2,3-cd)pyrene	9.00E-07	2.14E-06	1.53E-07	2.48E-06
Phenanthene	1.70E-05	1.05E-05	2.88E-06	1.22E-05
Pyrene	5.60E-06	4.25E-06	9.50E-07	4.92E-06
OCDD	0.00E+00	3.10E-09	0.00E+00	3.59E-09
Arsenic	0.00E+00	3.60E-05	0.00E+00	4.17E-05
Beryllium	0.00E+00	3.60E-05	0.00E+00	4.17E-05
Cadmium	0.00E+00	3.60E-05	0.00E+00	4.17E-05
Chromium	0.00E+00	1.08E-04	0.00E+00	1.25E-04
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	8.34E-04	0.00E+00	9.65E-04
Mercury	0.00E+00	3.60E-05	0.00E+00	4.17E-05
Nickel	0.00E+00	7.20E-04	0.00E+00	8.33E-04
Selenium	0.00E+00	2.09E-03	0.00E+00	2.42E-03

[a] Based on emission factors cited in Section3, Fuel Oil Combustion, and Section 4, Natural Gas Combustion, in USEPA Document No. AP-42.
[b] Based on the boiler firing natural gas at 226.8 MMBtu/hr or oil at 216.2 MMBtu/hr.
[c] Based on typical analysis of 500 ppm sulfur motor vehicle diesel fuel.

Table I
National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS (µg/m³) Primary	NAAQS (µg/m³) Secondary	Significant Impact Levels (µg/m³)
NO_2	Annual [a]	100	Same	1
SO_2	Annual [a]	80	–	1
	24-hour [b]	365	–	5
	3-hour [b]	–	1,300	25
PM_{10}	Annual [c]	50	–	1
	24-hour [d]	150	–	5
CO	8-hour [b]	10,000	Same	500
	1-hour [b]	40,000	Same	2,000
O_3	1-hour [d]	235	Same	–
Pb	3-month [a]	1.5	–	–

[a] Not to be exceeded.
[b] Not to be exceeded more than once per year.
[c] Not to be exceeded by the arithmetic average of the annual arithmetic averages from three successive years.
[d] Not to be exceeded more than an average of one day per year over three years.

Table J
Summary of natural gas/oil 'cut-point' BACT Analysis

Parameter	Value
Base Gas Usage (MMBtu/yr)	678,024
Future Gas Usage (MMBtu/yr)	1,482,564
Incremental Gas Usage (MMBtu/yr)	804,540
Incremental Gas Cost ($/MMBtu)	2.88
Base NOx Emissions (tpy)	209.73
Future NOx Emissions (tpy)	11.14
NOx Reduction (tpy)	198.59
SCR Fixed Capital Costs ($/yr)	214,806
SCR Annual Operating Costs ($/yr)	251,067
Annual Fuel Costs ($/yr)	2,314,420
Incremental Annual Costs ($/yr)	2,780,293
NOx Cost Effectiveness ($/ton)	14,000

Table K
Stack Parameters for the Proposed Combustion Turbine/HRSG [a]

Load	100%			
Fuel Type	Natural Gas		Oil	
Duct Burner (Off/On)	Off	On	Off	On
Stack Height (m) [b]	38.10	38.10	38.10	38.10
Stack Exit Diameter (m)	1.98	1.98	1.98	1.98
Stack Exit Velocity (m/s)	16.74	16.89	16.21	16.28
Stack Temperature (°K)	435.8	435.8	435.8	435.8
NO_X (g/s)	0.151	0.243	0.333	0.557
CO (g/s)	0.184	0.296	0.169	0.283
PM_{10} (g/s)	0.092	0.151	0.146	0.243
SO_2 (g/s)	0.035	0.057	0.718	0.740

[a] The stack parameters are based on the combustion turbine operating at ISO conditions.
[b] The stack height will be greater than the calculated GEP height of 30.48 meters, but less than the *de minimis* GEP height of 65.00 meters.

Table L
Stack Parameters for the Proposed Package Boilers (Per Unit)

Load	100%	
Fuel Type	Natural Gas	Oil
Stack Height (m) [a]	38.10	38.10
Flue Exit Diameter (m)	1.14	1.14
Stack Exit Velocity (m/s)	23.80	21.64
Stack Temperature (°K)	440.80	439.70
NO_X (g/s)	0.131	0.224
CO (g/s)	0.321	0.388
PM_{10} (g/s)	0.214	0.224
SO_2 (g/s)	0.023	1.050

[a] The stack height will be greater than the calculated GEP height of 30.48 meters, but less than the *de minimis* GEP height of 65.00 meters.

Table M
Background Concentrations of Criteria Pollutants (1998-2000)

Pollutant	Averaging Period	Monitoring Station(s)	1998 Measured Concentration (μg/m³)	1999 Measured Concentration (μg/m³)	2000 Measured Concentration (μg/m³)	Background Concentration (μg/m³) [a]
NO_2	Annual	Chicopee	24	23	24	24
CO	1-hour	Springfield	7,080	12,800	7,440	12,800
	8-hour		5,720	6,410	5,040	6,410
PM_{10}	24-hour	Springfield	89	69	79	89
	Annual		28	30	28	30
SO_2	3-hour	Springfield	100	94	115	115
	24-hour		68	63	60	68
	Annual		13	13	13	13

[a] The background concentrations are based on the highest short-term and annual average concentrations measured at any of the monitoring stations in Ware, Springfield or Chicopee from 1998 through 2000.

Table N
Maximum Non-criteria Pollutant Impacts Compared w/TELs & AALs

Pollutant	Max. 24-hr. Impact (ug/m³) [a]	TEL (ug/m³) [b]	Percent of TEL (%)	Maximum Annual Impact (ug/m³) [a]	AAL (ug/m³) [b]	Percent of AAL (%)
Acetaldehyde	4.38E-03	2.00E+00	0.22	1.40E-03	5.00E-01	0.28
Ammonia	7.80E-01	1.00E+02	0.78	2.50E-01	1.00E+02	0.25
Arsenic	6.09E-05	5.00E-04	12.19	1.95E-05	2.00E-04	9.77
Benzene	4.67E-03	1.74E+00	0.27	1.50E-03	1.20E-01	1.25
Beryllium	6.09E-05	1.00E-03	6.09	1.95E-05	4.00E-04	4.89
1,3-Butadiene	1.13E-03	1.20E+00	0.09	3.63E-04	3.00E-03	12.10
Cadmium	6.09E-05	3.00E-03	2.03	1.95E-05	1.00E-03	1.95
Chromium	1.83E-04	1.36E+00	0.01	5.87E-05	6.80E-01	0.01
Ethylbenzene	1.34E-03	3.00E+02	0.00	4.30E-04	3.00E+02	0.00
Formaldehyde	8.64E-02	3.30E-01	26.19	2.77E-02	8.00E-02	34.66
Lead	1.85E-03	1.40E-01	1.32	5.94E-04	7.00E-02	0.85
Mercury	6.09E-05	1.40E-01	0.04	1.95E-05	7.00E-02	0.03
Naphthalene	3.83E-03	1.43E+01	0.03	1.23E-03	1.43E+01	0.01
Nickel	1.22E-03	2.70E-01	0.45	3.91E-04	1.80E-01	0.22
Propylene Oxide	1.14E-03	6.00E+00	0.02	3.66E-04	3.00E-01	0.12
Selenium	3.53E-03	5.40E-01	0.65	1.13E-03	5.40E-01	0.21
Toluene	1.25E-02	8.00E+01	0.02	4.02E-03	2.00E+01	0.02
Xylenes	2.65E-03	1.18E+01	0.02	8.51E-04	1.18E+01	0.01

[a] The maximum 24-hour and annual concentrations of non-criteria pollutants calculated using the VALLEY Model.
[b] The TELs and AALs established by the DEP (1995).

EPA Region 1 PSD Permit Number 046-026-MA07

Pursuant to the provisions of the Clean Air Act, Subchapter I, Part C (42 U.S.C. Section 7470, *et. seq*) and the regulations found at the Code of Federal Regulations Title 40, Section 52.21, the United States Environmental Protection Agency New England (EPA) issued on July 25, 2005 a Prevention of Significant Deterioration (PSD) air quality permit to the University of Massachusetts Building Authority (the Authority) to install and operate a new central heating plant (CHP) at the University's Amherst, Massachusetts campus.

This Approval to Construct (Amended) adds to the Department's February 20, 2004 Approval to Construct elements from the EPA Region 1 PSD permit, including PM_{10} emission limits and the test methods for its measurement, an upper bound ammonia emission limit of 10 ppmvd @15% O_2 for the combustion turbine/HRSG (instead of the Department's 2.0 ppmvd ammonia emission limit in conjunction with the "soft landing" language of provision 4 in **SPECIAL TERMS AND CONDITIONS** of the Department's Approval), the requirement to conduct a second emissions test for PM_{10} while burning oil in the combustion turbine & package boilers one year after the initial test is completed, and the option for the package boilers, as a alternative to ammonia CEMS, to install, operate and maintain a nitrogen oxides CEMS with an ammonia injection rate monitor to calculate ammonia emissions.

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WESTERN REGIONAL OFFICE
436 Dwight Street • Springfield, Massachusetts 01103 • (413) 784-1100

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IAN A. BOWLES
Secretary

ARLEEN O'DONNELL
Commissioner

May 10, 2007

Mr. Ray Jackson, Assistant Director-Utilities
University of Massachusetts
Physical Plant Building
360 Campus Center Way
Amherst, MA 01003

Re: PVAPCD – Amherst
Regulation 310 CMR 7.02(5)(a)
UMass – Amherst Campus CHP
3 Boilers
CEMs, opacity monitors, temperature monitors, SCR & CO catalyst control system, ammonia storage & handling system
Appl. #1-B-07-019; Trans. # W131689

Final Approval

Dear Mr. Jackson:

The Department of Environmental Protection, Bureau of Waste Prevention, Western Regional Office ("the MassDEP") issued an Approval to Construct to the University of Massachusetts – Amherst Campus on February 20, 2004 for a new Central Heating Plant (CHP) consisting of a combustion turbine/generator (CTG), a heat recovery steam generator (HRSG), four package boilers, an emergency generator, and a diesel fire pump. An amended Approval to Construct was issued on August 9, 2005 that included the provisions of the USEPA Prevention of Significant Deterioration (PSD) Permit # 046-026-MA07 issued July 25, 2005.

The Approval to Construct required UMass -- Amherst to submit additional plan applications to the MassDEP for written approval. This Final Approval is for the continuous emissions monitoring systems (NOx, CO, NH_3, and O_2), opacity monitoring system, SCR control system, ammonia handling & storage system, and CO catalyst control systems for ***three (not the four as originally planned)*** package boilers.

Issued concurrently with this approval is the Final Approval for the CEMs, opacity monitors, temperature monitors, SCR & CO catalyst control system, and ammonia handling & storage system for the combustion turbine/generator and the heat recovery steam generator.

One additional plan approval is required by UMass – Amherst in order to satisfy the submittal requirements of the February 20, 2005 Approval to Construct; a limited plan application detailing a quality control/quality assurance (QA/QC) program for the long term operation of all the new CHP CEMs and temperature monitoring systems.

The plans bear the seal and signature of Andrew Jablonowski, Massachusetts Registered Professional Engineer No. 39123.

Project Description

Package Boilers

The three package boilers will be each rated at approximately 131,250 lb/hr steam flow with a maximum heat input rate of approximately 170 MMBtu/hr. The boilers will burn primarily motor vehicle diesel fuel with natural gas use based on availability.

Each boiler will utilize low-NO_x burners in combination with an SCR system. To control CO emissions, each of the boilers will be equipped with an oxidation catalyst, while the design of the combustion installations, implementation of good operating practices, and the use of natural gas or motor vehicle diesel fuel will serve to minimize emissions of particulate matter, SO_2, and VOC.

The exhaust gases from each of the boilers will be discharged via dedicated flues encased within a common 125-foot stack. Stack exit velocities, temperatures, and emission rates will be identical to what was originally modeled and approved by the MassDEP and USEPA, except the combined mass emissions (pounds per hour and tons per year) will be 25 percent less since only 3 boilers, not 4, will be installed.

Continuous Emission Monitors – Opacity Monitors – Temperature Monitors

UMass – Amherst will use dedicated and separate CEM, opacity, and temperature monitoring equipment on each boiler. The CEM and opacity monitors used for the boiler stack emissions as detailed in Table 1 below:

Table 1
Boiler Stack CEMs / Opacity Monitors

Pollutant/Parameter	Manufacturer & Model No.
NOx	Horiba Model CLA-510SS
CO	Horiba Model VIA-510
NH_3	Horiba Model CLA-510SS
O_2	Horiba Model MPA-510
Opacity	Durag Model D-R 290

The temperature monitoring system will continuously monitor and record the inlet temperature to each boiler's SCR and CO catalysts. The CEM, opacity, and temperature monitoring data will be captured and processed by a data acquisition and handling system (DAHS) manufactured by Honeywell that will include hardware and software (Cirrus EIS Version 6.0) running on a windows-based personal computer.

SCR & CO catalyst control systems
UMass – Amherst will use a dedicated SCR catalyst and CO catalyst on each boiler. The SCR catalyst will be a Cormetech CM-XPI catalyst bed operating at a temperature of 450 to 750°F. The ammonia flow control unit is manufactured by Peerless Manufacturing. The CO catalyst will be a Emerachem ADCAT CO Catalyst system.

Ammonia Storage & Handling System
UMass – Amherst will store 19.5% aqueous ammonia for use in the SCR control systems in two 5,000 gallon storage tanks. Ammonia is piped from the tanks into a skid-mounted ammonia control unit provided by Peerless Manufacturing. The control unit consists of one ammonia vaporizer equipped with a 30 kW electric heater, two air blowers and the associated pressure meters, flow meters, and control valves. From the control unit, the vaporized ammonia is blown into an ammonia manifold to distribute the vaporized ammonia/air mixture to the ammonia injection grid and into the flue gas duct and the SCR catalyst.

Provisions of Approval

It is the opinion of the MassDEP that the continuous emissions monitoring systems (NOx, CO, NH_3, and O_2), opacity monitoring system, temperature monitoring system, SCR and CO catalyst control systems, and the ammonia handling & storage system proposed for the three package boilers are consistent with modern air pollution control technology and Best Available Control Technology. The MassDEP hereby grants Final Approval for the installations described herein and in the submittal pursuant to Regulation 310 CMR 7.02(5)(a) of the "Regulations for the Control of Air Pollution in the Pioneer Valley Air Pollution Control District", subject to the following provisions:

1. UMass – Amherst shall notify the MassDEP in writing when the CEMs, opacity monitors, temperature monitors, and the SCR & CO catalyst control system installations are complete and ready for field inspection.

2. UMass – Amherst shall ensure that all monitors conform with all applicable requirements as specified in the Code of Federal Regulations 40 CFR Part 60, Appendix B and Appendix F.

3. UMass – Amherst shall ensure that the NH_3 CEM (a differential NOx/ammonia system) meets 40 CFR Appendix B, "Performance Specification 2 – Specifications and Test Procedures for SO_2 and NOx continuous emission monitoring systems in stationary sources."

4. UMass – Amherst shall ensure that the boilers, continuous emission monitor(s) / opacity monitor(s), temperature monitoring system(s), SCR and CO catalyst control system(s), and ammonia storage and handling system(s) are installed, operated and maintained in accordance with the manufacturer's recommended procedures.

5. UMass – Amherst shall ensure that the accuracy of all thermocouples used in the temperature monitoring systems is verified at least annually by a second, or redundant, thermocouple probe measured with a hand held meter. The acceptance criterion shall be ± 15 °F.

6. UMass – Amherst shall ensure that they maintain spare parts on-site for the boilers, continuous emission monitor(s) / opacity monitor(s), temperature monitoring system(s), SCR and CO catalyst control system(s), and ammonia storage and handling system(s) as recommended by the system component manufacturers.

7. UMass – Amherst, before emission testing of the facility, shall provide the MassDEP with a final site plan showing locations of major system components.

8. UMass – Amherst shall notify the MassDEP in writing of the date of the beginning of commercial operation.

This Final Approval incorporates by reference all documents and specifications submitted as part of the permit applications. The provisions of this Approval take precedence over any inconsistencies. ***All remaining provisions of the original Approval to Construct dated February 20, 2004 and the Amended Approval to Construct dated July 25, 2005 remain intact and enforceable except as specifically modified herein.***

This Final Approval consists of the application materials and this Approval letter. If conflicting information is found between these two documents, then the requirements of the Approval letter shall take precedence over the documentation in the application materials.

This Final Approval pertains only to the air quality control aspect of the proposal and does not negate the responsibility of the owners or operators to comply with other applicable state, local, or federal laws and regulations.

This Final Approval is an action of the MassDEP. There are limited rights of appeal. For a description of these rights, read the enclosure "Appeal Rights".

If you have any questions regarding this Final Approval, please do not hesitate to contact John Kirzec of the Western Regional Office at 755-2225.

Sincerely,

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Craig Goff
Permit Chief
Bureau of Waste Prevention
Western Region

UMASS CHP-FINAL boiler plans.doc (05/10/2007)

cc: John Mathews
Univ. of Massachusetts – Physical Plant Building
360 Campus Center Way
Amherst, MA 01003

Appeal Rights

This Final Approval is an action of MassDEP. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date you received this document.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts which are the grounds for the request and the relief sought. Additionally, the request must state why the Final Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P. O. Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

MassDEP may waive the adjudicatory hearing filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

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May 10, 2007

Mr. Ray Jackson, Assistant Director-Utilities
University of Massachusetts
Physical Plant Building
360 Campus Center Way
Amherst, MA 01003

Re: PVAPCD – Amherst
Regulation 310 CMR 7.02(5)(a)
UMass – Amherst Campus CHP
CTG & HRSG
CEMs, opacity monitor, temperature monitors, SCR & CO catalyst control system, ammonia storage & handling system
Appl. #1-B-07-018; Trans. # W131688

Final Approval

Dear Mr. Jackson:

The Department of Environmental Protection, Bureau of Waste Prevention, Western Regional Office ("the MassDEP") issued an Approval to Construct to the University of Massachusetts – Amherst Campus on February 20, 2004 for a new Central Heating Plant (CHP) consisting of a combustion turbine/generator (CTG), a heat recovery steam generator (HRSG), four package boilers, an emergency generator, and a diesel fire pump. An amended Approval to Construct was issued on August 9, 2005 that included the provisions of the USEPA Prevention of Significant Deterioration (PSD) Permit # 046-026-MA07 issued July 25, 2005.

The Approval to Construct required UMass -- Amherst to submit additional plan applications to the MassDEP for written approval. This Final Approval is for the continuous emissions monitoring systems (NOx, CO, NH_3, and O_2), opacity monitoring system, SCR control system, ammonia handling & storage system, and CO catalyst control systems for the CTG & HRSG.

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD Service - 1-800-298-2207.

DEP on the World Wide Web: http://www.mass.gov/dep
Printed on Recycled Paper

Issued concurrently with this approval is the Final Approval for the CEMs, opacity monitors, temperature monitors, SCR & CO catalyst control systems, and ammonia handling & storage system for the boilers.

One additional plan approval is required by UMass – Amherst in order to satisfy the submittal requirements of the Approval to Construct; a limited plan application detailing a quality control/quality assurance (QA/QC) program for the long term operation of the CEMs and temperature monitoring systems.

The plans bear the seal and signature of Andrew Jablonowski, Massachusetts Registered Professional Engineer No. 39123.

Project Description

Combustion Turbine/Generator and Heat Recovery Steam Generator

The combustion turbine/generator (CTG) will be a Solar Mars 100 series machine with a nominal rating of 10 MW and a heat input rating of approximately 120 MMBtu/hr. The CTG exhaust will be discharged to a heat recovery steam generator (HRSG) rated at 100,000 lb steam/hr and equipped with a duct burner rated at 77.4 MMBtu/hr. The CTG can burn either natural gas or motor vehicle diesel fuel, while the duct burner will burn natural gas only.

The CTG will utilize a dry low-NOx combustor in conjunction with a selective catalytic reduction (SCR) system to minimize NOx emissions. An oxidation catalyst will control carbon monoxide (CO) emissions, while the design of the combustion installations, implementation of good operating practices, and the use of natural gas or motor vehicle diesel fuel will serve to control emissions of particulate matter, SO_2 , and VOC. The exhaust gases from the CTG/HRSG will be discharged to the atmosphere via a dedicated 125 foot tall stack.

Continuous Emission Monitors – Opacity Monitors – Temperature Monitors

UMass – Amherst will use CEM, opacity, and temperature monitoring equipment on the CTG/HRSG stack, as detailed in Table 1 below:

Table 1
CTG/HRSG Stack CEMs / Opacity Monitor

Pollutant/Parameter	Manufacturer & Model No.
NOx	Horiba Model CLA-510SS
CO	Horiba Model VIA-510
NH_3	Horiba Model CLA-510SS
O_2	Horiba Model MPA-510
Opacity	Durag Model D-R 290

The temperature monitoring system will continuously monitor and record the inlet temperature to the SCR and CO catalyst. The CEM, opacity, and temperature monitoring data will be captured and processed by a data acquisition and handling system (DAHS) manufactured by Honeywell that will include hardware and software (Cirrus EIS Version 6.0) running on a windows-based personal computer.

SCR & CO catalyst control systems
UMass – Amherst will use an SCR catalyst and CO catalyst on the CTG/HRSG. The SCR catalyst will be a Cormetech CM-21 catalyst bed operating at a temperature of 400 to 800°F.

Ammonia Storage & Handling System
UMass – Amherst will store 19.5% aqueous ammonia for use in the SCR control systems in two 5,000 gallon storage tanks. Ammonia is piped from the tanks into a skid-mounted ammonia process control unit manufactured by Rentech Boiler Systems. The control unit consists of one ammonia vaporizer equipped with a 60 kW electric heater, two air blowers, and the associated pressure meters, flow meters, and control valves. From the control unit, the vaporized ammonia is blown into an ammonia manifold to distribute the vaporized ammonia/air mixture to the ammonia injection grid and into the flue gas duct and the SCR catalyst.

Provisions of Approval

It is the opinion of the MassDEP that the continuous emissions monitoring systems (NOx, CO, NH_3, and O_2), opacity monitoring system, temperature monitoring system, SCR and CO control systems, and the ammonia handling & storage system proposed for the CTG/HRSG are consistent with modern air pollution control technology and Best Available Control Technology. The MassDEP hereby proposes to grant a Final Approval for the installations described herein and in the submittal pursuant to Regulation 310 CMR 7.02(5)(a) of the "Regulations for the Control of Air Pollution in the Pioneer Valley Air Pollution Control District", subject to the following provisions:

1. UMass – Amherst shall notify the MassDEP in writing when the CEMs, opacity monitors, temperature monitors, and the SCR & CO catalyst control installations are complete and ready for field inspection.

2. UMass – Amherst shall ensure that all monitors conform with all applicable requirements as specified in the Code of Federal Regulations 40 CFR Part 60, Appendix B and Appendix F.

3. UMass – Amherst shall ensure that the NH_3 CEM (a differential NOx/ammonia system) meets 40 CFR Appendix B, "Performance Specification 2 – Specifications and Test Procedures for SO_2 and NOx continuous emission monitoring systems in stationary sources."

4. UMass – Amherst shall ensure that the combustion turbine/generator, heat recovery steam generator, continuous emission monitor(s) / opacity monitor(s), temperature monitoring system(s), SCR and CO catalyst system(s), and ammonia storage and handling system(s) are installed, operated and maintained in accordance with the manufacturer's recommended procedures.

5. UMass – Amherst shall ensure that they maintain spare parts on-site for the combustion turbine / generator, continuous emission monitor(s) / opacity monitor(s), temperature monitoring system(s), SCR and CO catalyst control system(s), and ammonia storage and handling system(s) as recommended by the system component manufacturers.

6. UMass – Amherst shall ensure that the accuracy of all thermocouples used in the temperature monitoring systems are verified at least annually by a second, or redundant, thermocouple probe measured with a hand held meter. The acceptance criterion shall be $\pm$ 15 °F.

7. UMass – Amherst, before emission testing of the facility, shall provide the MassDEP with a final site plan showing locations of major system components.

8. UMass – Amherst shall notify the MassDEP in writing of the date of the beginning of commercial operation.

This Final Approval incorporates by reference all documents and specifications submitted as part of the permit applications. The provisions of this Approval take precedence over any inconsistencies. ***All remaining provisions of the original Approval to Construct dated February 20, 2004 and the Amended Approval to Construct dated July 25, 2005 remain intact and enforceable except as specifically modified herein.***

This Final Approval consists of the application materials and this Approval letter. If conflicting information is found between these two documents, then the requirements of the Approval letter shall take precedence over the documentation in the application materials.

This Final Approval pertains only to the air quality control aspect of the proposal and does not negate the responsibility of the owners or operators to comply with other applicable state, local, or federal laws and regulations.

This Final Approval is an action of the MassDEP. There are limited rights of appeal. For a description of these rights, read the enclosure "Appeal Rights".

If you have any questions regarding this Final Approval, please do not hesitate to contact John Kirzec of the Western Regional Office at 755-2225.

Sincerely,

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Craig Goff
Permit Chief
Bureau of Waste Prevention
Western Region

UMASS CHP-FINAL ctg&hrsg plans.doc (05/10/2007)

cc: John Mathews
Univ. of Massachusetts – Physical Plant Building
360 Campus Center Way
Amherst, MA 01003

Appeal Rights

This Final Approval is an action of MassDEP. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date you received this document.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts which are the grounds for the request and the relief sought. Additionally, the request must state why the Final Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P. O. Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

MassDEP may waive the adjudicatory hearing filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

July 27, 2005

David J. MacKenzie, Executive Director
University of Massachusetts Building Authority
One Beacon Street, 26th Floor
Boston, MA 02108

Dear Mr. MacKenzie:

The Environmental Protection Agency-New England office has reviewed and approved your Prevention of Significant Deterioration (PSD) permit application to install and operate a new central heating plant at the University of Massachusetts' Amherst Campus.

Enclosed is the final PSD permit issued pursuant to our review of your application.

If you have any questions concerning this permit, please contact Brendan McCahill at (617) 918-1652.

Sincerely;

Dan Brown, Manager
Air Permits, Toxics and Indoor Programs Unit

Attachment

cc: Ian Thompson, Earth Tech, Inc.
Barbara Kwetz, Massachusetts DEP
Craig Goff, Massachusetts DEP
Donald Squires, Massachusetts DEP

EPA United States Environmental Protection Agency New England

One Congress Street, Suite 1100
Boston, MA 02114

Prevention of Significant Deterioration Air Permit

issued to the

University of Massachusetts Building Authority
One Beacon Street, 26th Floor
Boston, MA 02108

for the

University of Massachusetts-Amherst Campus
Central Heating Plant

PSD Permit Number 046-026-MA07

Pursuant to the provisions of the Clean Air Act, Subchapter I, Part C (42 U.S.C. Section 7470, *et. seq*) and the regulations found at the Code of Federal Regulations Title 40, Section 52.21, the United States Environmental Protection Agency-New England office (EPA-New England) is issuing a Prevention of Significant Deterioration (PSD) air quality permit to the University of Massachusetts Building Authority (the Authority) to install and operate a new central heating plant (CHP) at the University's Amherst, Massachusetts campus. The CHP consists of a combustion turbine (CT) nominally rated at 10 megawatts, a heat recovery steam generator (HRSG) with a duct burner (DB) rated at 77.4 million British thermal units (Btu) per hour, and four conventional package boilers each rated at 131,250 pounds per hour of steam. The turbine and four boilers will be equipped with selective catalytic reduction systems and oxidation catalysts. The design, construction and operation of the CHP project shall be subject to the attached permit conditions and permit limitations. This permit shall be effective 30 days from receipt of notice from EPA of permit issuance and shall remain in effect until rescinded by or surrendered to EPA. This permit becomes invalid if the Authority does not commence construction within 18 months after receipt of permit issuance. EPA may extend the 18-month period upon a satisfactory showing that an extension is justified. This permit does not relieve the Authority from the obligation to comply with applicable state and federal air pollution control rules and regulations.

Robert W. Varney — 7-25-05

Robert W. Varney
Regional Administrator

Date of issuance

Environmental Protection Agency -New England

Prevention of Significant Deterioration Air Permit

University of Massachusetts-Amherst Campus
Central Heating Plant

Permit Terms and Conditions

I. Emission Limitations

1. The emission rate of particulate matter less than 10 microns (PM_{10}) discharged to the atmosphere shall not exceed the following emission limits in pounds per million British Thermal Units (lbs/MMBtu) and pounds per hour (lbs/hour) for each emission unit.

Emission unit	Natural Gas	Motor Vehicle Diesel Fuel
CT/HRSG without DB	0.03 lbs/MMBtu 4.12 lbs/hr	0.04 lbs/MMbtu 5.46 lbs/hr
CT/HRSG and DB	0.03 lbs/MMBtu 6.45 lbs/hr	0.04 lbs/MMBtu 8.56 lbs/hr
Package Boiler (per unit)	0.02 lbs/MMBtu 3.40 lbs/hr	0.04 lbs/MMBtu 6.49 lbs/hr
Package Boiler (per unit)		0.03 lbs/MMBtu Filterable emissions only

<u>Notes</u>

(a) The hourly emission rates are based on worst case scenarios (100% load and 0° F ambient temperature).

(b) The lbs/hr and lbs/MMBtu emission rates are based on a 1-hour block average.

(c) Emission limits apply at all times including startup and shut down.

2. For each package boiler, the emission rate of ammonia discharged to the atmosphere shall not exceed 2.0 parts per million, on a dry volumetric basis, corrected to 3 percent oxygen (1-hour average).

3. For the CT/HRSG, the emission rate of ammonia discharged to the atmosphere shall not exceed 10.0 parts per million, on a dry volumetric basis, corrected to 15 percent oxygen (1-hour average).

II. Operating Requirements

1. The owner/operator shall combust natural gas or motor vehicle diesel fuel.

2. The owner/operator shall operate the emergency engine and emergency fire pump only during emergency situations or for routine maintenance testing. Total hours of operation for each engine shall not exceed 300 hours during any 12-month period.

3. Sulfur in natural gas shall not exceed 0.8 grains/100ft^3.

4. Sulfur in diesel fuel shall not exceed 0.05 percent by weight.

III. Testing Requirements

1. The owner/operator shall ensure that all stacks and exhaust ducts are constructed so as to accommodate the emissions testing requirements stipulated in 40 CFR Part 60, Appendix A. The CT/HRSG and boiler ducts shall include two outlet sampling ports 90 degrees apart from each other. The sampling ports must be located at a minimum of one duct diameter upstream and two duct diameters downstream of any flow disturbance.

2. The owner/operator shall measure the 0.03 lbs/MMBtu filterable PM_{10} emission limit using 40 CFR 51, Appendix M, Test Method 201or 201A. For all other PM_{10} emission limits, the owner/operator shall measure PM_{10} using 40 CFR 51, Appendix M, Test Method 201 or 201A and Test Method 202.

3. The owner/operator shall conduct initial PM_{10} compliance emission tests for the CT/HRSG/DB and boilers at 100% of maximum load to determine compliance with the emission limits in lbs/hr and lbs/MMBtu established for PM_{10} while burning motor vehicle diesel fuel.

4. The owner/operator shall conduct initial ammonia compliance emission test for the CT/HRSG/DB and boilers at 100% of maximum load using EPA Conditional Test Method 27 or an equivalent test method approved by EPA- New England.

5. The owner/operator shall complete the boiler emissions tests within 180 days after initial start-up of the boilers. The owner/operator shall conduct a second emissions test one year after initial stack is completed. If the second stack test shows that the emissions unit is in compliance, additional stack testing shall be required only when requested by EPA-New England.

6. The owner/operator shall complete CT/HRSG/DB emissions tests within 180 days after initial start-up of the CT/HRSG/DB. The owner/operator shall conduct a second emissions test one year after initial stack is completed. If the second stack test shows that the emissions unit is in compliance, additional stack testing shall be required only when requested by EPA-New England.

7 The owner/operator shall submit emissions test protocol(s) to EPA-New England for review and written approval at least 30 days prior to the date of actual testing.

8. The owner/operator shall submit the final emissions test report(s) to the EPA-New England within 60 days after the completion of each of the tests.

IV. Monitoring Requirements

1. The owner/operator shall monitor sulfur content of each new shipment of motor vehicle diesel fuel received. Compliance with the percent sulfur-in-fuel requirement can be demonstrated through testing (testing certification) or by maintaining a shipping receipt from the fuel supplier (shipping receipt certification) provided the testing certification or shipping receipt certification documenting the sulfur content is done in accordance with the applicable ASTM test methods (D4294-90) or any other method approved by the EPA-New England.

2. The owner/operator shall install, operate and maintain a Continuous Emission Monitoring System (CEMS) for ammonia or a nitrogen oxides CEMS with an ammonia injection rate monitor to calculate ammonia emissions. The CEMS shall satisfy the requirements of Performance Specification 2 (PS-2) of 40 CFR Part 60, Appendix B and Appendix F.

V. Recordkeeping Requirements

1. The owner/operator shall maintain a log to record problems, upsets or failures associated with the ammonia handling system.

2. The owner/operator shall maintain records of all periods of excess ammonia emissions, even if attributable to an emergency/malfunction or startup/shutdown, and shall quantify these emissions.

3. The owner/operator shall maintain records of all measurements, performance evaluations, calibration checks, maintenance, and adjustments for the ammonia CEMS.

4. The owner/operator shall maintain on-site permanent records of output from ammonia CEMS and make these records available to the EPA-New England on request.

5. The owner/operator shall maintain records of the testing certification or shipping receipt certification used to certify that each new shipment of motor vehicle diesel fuel complies with the percent sulfur-in-fuel requirement specified herein.

6. The owner/operator shall maintain and make available to the EPA-New England upon inspection all operating and monitoring records and logs for the last five years.

7. The owner/operator shall establish a recordkeeping system with sufficient detail to document that the operation of each emergency generator and diesel fire pump does not exceed 300 hours for any rolling 12-month period.

VI. Reporting Requirements

The owner/operator shall submit to the EPA-New England a semi-annual report postmarked by January 30th and July 30th of each year, which contains for the prior calendar 6-month period the following information, at a minimum:

a) Reports from the facility's ammonia CEMS summary data;
b) For each period of excess emissions or excursions from allowable operating conditions, the owner/operator shall list the duration, cause (including whether it is attributable to a malfunction or emergency), the response taken, and the amount of excess emissions. Periods of excess emissions shall include malfunctions, emergency, and upsets or failures associated with the emission control system and CEMS; and
c) A tabulation of oil use during the period.

VII. SPECIAL TERMS AND CONDITIONS

1. The owner/operator shall only burn natural gas or motor vehicle diesel fuel in the CT and the package boilers, and only natural gas in the DB.

2. The owner/operator shall comply with any Massachusetts Department of Environmental Protection plan approval that applies to the CHP project.

3. The owner/operator shall tune each package boiler annually in accordance with procedures contained in EPA 340/1-83-023 "Combustion Efficiency Optimization Manual for Operators of Oil and Gas Fired Boilers" (or equivalent) with the goal of reducing air pollutant emissions to optimum levels.

4. At the time of fuel purchase, the owner/operator shall ensure that the sulfur content of the fuel used in the emergency generator (which may also burn natural gas) and the engine for the fire suppression water pump(s) conforms with the then current sulfur limit applied to on-road specification oil as defined in the Code of Federal Regulations (at the time of issuance of this permit, defined in 40 CFR § 80.29(a)(i)).

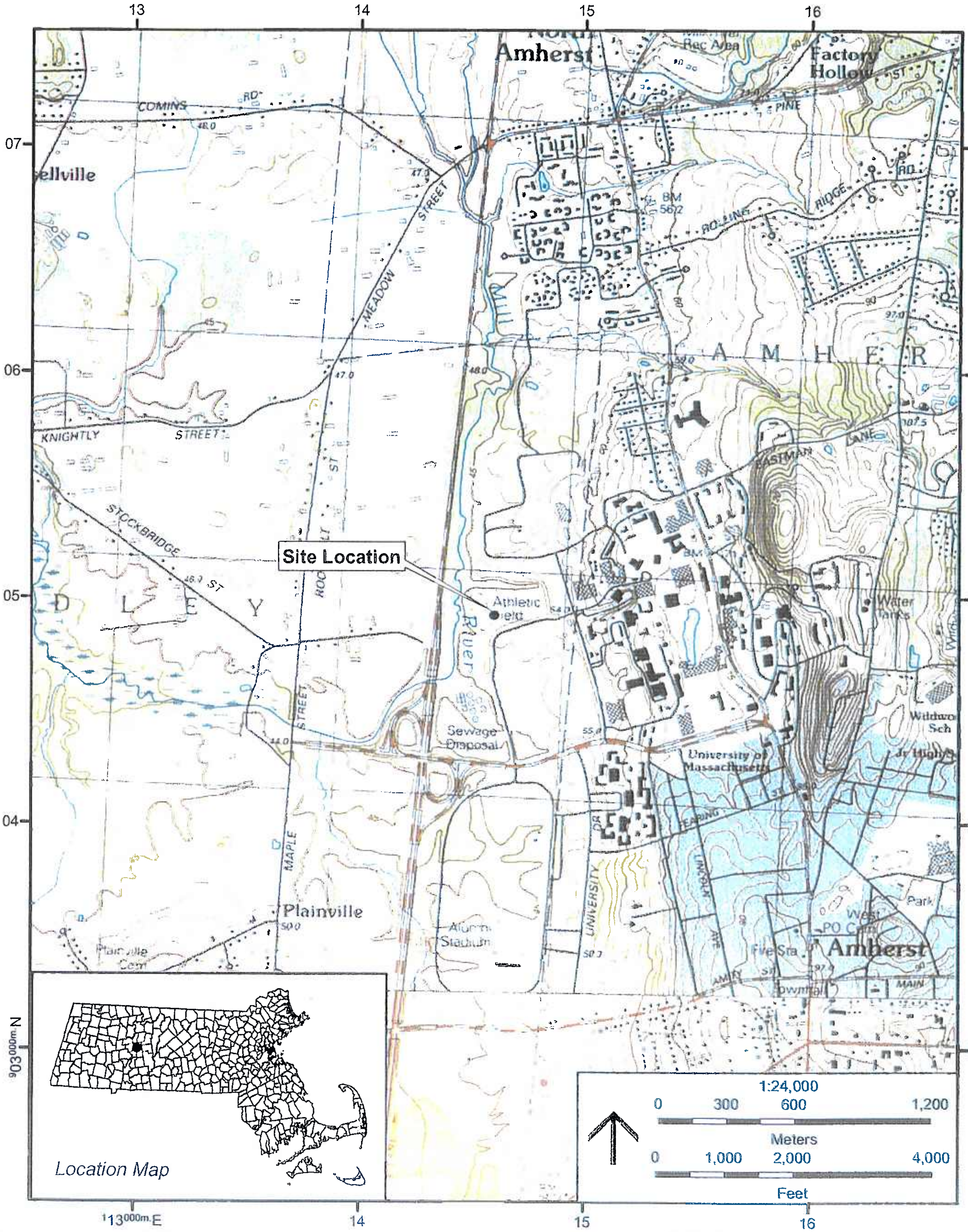
5. Upon startup and certification of the new CHP plant, the owner/operator shall decommission and disable the existing oil/coal-fired boilers.

Appendix E

Supporting Documentation

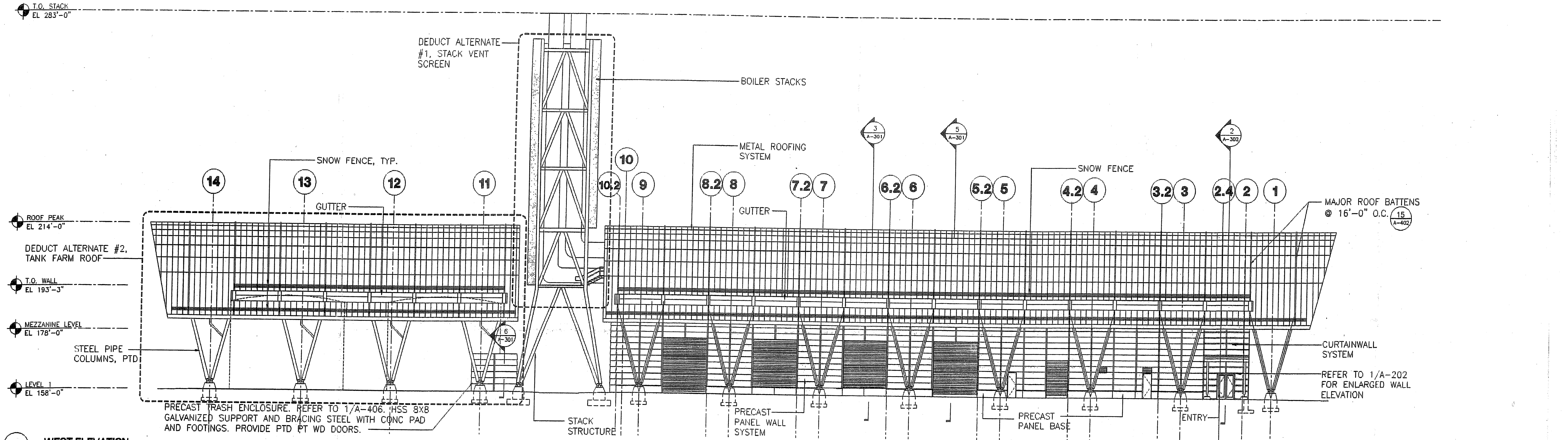
Figure – Site Locus Map
Drawing – Roof Plan
Drawing – Stack Elevations
Drawing – Stack Details

EarthTech
A Tyco International Ltd. Company

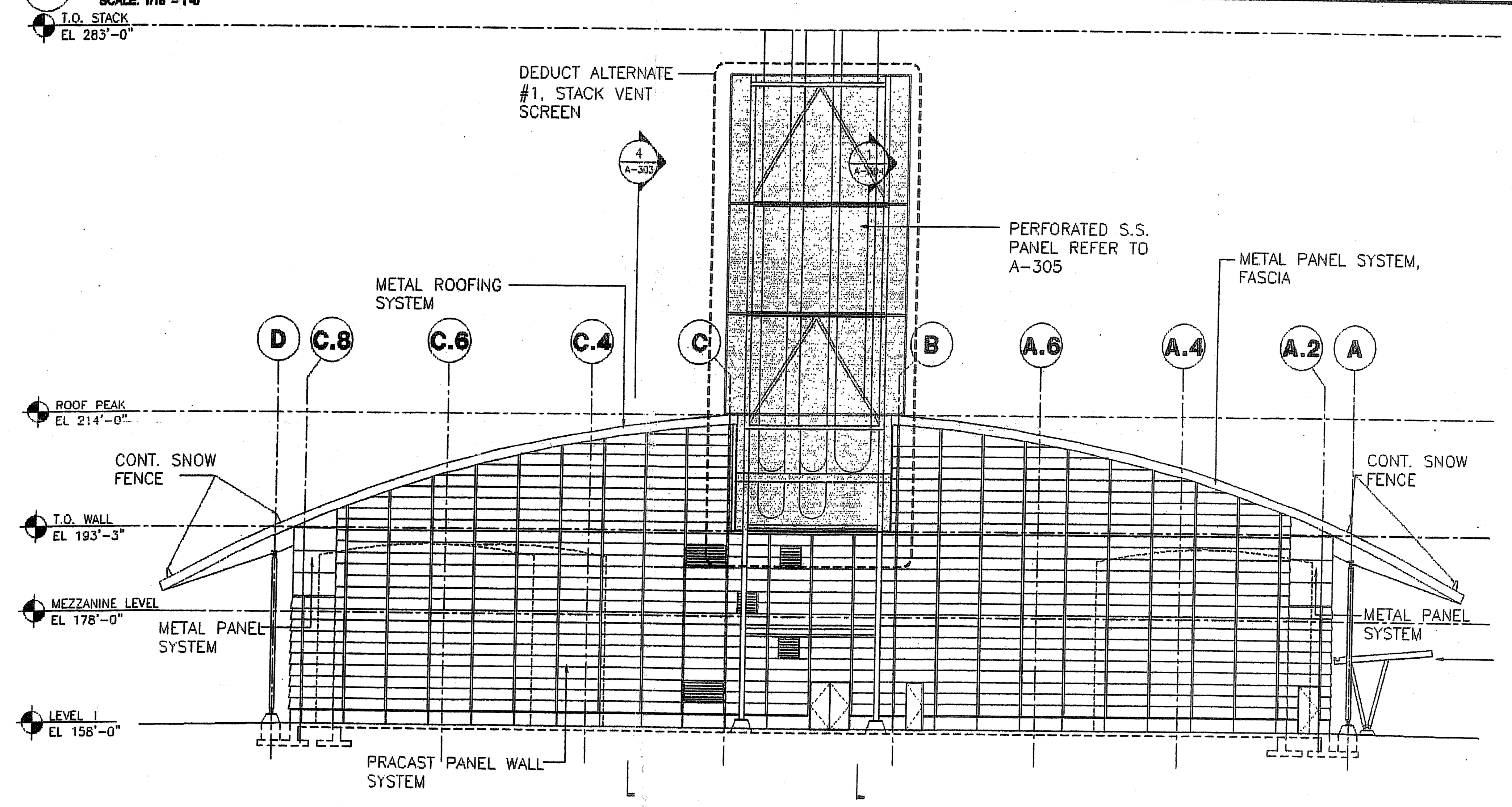


Portion of Mt Toby and Mt Holyoke
7.5' USGS quadrangles.
Scanned quadrangles supplied by EOEA, MassGIS.
Date of quad: 1979 and 1990.
10,000 Meter Grid Massachusetts State Plane NAD83.

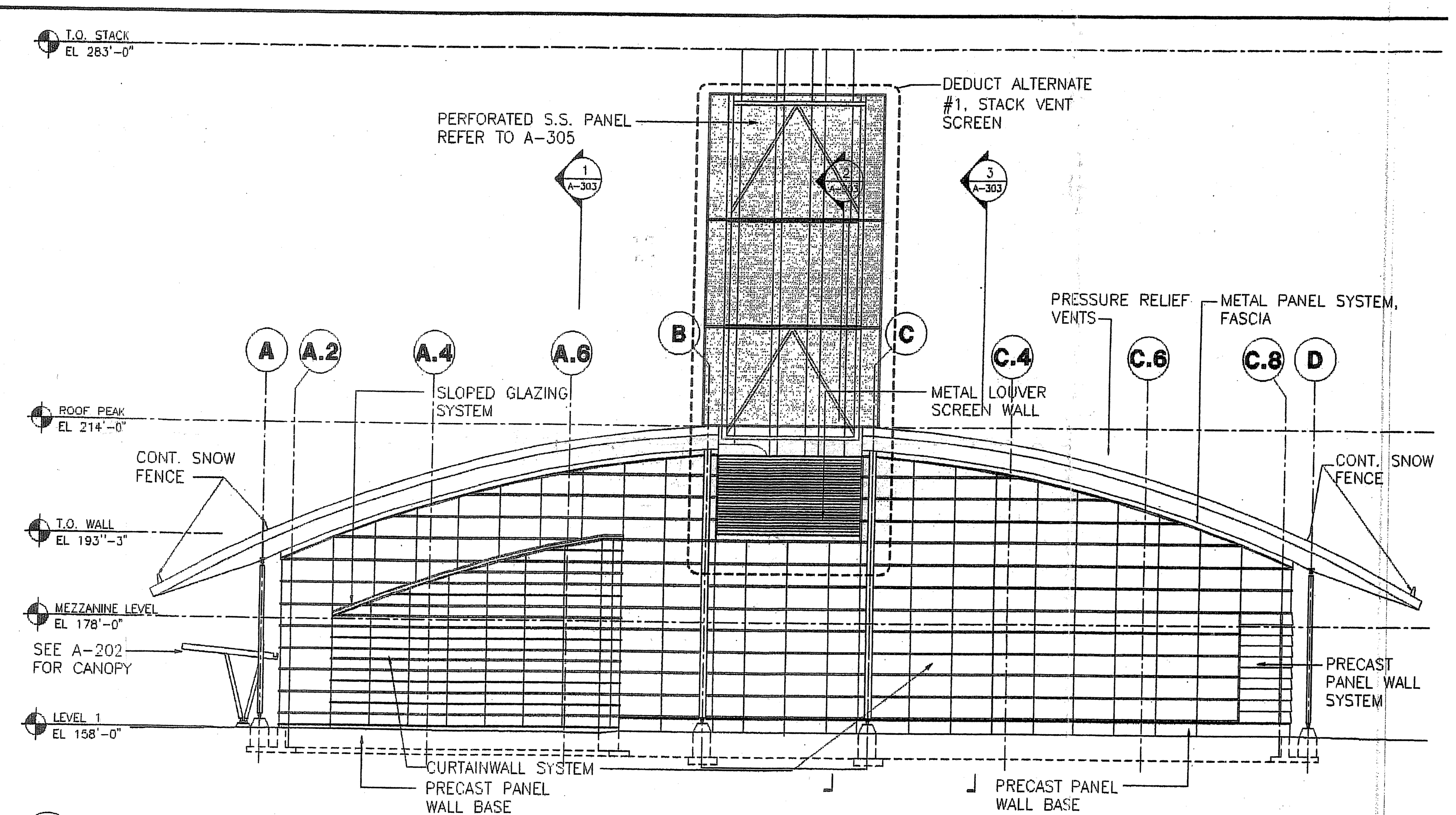
Figure 1
Site Locus Map
Proposed Central Heating Plant, University of Massachusetts
Amherst, Massachusetts



1 WEST ELEVATION
SCALE: 1/16" = 1'-0"



2 NORTH ELEVATION
SCALE: 1/16" = 1'-0"



3 SOUTH ELEVATION
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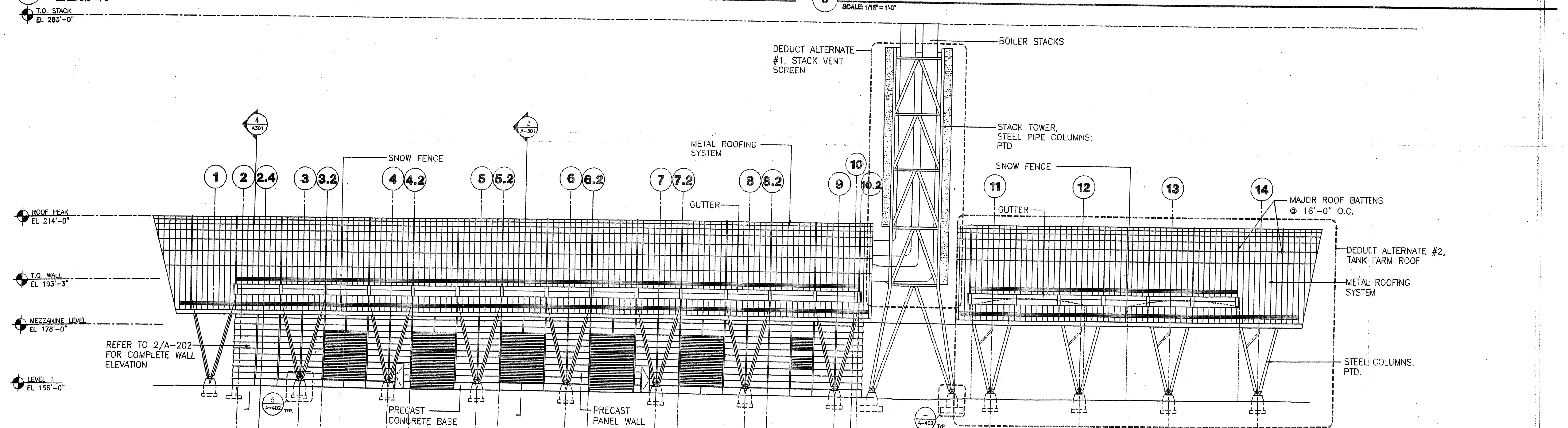


4 EAST ELEVATION
SCALE: 1/16" = 1'-0"

UNIVERSITY OF MASSACHUSETTS BUILDING AUTHORITY

Number	Date	Description
	9.06.05	ISSUED FOR BID

R.G. Vanderweil Engineers, Inc.
274 Summer Street • Boston, MA 02210

Cambridge Seven Associates, Inc.
Architect

McNamara/Salvia, Inc
Structural Engineer

BSC Group
Civil Engineer

Haley & Aldrich, Inc.
Geotechnical Engineer

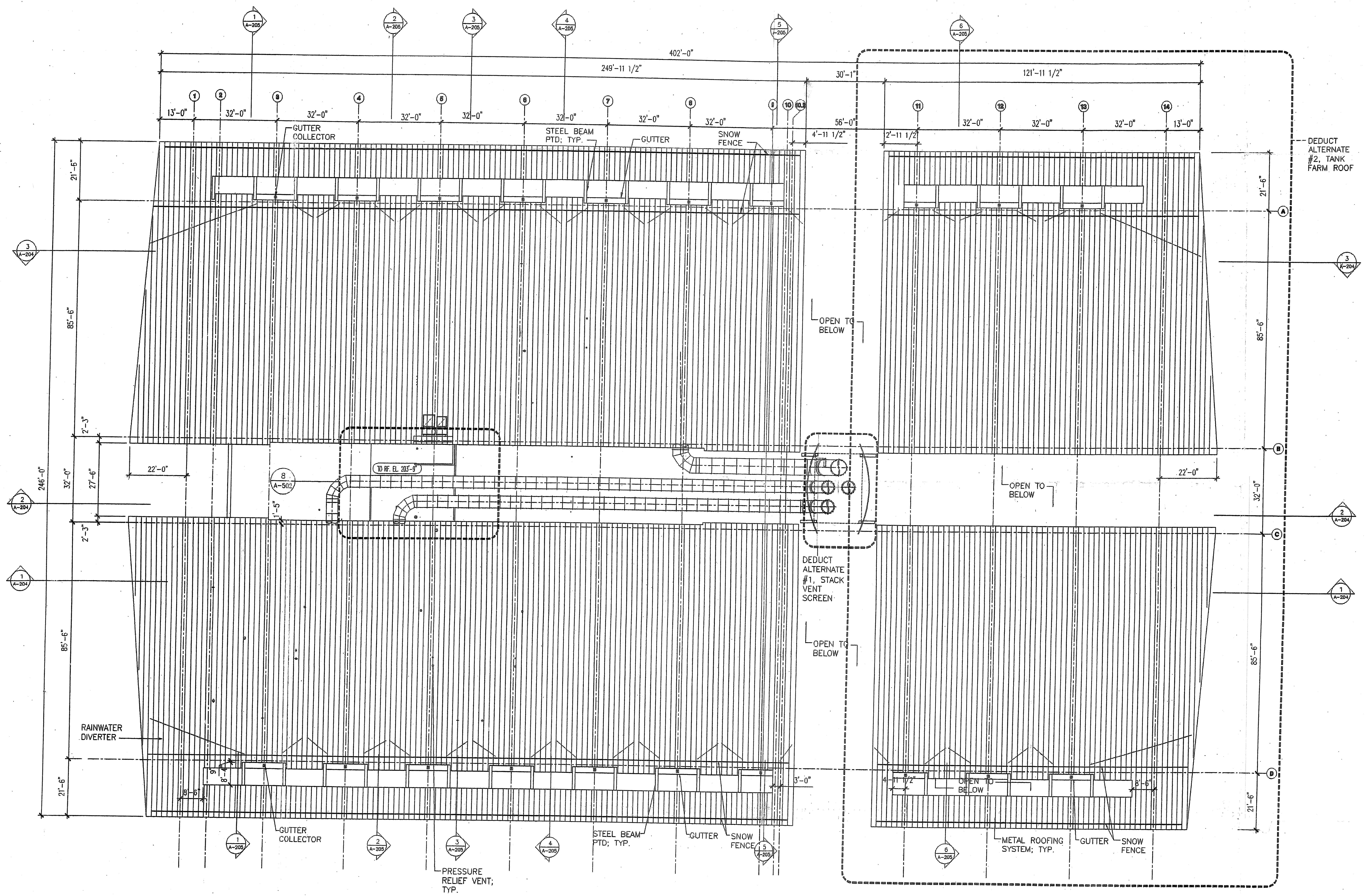
UMassAmherst

Project:
UNIVERSITY OF MASSACHUSETTS AMHERST, MA
CENTRAL HEATING PLANT

Title:
EXTERIOR ELEVATIONS

Date: 06 September 2005 Project Number: 0116.01
Drawn By: TMC Checked By: TM
Scale: 1/16" = 1'-0"

A-201



1 ROOF PLAN
SCALE: 1/16" = 1'-0"

UNIVERSITY OF MASSACHUSETTS BUILDING AUTHORITY

GENERAL NOTES

1. COORDINATE FINAL ROUTING OF PRESSURE RELIEF VENT PIPING WITH ARCHITECT AND ROOF CONSTRUCTION PRIOR TO FABRICATION.

Number	Date	Description
	9.06.05	ISSUED FOR BID

R.G. Vanderweil Engineers, Inc.
274 Summer Street - Boston, MA 02210

Cambridge Seven Associates, Inc.
Architect
1050 Massachusetts Ave.
Cambridge, MA 02138
617.492.7000 Telephone
617.492.7007 Facsimile

McNamara/Salvia, Inc
Structural Engineer
160 Federal Street
16th Floor
Boston, Ma 02110
617-737-0040 Telephone
617-737-8140 Facsimile

BSC Group
Civil Engineer
15 Elkins Street
Boston, MA 02127
617.896.4300 Telephone
617.896.4301 Facsimile

Haley & Aldrich, Inc.
Geotechnical Engineer
465 Medford Street
Boston, MA 02129
617.886.7400 Telephone
617.886.7600 Facsimile

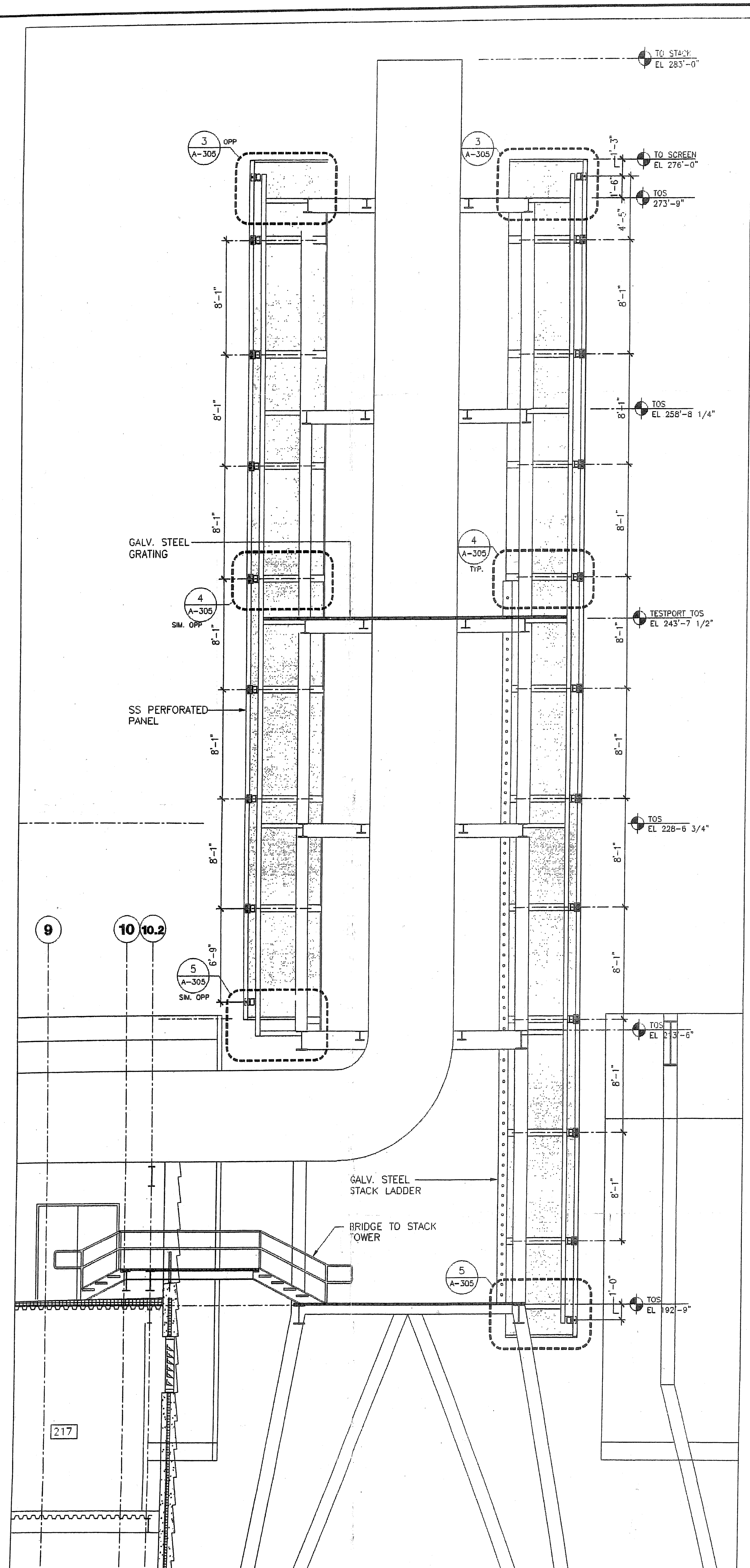
UMassAmherst

Project:
UNIVERSITY OF MASSACHUSETTS
AMHERST, MA
CENTRAL HEATING PLANT

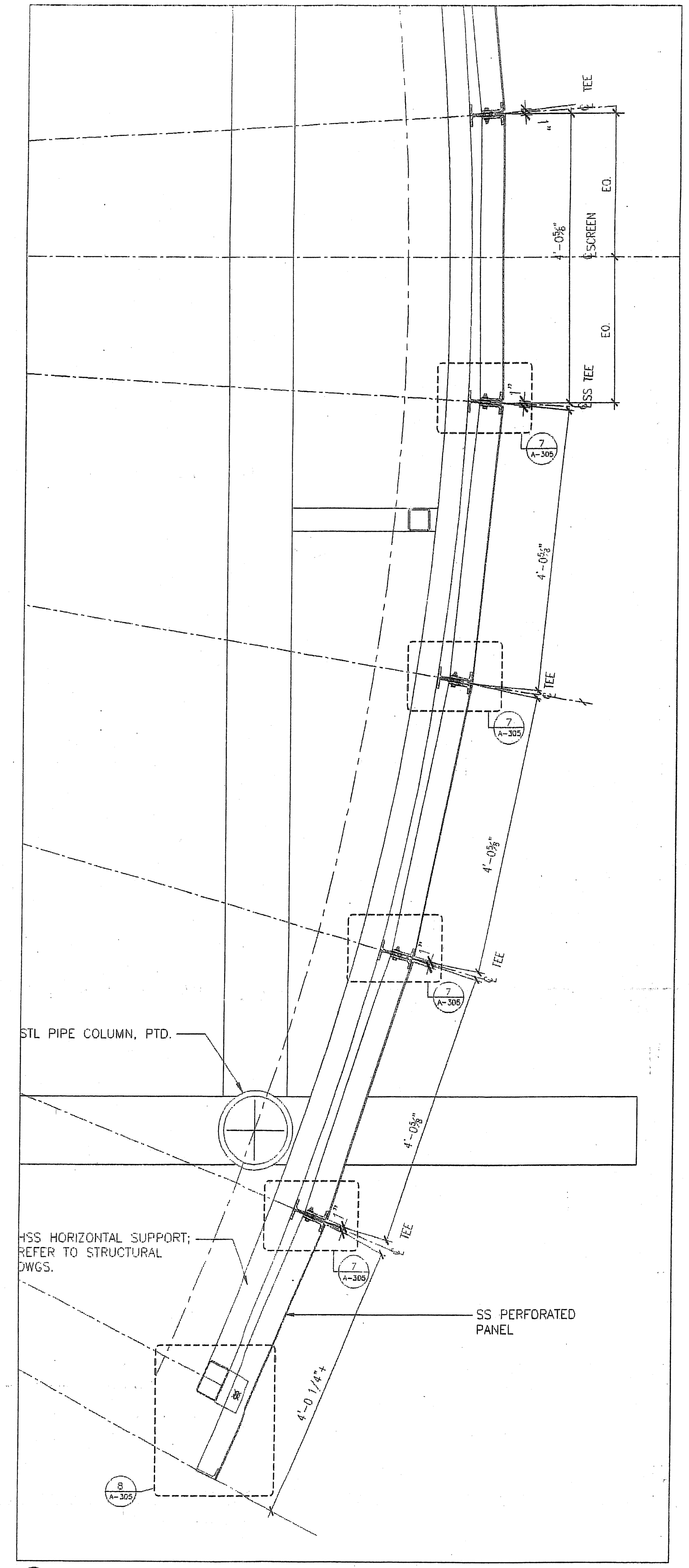
Title:
ROOF PLAN

Date: 06 September 2005 | Project Number: 0115.01
Drawn By: APM | Checked By: TM
Scale: 1/16" = 1'-0"

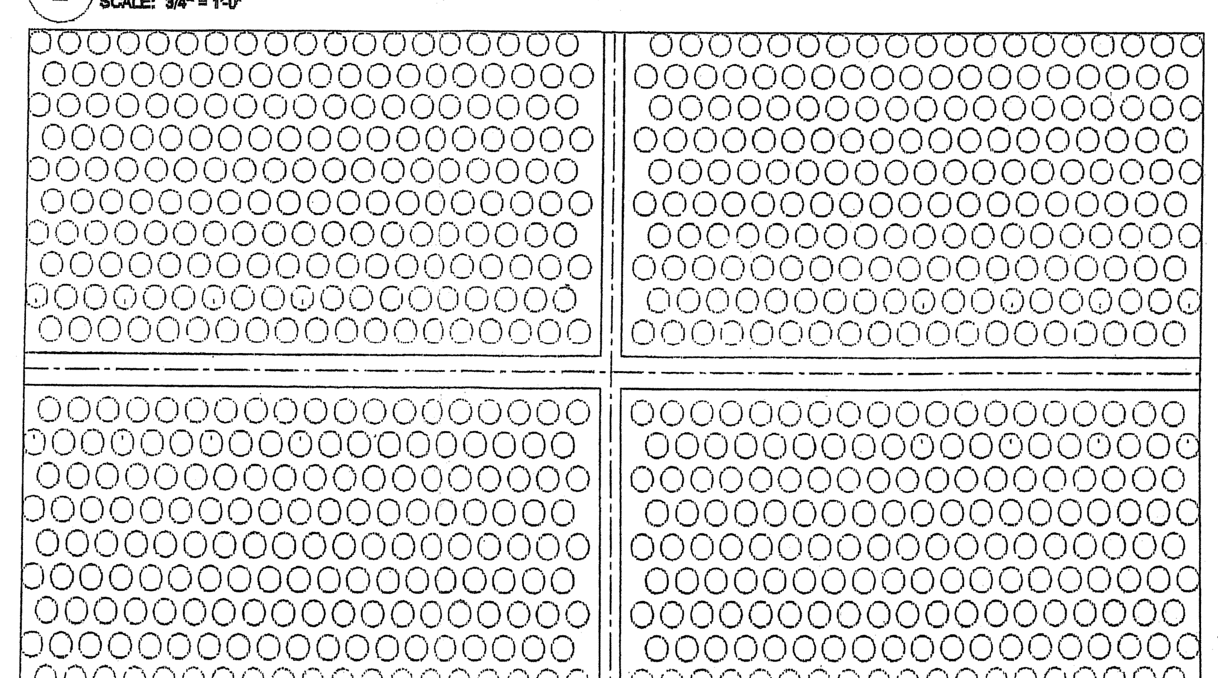
A-104



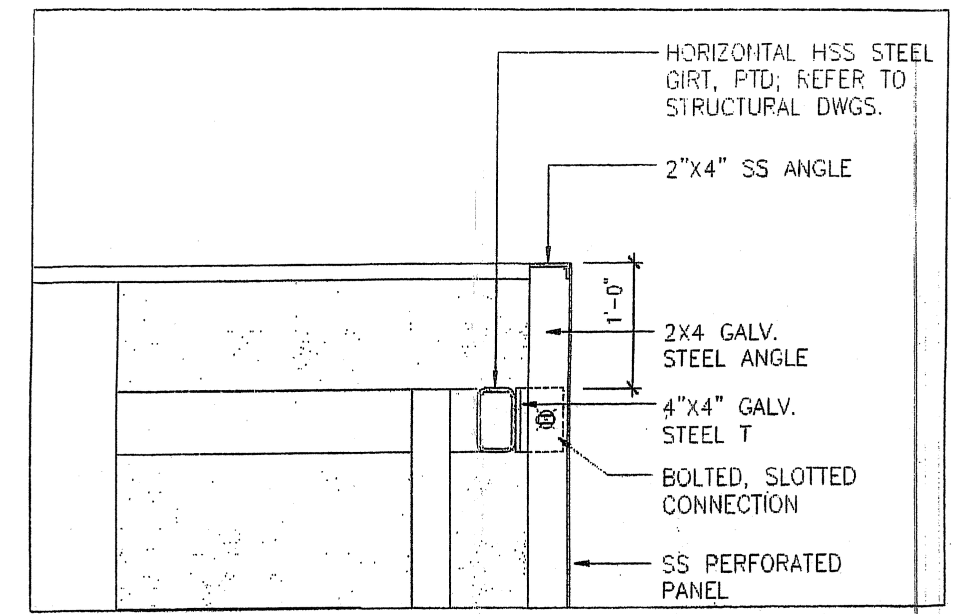
1 SLOT SECTION
SCALE: 1/4" = 1'-0"



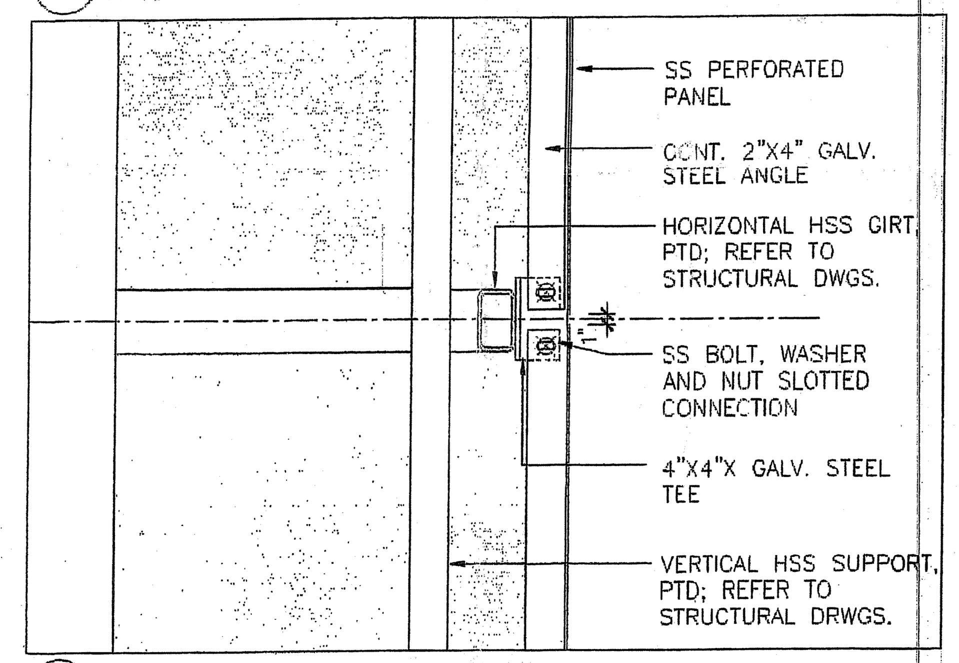
2 PARTIAL SCREEN PLAN
SCALE: 3/4" = 1'-0"



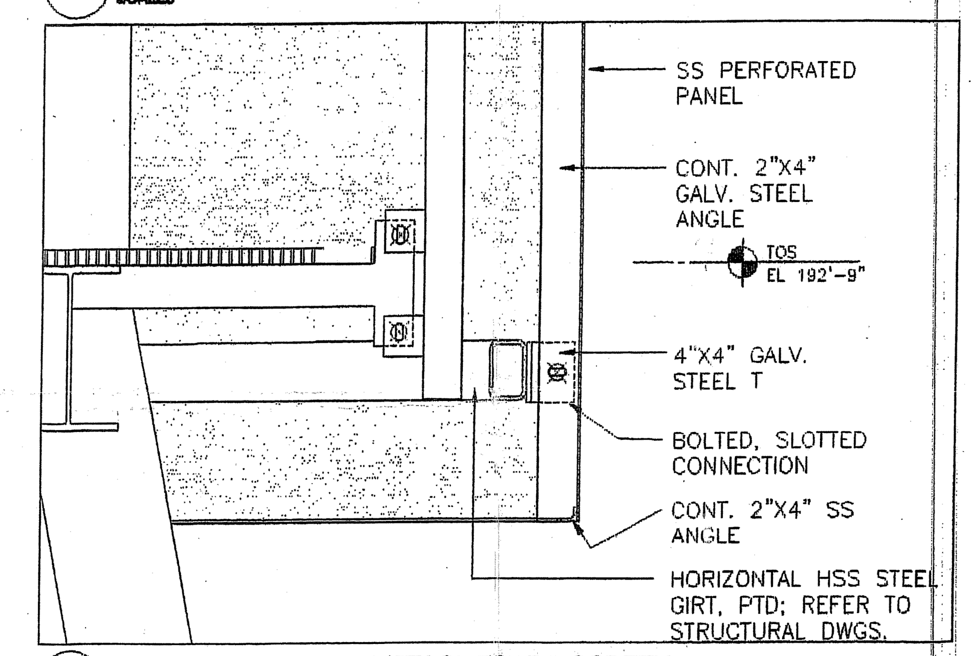
6 SCREEN PARTIAL ELEVATION
SCALE: 3" = 1'-0"



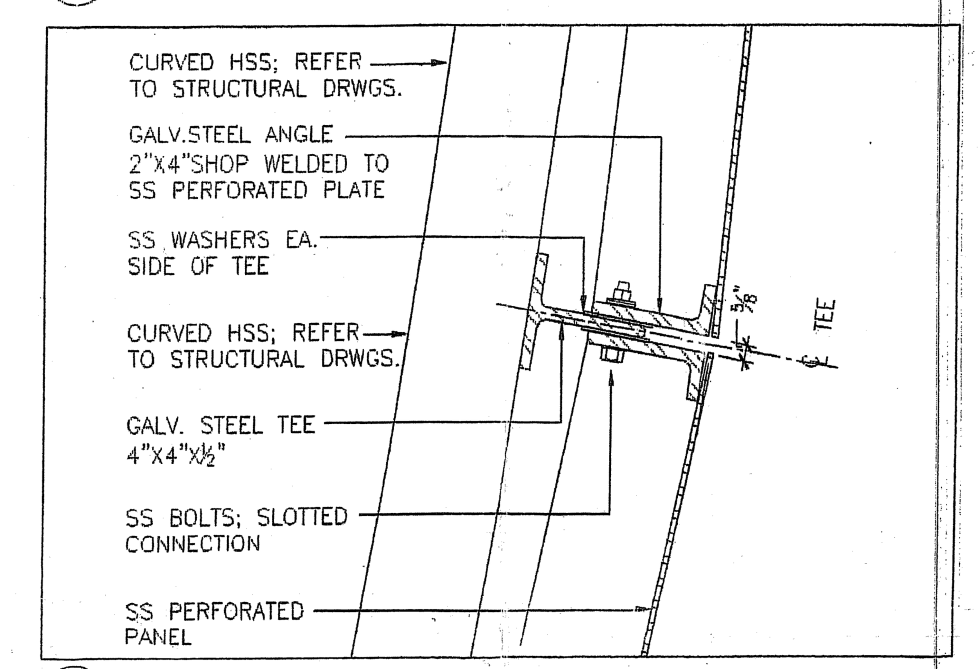
3 SECTION DETAIL @ TO STACK TOWER SCREEN



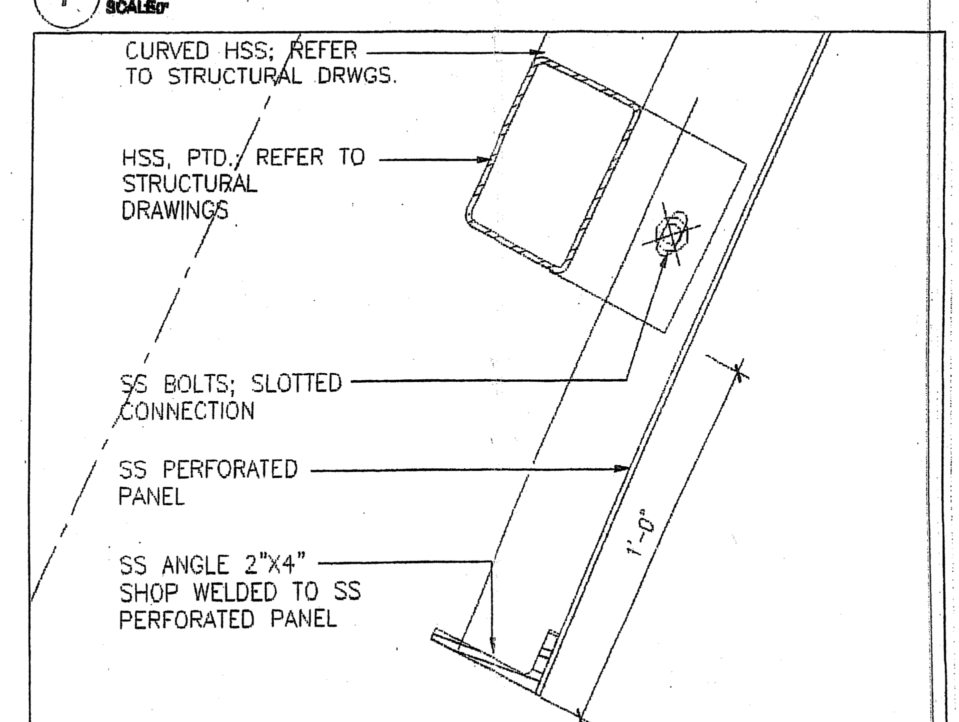
4 SECTION DETAIL @ STACK TOWER SCREEN



5 SECTION DETAIL @ BO STACK TOWER SCREEN



7 SCREEN PLAN DETAIL



8 SCREEN PLAN DETAIL

UNIVERSITY OF MASSACHUSETTS BUILDING AUTHORITY

Number	Date	Description
	9.06.05	ISSUED FOR BID

R.G. Vanderweil Engineers, Inc.
274 Summer Street - Boston, MA 02210

Cambridge Seven Associates, Inc.
Architect

McNamara/Salvia, Inc
Structural Engineer
150 Federal Street
Boston, MA 02110

BSC Group
Civil Engineer

Haley & Aldrich, Inc.
Geotechnical Engineer

UMassAmherst

Project:
UNIVERSITY OF MASSACHUSETTS
AMHERST, MA
CENTRAL HEATING PLANT

Title:
STACK TOWER & SCREEN

Date: 08 September 2005
Project Number: 0115.01
Drawn By: TMC
Checked By: TM
Scale: AS NOTED

A-305