STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
Bob Holden, Governor • Stephen M. Mahfood, Director
www.dnr.mo.gov

DEC 29 2004

Mr. Block Andrews
Director of Environmental Services
Aquila, Incorporated
20 West 9th Street
Kansas City, MO 64105

RE: New Source Review Permit - Project Number: 2004-03-143

Dear Mr. Andrews:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files.

Operation in accordance with these conditions, your new source review permit application and with your Part 70 Operating Permit Application is necessary for continued compliance.

The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact me at (573) 751-4817, or you may write to the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102.

Thank you,

AIR POLLUTION CONTROL PROGRAM

Kendall B. Hale

Kendall B. Hale
New Source Review Unit Chief

KLM:lkb

Enclosures

c: Kansas City Regional Office
PAMS File: 2004-03-143

Permit Number: 122004-017

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 122004-017 Project Number: 2004-03-143

Owner: Aquila, Incorporated

Owner's Address: 20 West 9th Street, Kansas City, Missouri 64105

Installation Name: South Harper Peaking Facility

Installation Address: 24110 S. Harper Road, Peculiar, Missouri 64078

Location Information: Cass County, S29/32, T45N, R32W

Application for Authority to Construct was made for:

Installation of three natural gas fired simple cycle combustion turbines, a 9.8 million Btu per hour natural gas fired heater, and a 0.47 million Btu per hour emergency diesel fire pump to generate a total nominal electrical power output of 341 megawatts during peak electricity demand periods. This review was conducted in accordance with Section (8), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

☐ Standard Conditions (on reverse) are applicable to this permit.

☑ Standard Conditions (on reverse) and Special Conditions (listed as attachments starting on page 2) are applicable to this permit.

DEC 29 2004

EFFECTIVE DATE

DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

MO 780-1204 (1-03)

APPENDIX 7

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available not more than 60 days but at least 30 days in advance of this date. Also, you must notify the Department of Natural Resources Regional Office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed Special Conditions as provided in RSMo 643.075. If you choose to appeal, the Air Pollution Control Program must receive your written declaration within 30 days of receipt of this permit.

If you choose not to appeal, this certificate, the project review, your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Department of Natural Resources has established the Outreach and Assistance Center to help in completing future applications or fielding complaints about the permitting process. You are invited to contact them at 1-800-361-4827 or (573) 526-6627, or in writing addressed to Outreach and Assistance Center, P.O. Box 176, Jefferson City, MO 65102-0176.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention Construction Permit Unit.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

South Harper Peaking Facility
Cass County, S29/32, T45N, R32W

1. Operational Limitation

A. South Harper Peaking Facility (Aquila) shall burn only natural gas from the three natural gas fired simple cycle combustion turbines. If Aquila wishes to use any other type of fuel in the future in any of the three turbines, the Best Available Control Technology (BACT) analysis and ambient air quality analysis will need to be re-evaluated.

B. Aquila shall limit the total hours of operation of the three Siemens-Westinghouse Model 501D5A turbines (Emissions Points EP-01, EP-02, and EP-03) to less than 5,000 hours in any consecutive 12-month period.

C. Aquila shall limit the total hours of operation of each of the three Siemens-Westinghouse Model 501D5A turbines (EP-01, EP-02, and EP-03) to less than 2,000 hours in any consecutive 12-month period, except in the case of a Force Majeure Event. In the case of a Force Majeure Event that renders one or two gas turbines inoperable, the total unused permitted hours of operation may be transferred to the remaining operable unit(s). In order for an event to be considered a Force Majeure Event, Aquila must receive approval from the Air Pollution Control Program's Enforcement Section.

D. Except during periods of startup and shutdown, Aquila shall limit the total hours of operation of the gas heater (EP-04) to less than 6,000 hours in any consecutive 12-month period.

E. Except during periods of startup and shutdown, Aquila shall run the three Siemens-Westinghouse Model 501D5A turbines (EP-01, EP-02, and EP-03) at a load level no less then 75 percent.

F. Aquila shall only operational test the emergency fire pump between the hours of 1:00 p.m. and 5:00 p.m. and shall limit the total hours of operation to less than 250 hours in any consecutive 12-month period.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

2. Emission Limitation

A. Except during periods of startup and shutdown, Aquila shall limit Nitrogen Oxide (NO_X) emissions from each of the Siemens-Westinghouse Model 501D5A turbines (EP-01, EP-02, and EP-03) to 15 parts per million by volume (ppmvd) corrected to 15 percent (%) oxygen on a dry basis for a three-hour rolling average.

B. Except during periods of startup and shutdown, Aquila shall limit Carbon Monoxide (CO) emissions from each of the Siemens-Westinghouse Model 501D5A turbines (EP-01, EP-02, and EP-03) to 25 ppmvd corrected to 15 percent (%) oxygen on a dry basis for a one hour rolling average.

C. Except during periods of startup and shutdown, Aquila shall limit emissions of Particulate Matter less than ten microns in aerodynamic diameter (PM_{10}) to less than 15.25 pounds per hour when utilizing wastewater injection for Turbine Number One (Siemens-Westinghouse Model 501D5A, EP-01) and 10.00 pounds per hour each from Turbine Numbers Two and Three (Siemens-Westinghouse Model 501D5A, EP-02 and EP-03) and Turbine One when not using wastewater injection.

3. Compliance Testing

Stack tests shall be performed on one of the three identical gas turbines permitted herein at Aquila sufficient to demonstrate compliance with the Special Conditions contained in this permit. Specifically, the stack testing shall:

A. Demonstrate compliance with the emission limitations specified in Special Conditions 2.A through 2.C.

B. Develop a formaldehyde emission factor in order to verify the validity of the emission factor used for the modeling analysis. In the event that the stack testing results in an emission factor that exceeds that used in this review, a revised modeling analysis will need to be submitted by Aquila. The revised modeling must be submitted to the Director of the Air Pollution Control Program within 90 days of completion of the required testing.

C. Demonstrate compliance with Subpart GG, *Standards of Performance for Stationary Gas Turbines,* of the New Source Performance Standards (NSPS).

D. Be conducted across the full range of loads (i.e. 75%, 85%, and 100%) that the turbines are expected to operate.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

E. The stack test shall be performed within 60 days of achieving the maximum production rate of the turbines but no later than 180 days after initial startup for commercial operation of the turbines and shall be conducted in accordance with the stack procedure outlined in Special Conditions 3.A through 3.D. The test shall be conducted every five (5) years from the date of the initial test.

F. The date on which performance tests are conducted must be pre-arranged with the Air Pollution Control Program a minimum of 30 days prior to the proposed test so that a pretest meeting may be arranged if necessary, and to assure that the test date is acceptable for an observer to be present. A completed Proposed Test Plan form (copy enclosed) may serve the purpose of notification and must be approved by the Air Pollution Control Program prior to conducting the required emission testing.

G. Two copies of a written report of the performance test results shall be submitted to the Director of the Air Pollution Control Program within 30 days of completion of any required testing. The report must include legible copies of the raw data sheets, analytical instrument laboratory data, and complete sample calculations from the required EPA method for at least one sample run.

H. The test report is to fully account for all operational and emission parameters addressed by these permit conditions as well as in Subpart GG of the NSPS.

I. Pursuant to 40 CFR §60.8(b)(3) and subject to the following conditions, Aquila may substitute the 40 CFR Part 75 NO_X and diluent continuous emission monitoring system (CEMS) certification procedures for the Reference Method 20 testing for the purpose of demonstrating initial compliance with Subpart GG of the NSPS. If the Part 75 NO_X and diluent CEMS certification procedures are chosen to demonstrate initial compliance, Aquila shall adhere to the following requirements:

1) Aquila shall successfully complete the Part 75 NO_X and diluent CEMS certification tests so that the data are, at a minimum, conditionally certified prior to the testing deadlines outlined in 40 CFR §60.8(a) or Part 75, whichever date is earlier.

2) Aquila shall perform a stratification test for NO_X and diluent pursuant to the procedures specified in 40 CFR Part 75, Appendix A, Section 6.5.6.1(a) through (e) or Section 6.5.6.2 (a) through (e).

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Once the stratification sampling is completed, Aquila shall analyze the data using the procedures in Section 6.5.6.3(a) and (c) to determine if subsequent RATA testing will occur along a short or long reference method measurement line. The short or long reference method measurement line, as determined above, will serve in lieu of the sampling points usually required by Reference Method 20. In no case shall RATA be based on fewer than three sample points as specified in 40 CFR Part 60, Appendix B, Performance Specification 2, Section 3.2.

3) Since the PSD permit limits Aquila to only natural gas, the SO_2 measurement requirements under 40 CFR Part 60, Appendix A, Reference Method 20, Section 6.3 are waived pursuant to 40 CFR §60.8(b)(4).

4. Continuous Emission Monitoring System (CEMS)

A. Aquila shall install, calibrate, maintain, and operate CEMS, and record the output of the systems, for measuring NO_X emissions discharged into the atmosphere. The CEMS shall be installed and operated according to the guidelines in 40 CFR Part 75 for the NO_X and diluent CEMS requirements. These systems shall be placed in an appropriate location on each combustion turbine's flue gas exhaust such that accurate readings are possible.

B. Aquila shall install, calibrate, maintain, and operate a CEMS, and record the output of the systems, for measuring the oxygen (O_2) content of the flue gases at each location where NO_X emissions are monitored. The O_2 content of the flue gases may be determined by use of either an O_2 CEMS or a CO_2 CEMS. If Aquila elects to use a CO_2 CEMS, the conversion process in EPA Method 20 must be used to correct the NO_X concentrations to 15 percent O_2.

5. Record Keeping

A. Aquila shall keep monthly, and the sum of the most recent 12-months, records that are adequate to determine compliance with Special Condition Number 1.B (total installation hours of operation). Attachment A, *Operational Schedule of the Three Siemens-Westinghouse Model 501D5A Turbines,* or an equivalent form of the company's own design, is suitable for this purpose. The most recent 60 months of records shall be maintained on-site and shall be made immediately available to Missouri Department of Natural Resources' personnel upon request.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

B. Aquila shall keep monthly, and the sum of the most recent 12-months, records that are adequate to determine compliance with Special Condition Number 1.C (individual turbine hours of operation). Attachment B, *Individual Turbine Operational Schedule*, or an equivalent form of the company's own design, is suitable for this purpose. The most recent 60 months of records shall be maintained on-site and shall be made immediately available to Missouri Department of Natural Resources' personnel upon request.

C. Aquila shall keep monthly, and the sum of the most recent 12-months, records that are adequate to determine compliance with Special Condition Number 1.D (gas heater hours of operation). Attachment C, *Gas Heater Operational Schedule*, or an equivalent form of the company's own design, is suitable for this purpose. The most recent 60 months of records shall be maintained on-site and shall be made immediately available to Missouri Department of Natural Resources' personnel upon request.

D. Aquila shall keep monthly, and the sum of the most recent 12-months, records that are adequate to determine compliance with Special Condition Number 1.F (fire pump hours of operation). Attachment D, *Fire Pump Operational Schedule*, or an equivalent form of the company's own design, is suitable for this purpose. The most recent 60 months of records shall be maintained on-site and shall be made immediately available to Missouri Department of Natural Resources' personnel upon request.

6. Reporting

A. Aquila shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, Missouri 65102, no later than ten (10) days after the end of each month if the 12-month cumulative total (Special Condition 5.A) records show that the source exceeded the limitation of Special Condition 1.B (5,000 hours of operation).

B. Aquila shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, Missouri 65102, no later than ten (10) days after the end of each month if the 12-month cumulative total (Special Condition 5.B) records show that the source exceeded the limitation of Special Condition 1.C (2,000 hours of operation per turbine).

C. Aquila shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, Missouri 65102, no later than ten

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

(10) days after the end of each month if the 12-month cumulative total (Special Condition 5.C) records show that the source exceeded the limitation of Special Condition 1.D (6,000 hours of operation).

D. Aquila shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, Missouri 65102, no later than ten (10) days after the end of each month if the 12-month cumulative total (Special Condition 5.D) records show that the source exceeded the limitation of Special Condition 1.F (250 hours of operation).

E. Pursuant to 40 CFR §60.13(i), Aquila may make use of 40 CFR Part 75, Appendix D as an alternative to the fuel monitoring and sulfur fuel sampling and analysis requirements of Subpart GG of the NSPS. If Aquila elects to use this alternative, Aquila is subject to the following requirements:

1) Aquila shall submit an excess emissions report to the Air Pollution Control Program's Enforcement Section consistent with the format and schedule described in 40 CFR §60.7(d); and

2) For the purpose of excess emission reporting, Aquila shall report each day during which the sulfur content of the fuel exceeds the 0.8 percent by weight limitation.

F. Aquila shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, Missouri 65102, no later than ten (10) days after the end of the month, in which performance testing has been performed and indicates non-compliance with Special Condition 2.A, 2,B, or 2.C.

G. In the case of a Force Majeure Event, Aquila shall notify the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, Missouri 65102, no later than ten (10) days after an event has occurred that Aquila feels meets the definition of a Force Majeure Event.

Note 1: The term "startup and shutdown" used herein is hereby defined as those periods of time that a gas turbine is operated at a load level less than 75%.

Note 2: The term "Force Majeure Event" used herein is hereby defined as any event, occurrence, or circumstance beyond the reasonable control of, and without the fault or negligence of, Aquila. "Force Majeure Event " shall include, but are not limited to, earthquakes, fires, floods, lightning strikes,

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

acts of the public enemy, war, or regulations or restrictions imposed by governmental, military, or lawfully established civilian authorities. A claim of Force Majeure Event is subject to the approval of the Air Pollution Control Program Enforcement Section.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (8) REVIEW
Project Number: 2004-03-143
Installation ID Number: 037-0063
Permit Number: 122001-117

South Harper Peaking Facility
24110 S. Harper Road
Peculiar, Missouri 64708

Complete: March 29, 2004
Reviewed: April 7, 2004

Parent Company:
Aquila, Incorporated
20 West 9th Street
Kansas City, Missouri 64105

Cass County, S29/32, T45N, R32W

REVIEW SUMMARY

- South Harper Peaking Facility (Aquila) has applied for the authority to install three natural gas fired simple cycle combustion turbines to generate a total nominal electrical power output of 341 megawatts (MW) during peak electricity demand periods. The three gas turbines to be utilized are identical Siemens Westinghouse Model 501D5A units. The individual turbine units have a maximum hourly design rate (MHDR) heat input of 1,455 million British Thermal Units (MMBtu) per hour. The project will also consist of a 9.8 MMBtu per hour natural gas fired heater, used to pre-heat the natural gas fuel supplied to the turbines and a 0.47 MMBtu per hour emergency diesel fire pump.

- Hazardous Air Pollutant (HAP) emissions are expected from the heater and three turbines due to the combustion of natural gas and the fire pump due to the combustion of diesel fuel. The primary HAPs of concern from the proposed equipment are acrolein, formaldehyde, and polycyclic aromatic hydrocarbons (PAH). The potential emissions of formaldehyde (CAS Number 50-00-0) are above its respective threshold level, but less than major source levels.

- 40 CFR Part 60 Subpart GG, *Standards of Performance for Stationary Gas Turbines* is applicable to the three gas turbines permitted herein.

- None of the National Emission Standards for Hazardous Air Pollutants (NESHAP) in 40 CFR Part 61 are applicable to this project.

- Maximum Achievable Control Technology (MACT), Subpart YYYY, *Combustion Turbines* does not apply because potential emissions of individual and combined HAPs are indirectly limited to a de minimis level by the hours of operation conditions of this permit.

- This review was conducted in accordance with Section (8) of Missouri State Rule 10

CSR 10-6.060, *Construction Permit Required.* Potential emissions of PM_{10}, NO_X and CO are above major thresholds. Potential emissions of VOC are greater than de minimis levels. Potential emissions of individual and combined HAPs are indirectly limited to a de minimis level by the hours of operation conditions of this permit.

- Since potential emissions of total and individual HAPs are at de minimis levels, this installation is not considered a major source of HAPs as defined in 40 CFR Part 63, and 10 CSR 10-6.060(9).

- The Best Available Control Technology (BACT) requirements apply to the proposed equipment. The BACT analysis was based upon each turbine operating in simple cycle mode, burning exclusively natural gas, and operating only 2,000 hours per year. The gas heater will operate only 6,000 hours per year. NO_X emissions from the gas turbines will be controlled through the use of dry low-NO_X burners. Low NO_x burners will also be employed on the gas heater. Ignition Timing Retard will be used on the emergency fire pump for NO_x emission control. Good combustion practices will be utilized to control CO emissions. The exclusive use of low ash/low sulfur containing fuel, together with good combustion practices, will be utilized in controlling PM_{10} and SO_X emissions from all equipment. A re-evaluation of the BACT analysis and/or ambient air quality analysis will be required if South Harper Peaking Facility wishes to: retrofit the turbines with a heat recovery steam generator within a short period of time (e.g. 4-5 years) that would otherwise be accommodated within a phased Prevention of Significant Deterioration (PSD) permit, burn other forms of fuel in any of the equipment, or wishes to increase the hours of operation limitation for any piece of equipment.

- This installation is on the List of Named Installations [10 CSR 10-6.020(3)(B), Table 2] Number 27. A stationary source category which, as of August 7, 1980, is being regulated under Section 111 or 112 of the Act. This installation is subject to Subpart GG of the NSPS, which applies to gas turbines installed after October 3, 1977. Therefore, the major source threshold for all criteria pollutants is 100 tons per year.

- This installation is located in Cass County, which is not currently designated nonattainment for any criteria pollutant.

- Air quality modeling for this project was performed to determine the ambient impact of those pollutants that will be emitted in significant amounts (NO_X, CO, and PM_{10}). Air quality modeling was also performed to determine the ambient impact of formaldehyde. Based upon the model reviewed by the Air Pollution Control Program staff, the study submitted by Aquila is complete and demonstrates there will not be an exceedance of the National Ambient Air Quality Standards (NAAQS), Risk Assessment Levels (RALs), or available increment.

- Ambient air monitoring was not required for this project since the modeling analysis indicated that the ambient impacts of the modeled pollutants were below significance thresholds. Continuous Emission Monitoring Systems (CEMS) are required on each combustion turbine to demonstrate compliance with NO_X emissions limits.

- Emission testing for NO_X, CO, PM_{10}, and formaldehyde will be required as specified in the special conditions of this permit.

- A Part 70 Operating Permit application is required for this installation within 1 year of equipment startup.

- Approval of this permit is recommended with special conditions.

INSTALLATION/PROJECT DESCRIPTION

South Harper Peaking Facility (Aquila) has applied for the authority to construct three natural gas fired simple cycle combustion turbines to generate a total nominal electrical power output of 341 MW during peak electricity demand periods in Cass County near Peculiar, Missouri. The plant was to be located originally near Harrisonville, Missouri and public notice for the initial location took place earlier this year. On September 13, 2004, a revised PSD permit application was received changing the location of the plant to Peculiar, Missouri.

The three gas turbines to be utilized for this project are identical Siemens-Westinghouse Model 501D5A units that will be fired exclusively with natural gas. The individual turbine units have a heat input of 1,455 MMBtu per hour. This heat input is taken at a worst case ambient temperature of negative 1.8 degrees Fahrenheit (°F), an ambient relative humidity of 60%, a barometric pressure of 14.458 pounds per square inch absolute, and is based on a higher heating value of natural gas. Each 4-stage Siemens-Westinghouse Model 501D5A gas turbine utilizes 14 can-type dry low-NO_X combustors in a circular array. It incorporates a 19-stage axial flow compressor, and utilizes electric starting motors. Each turbine will power an air-cooled, 60 hertz (i.e. 3600 revolutions per minute) generator. The project will also consist of a 9.8 MMBtu per hour natural gas fired heater used to heat the natural gas fuel supplied to the turbines and a 0.47 MMBtu per hour emergency diesel fire pump.

Simple cycle turbines have high volume, high temperature exhaust streams. The maximum heat input and subsequent generating capacity of each turbine depends on ambient conditions. At higher temperatures, the heat consumption and output generally decreases. Potential emissions from the turbines are greatest during periods of low ambient temperature since more fuel can be burned during these times. However, the turbine is operating at its maximum efficiency during lower temperatures. The Siemens-Westinghouse Model 501D5A turbines are equipped with dry low-NO_X burners, which will achieve a maximum NO_X emission rate of 15 parts per million by volume on a dry basis (ppmvd) when corrected to 15% oxygen in the stack gas.

In order to distinguish between a peaking station and a baseload station, the Air Pollution Control Program has previously limited the hours of operation of power plants that are strictly designed as peaking stations. The limitation on hours of operation ensures an installation, that is permitted as a peaking station, does not operate continuously as a baseload station. The annual hours of operations that a power plant will operate impacts the conclusions arrived at in a project's Best Available Control Technology (BACT) analysis.

Recent permits issued by the Air Pollution Control Program have limited each turbine to 2,000 hours per year with a limitation of 5,000 hours per year for all the turbines combined. The same limitations apply to the Aquila installation. For record keeping purposes, operational time is considered to be the total number of hours that Aquila has any of the three or combination of the three turbines connected to the utility grid by closure of the generator breaker.

EMISSIONS/CONTROLS EVALUATION

All of the criteria pollutants will be emitted from the operation of these units, with PM_{10}, NO_X, and CO being emitted in amounts greater than significance levels (i.e. greater than de minimis levels). HAP emissions are also expected due to the operation of the turbines, with the main HAP of concern being formaldehyde. Potential emissions of both formaldehyde and VOCs are indirectly limited to their respective de minimis levels by the hours of operation conditions in this permit. The emission factor used to determine formaldehyde emissions will be verified through stack testing. Dry low-NO_X burners will be used to control NO_X emissions from the turbines. The Special Conditions of this permit limits the NO_X emissions to 15 ppmvd on a three-hour rolling average. Good combustion practices will be used to control CO emissions from the turbines. The CO emissions of the turbines are limited to 25 ppmvd on a one-hour rolling average by the Special Conditions of this permit.

The emission factors used to estimate emissions from the Siemens-Westinghouse Model 501D5A turbines for the criteria pollutants were provided by the equipment manufacturer.

Potential emissions of the application represent the potential of the proposed equipment, assuming continuous operation (8760 hours per year). Conditioned potential emissions are based on an annual limit of 2,000 hours for each the three turbines and 6,000 hours for the gas heater. The potential emissions in Table 1 represent the emission rate at 100% loading and ambient conditions of 0.0°F. Emissions from start-up and shutdown are not included in the emission estimates in the table.

Table 1: Emissions Summary (tons per year)

Pollutant	Regulatory *De Minimis* Levels	Existing Potential Emissions	Existing Actual Emissions	Potential Emissions of the Application	Conditioned Potential Based on Hours Limitation	New Installation Conditioned Potential
PM_{10}	15.0	N/A	N/A	154.72	35.47	N/A
SO_x	40.0	N/A	N/A	12.00	2.86	N/A
NO_x	40.0	N/A	N/A	1,075.16	247.42	N/A
VOC	40.0	N/A	N/A	75.13	17.26	N/A
CO	100.0	N/A	N/A	1,090.22	250.53	N/A
Acrolein	0.04*/10.0	N/A	N/A	0.12	0.03	N/A
Formaldehyde	2.0*/10.0	N/A	N/A	13.58	3.10	N/A
PAH	0.01*/10.0	N/A	N/A	0.04	0.01	N/A
Total HAPs	10.0/25.0	N/A	N/A	19.72	4.54	N/A

N/A = Not Applicable
* Threshold level for the HAP of concern.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (8) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required.* Potential emissions of NO_X and CO are above major thresholds. Potential emissions of PM_{10} are above significant levels (i.e. de minimis levels). Potential emissions of all other pollutants are at de minimis levels.

APPLICABLE REQUIREMENTS

South Harper Peaking Facility shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit application.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information,* 10 CSR 10-6.110

  The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of an Emissions Inventory Questionnaire (EIQ) is required April 1 for the previous year's emissions.

- *Operating Permits*, 10 CSR 10-6.065
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-2.070

SPECIFIC REQUIREMENTS

- *Maximum Allowable Emissions of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating*, 10 CSR 10-2.040
- *New Source Performance Regulations*, 10 CSR 10-6.070 – *New Source Performance Standards (NSPS) for Stationary Gas Turbines*, 40 CFR Part 60, Subpart GG.
- *Restriction of Emission of Sulfur Compounds,* 10 CSR 10-6.260
- *Acid Rain Source Permits Required,* 10 CSR 10-6.270
- *Emission Limitations and Emissions Trading of Oxides of Nitrogen*, 10 CSR 10-6.350
- *Restriction of Emission of Particulate Matter From Industrial Processes*, 10 CSR 10-6.400

BACT ANALYSIS

Introduction

Any source subject to Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, Section (8) must conduct a Best Available Control Technology (BACT) analysis on any pollutant emitted in greater than de minimis levels. The BACT requirement is detailed in Section 165(a)(4) of the Clean Air Act, at 40 CFR 52.21 and 10 CSR 10-0.60(8)(B).

A BACT analysis is done on a case by case basis and is performed using a "top-down" method. The following steps detail the top-down approach:

1. Identify all potential control technologies – must be a comprehensive list, it may include technology employed outside the United States and must include the Lowest Achievable Emission Rate (LAER) determinations.
2. Eliminate technically infeasible options – must be well documented and must preclude the successful use of the control option.
3. Rank remaining control technologies – based on control effectiveness, expected emission rate, expected emission reduction, energy impacts, environmental impacts, and economic impacts.

4. Evaluate the most effective controls – based on case by case consideration of energy, environmental, and economic impacts.
5. Select BACT.

The three turbines, gas heater and emergency fire pump being permitted by Aquila are subject to BACT analysis for PM_{10}, NO_X, and CO emissions. Aquila prepared a BACT analysis based on the U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC) database, vendor information, and previous permits for combustion turbines gas heaters and fire pumps issued in the State of Missouri and elsewhere. The BACT determination for the turbines must be at least as stringent as the NSPS for Combustion Turbines set forth in 40 CFR 60. The applicant has proposed emissions well below the NSPS limits. The BACT analysis is summarized, by pollutant, below.

NO_X Control Technologies

The conditioned potential emissions of NO_X resulting from the project permitted herein are significant (i.e. greater than 40.0 tons per year). Therefore, a BACT analysis is required for this pollutant. Table 2 lists the control technologies Aquila evaluated for this review (in order of control achieved) and the emission rates each control technology can attain.

Table 2: NO_X Control Technologies Considered

Control Technology	Equipment	Emission Rate/Control Efficiency Achieved
SCONOX™	Turbines	2 ppmvd
XONON ™	Turbines	3 ppmvd
Selective Catalytic Reduction (SCR)	Turbines	3-9 ppmvd
Selective Non-catalytic Reduction (SNCR)	Turbines	4-10 ppmvd
Dry Low-NO_X Burner	Turbines	9-25 ppmvd
Water/Steam Injection	Turbines	22-42 ppmvd
Low-NOx Burner	Gas Heater	N/D*
Selective Catalytic Reduction (SCR)	Gas Heater	90% C.E.
Ignition Timing Retard (ITR)	Emergency Diesel Fire Pump	N/D*
Selective Catalytic Reduction (SCR)	Emergency Diesel Fire Pump	90% C.E.

*N/D = Not Determined

SCONOX™

The SCONOX™ system is an add-on control device that uses an oxidation/absorption/regeneration cycle across a catalyst bed to achieve back-end reductions of NO_X, CO, and VOC. The system does not require ammonia as a reagent, and involves parallel catalyst beds that are alternately taken off line through means of mechanical dampers for regeneration.

According to Goal Line Technologies, LLC, the SCONOX™ catalyst works by simultaneously oxidizing CO to CO_2, NO to NO_2, and then absorbing NO_2. The NO_2 is absorbed into a potassium carbonate catalyst coating as potassium nitrite (KNO_2) and potassium nitrate (KNO_3). When a catalyst module begins to become loaded with KNO_2 and KNO_2, it is taken off line and isolated from the flue gas stream with mechanical dampers for regeneration.

Once the module has been isolated from the turbine exhaust [contains approximately five percent (5%) oxygen], four percent (4%) hydrogen in an inert carrier gas of nitrogen or steam is introduced. An absence of oxygen is necessary to retain the reducing properties necessary for regeneration. The lower flammability limit for hydrogen is 4%, so it is important that the air seals around the dampers do not leak. Hydrogen reacts with potassium nitrites and nitrates during regeneration to form water (H_2O) and nitrogen (N_2), which is emitted from the stack.

The SCONOX™ system can operate effectively at temperatures ranging from 300°F to 700°F. The gas turbines permitted herein will have an exhaust gas temperature of 950°F to 984°F. The exhaust gas from these turbines would have to be lowered to accommodate this air pollution control system. The SCONOX™ system manufacturer indicates that this technology can be applied to simple cycle turbines. Therefore, this control technology is considered technically feasible for this project.

SCONOX™ is a new technology and has been demonstrated on a 23 MW combined cycle turbine in the State of California. However, it has yet to be demonstrated for long term commercial operation on simple cycle turbines operated as peak power generation units. It is an inherent necessity for peak power generation units to be capable of rapid start-up and shutdown. The unknowns associated with any pollution control system which is the first of its kind, and which has no long term company or operation history, represents a level of risk that would alter the ability to reasonably finance the project. Therefore, SCONOX™ was eliminated as BACT for NO_X for this project.

XONON™

The XONON™ technology replaces traditional flame combustion with flameless catalytic combustion. The XONON™ system utilizes a chemical process versus a flame to combust fuel, thus limiting temperature and NO_X formation. Due to the subsequent low temperature of the process, thermal NO_X is virtually eliminated. This technology designed by Catalytica, Inc. has undergone testing on a 1.5 MW Kawasaki turbine in the State of California, which operates continually in a baseload capacity. NO_X emissions of three ppm or less have been demonstrated. Tests are currently underway to apply this technology to other types and sizes of turbines, but that data is currently unavailable. At this time it is unclear whether this technology, in its current state, could be applied to turbines used to generate peak power, which experiences repeated start-up, shutdowns, and changing load conditions. Therefore, for the purposes of this BACT analysis, the XONON™ system was not considered to be technically feasible.

Selective Catalytic Reduction (SCR)

SCR is a post-combustion control technology in which ammonia is added to the flue gas in the presence of a catalyst. The ammonia and NO_X react to form nitrogen and water. Since the exhaust stream for the turbines permitted herein is between 950°F and 984°F, a high temperature catalyst must be considered. High temperature zeolite catalysts do exist that allow the gases entering the SCR to reach temperatures of 1,050°F and greater. High excess air concentrations and high fuel combustion temperatures create NO_X. Lowering flame temperatures and controlling oxygen-fuel mix ratios at critical points in the combustion process can reduce NO_X formation. The catalyst accelerates the chemical reaction in which the ammonia and NO_X react to form nitrogen and water.

With SCR technology, the percent reduction of NO_X emissions can be increased by adding additional catalyst and ammonia. SCR is considered technically feasible for this application.

The feasibility of SCR was evaluated based upon economic, energy, and environmental impacts. The ammonia that does not react with NO_X passes through the system and is released into the atmosphere. In addition, SCR would cause a loss of energy due to an increase in back pressure on the combustion turbines as a result of the pressure drop across the catalyst bed. Also, the start-up and shutdown requirements of the additional SCR equipment would severely impair the "quick start" capability of the peaking turbine generators thereby eliminating the "spinning reserve" capacity of the peaking units. The use of SCR was estimated to cost $13,776 per ton of NO_X removed. This cost estimate was based upon each turbine operating 2,000 hours per year. Thus, SCR was eliminated as BACT due its cost for the limited number of operational hours being permitted (2,000 hours per turbine per year).

Selective Non-catalytic Reduction (SNCR)

SNCR is a post-combustion NO_X control technology in which a reagent (ammonia or urea) is injected into the exhaust gases in a temperature range between 1,700°F and 2,000°F. The reagent reacts chemically with NO_X forming nitrogen and water. Outside the upper end of this temperature range, the reagent is converted to NO_X. Outside the lower end of this temperature range, the reagent will not react and the reagent is discharged into the atmosphere. The Siemens-Westinghouse Model 501D5A turbines have exhaust temperatures up to approximately 984°F. Thus, in order to reach the temperature range in which SNCR is effective, the exhaust temperature of the turbines would need to be raised. To raise the exhaust temperature, additional fuel would need to be combusted and thereby increasing the NO_X and other criteria pollutant emissions. SNCR has not been applied to any combustion turbines according the RBLC database. Based upon this information, SNCR was eliminated as BACT for this project.

Dry Low-NO_X Combustors

Typically high fuel combustion temperature and high excess air concentrations create NO_X. Lowering the flame temperature and controlling the oxygen-fuel mix ratios at critical points in the combustion process can reduce NO_X formation. Because of their low cost-effectiveness per ton of NO_X reduced, dry low-NO_X technology has been rapidly incorporated into new equipment designs. Dry low-NO_X burners can achieve NO_X emissions at or below 15 ppm. For this project, dry low-NO_X technology is integrated into the design of the Siemens-Westinghouse Model 501D5A turbines and represents the baseline emission of 15 ppm for this turbine.

Water or Steam Injection

This is a combustion control technology that utilizes water or steam for flame quenching to reduce peak flame temperatures and thereby reduce NO_X formation. The injection of water or steam into a gas turbine can increase the power output by increasing the mass throughput, but at the same time reduces the efficiency of the turbine. Typically, water injection can achieve NO_X emission levels of 22 ppm while firing natural gas. Since dry low-NO_X burners are all ready being installed on the turbines and dry low-NO_X burners cannot be used with water or steam injection for additional NO_X control, water injection has been eliminated as BACT for this project.

Selection of NO_X Control Technology for Turbines
For this project, consisting of three stationary gas turbines operating in simple cycle mode for generation of electrical power during peak electricity demand periods and considering the 2,000 hours per year operational limitation, dry low NOx combustors with a NO_X emission limit of 15 ppmvd when corrected to 15% oxygen on a dry basis is considered BACT. This limitation is based on a three hour rolling average, and is not applicable during periods of startup and shut down.

Selection of NO_x Control Technology for Fuel Gas Heater
The RBLC web page does not list information regarding control equipment for gas heaters of this size. The only add-on NO_x control technique available for a unit the size that Aquila intends to install is SCR. The SCR process for removal of NO_x is discussed in the SCR section above. The vendor's removal efficiency for NO_x is 90%. The overall initial capital cost of installing an SCR system on the gas heater is approximately $119,000. On an annual basis, the SCR system would cost $102,900, which results in a cost per ton of NO_x removed of $58,000 while removing only 1.8 tons of NO_x per year. Based on environmental and economic impacts, low- NO_x burners are considered to be BACT.

Selection of NO_x Control Technology for Emergency Diesel Fire Pump
The use of add-on controls has not been documented in the RBLC for emergency fire pumps similar to this unit. However, SCR system vendors have indicated that these controls are available for the fire pump and for a unit of the size Aquila intends to install, 90% removal efficiency can be expected. The overall initial capital cost of installing an SCR system on a fire pump is approximately $131,300. On an annual basis, the SCR system would cost $43,960, which results in a cost per ton of NO_x removed of $189,690, while removing only 0.2 tons of NO_x per year. With such a low amount of NO_x removed at such a high cost per ton, SCR was not selected as BACT. Instead NO_x emissions on these diesel-fired units will be controlled by the use of ignition timing retard (ITR).

CO Control Technology

The conditioned potential emissions of CO resulting from the project permitted herein are significant (i.e., greater than 100.0 tons per year). Therefore, a BACT analysis is required for this pollutant. Table 3 lists the control technology Aquila evaluated for the BACT analysis for CO (in order of control achieved) and the emission rates each control technology can attain.

Table 3: CO Control Technology

Control Technology	Equipment	Controlled CO Emission Level
SCONOX™	Turbines	2 ppm
Oxidation Catalyst	Turbines	2 ppm
Combustion Control	Turbines	25 ppm
Good Combustion Practices	Gas Heater, Emergency Fire Pump	N/D*
Oxidation Catalyst	Gas Heater, Emergency Fire Pump	N/D*

*N/D = Not Determined

SCONOX™

SCONOX™

The SCONOX™ system was described in the BACT analysis for NO_X. In addition to controlling NO_X, the SCONOX™ system also controls VOC and CO. In analyzing the feasibility of the SCONOX™ system for this project, the review took into account the fact SCONOX™ controls all three pollutants. The reasons as to why SCONOX™ was eliminated as BACT for NO_X also result in the elimination of SCONOX™ as BACT for CO.

Oxidation Catalysts

Oxidation catalysts are a post-combustion technology used to oxidize CO to Carbon Dioxide (CO_2) without the introduction of additional chemicals. The activation energy for this reaction is lowered through the use of a catalyst and the oxidation then proceeds by utilizing excess air present in the turbine exhaust. An oxidation catalyst is usually platinum based, and operates in an optimal temperature range between 700°F and 1,100°F. Catalyst sintering can occur at higher temperatures resulting in permanent damage to the catalyst. Also, the addition of a catalyst bed onto the turbine exhaust will create a pressure drop, resulting in back pressure on the turbine. This reduces the turbine's efficiency and translates into energy costs. Conversion efficiencies for CO up to 95% are possible, and catalysts are available that will effectively handle the temperature range at which these turbines will operate.

Oxidation catalyst has not typically been required as BACT for natural gas combustion turbines operated in simple cycle mode and used exclusively for peaking service. The Missouri Department of Natural Resources acknowledges that oxidation catalyst has not been widely required as BACT in previous determinations. However, the use of oxidation catalyst is increasing and sources are voluntarily installing oxidation catalyst. The use of an Oxidation Catalyst was estimated to cost $8,618 per ton of CO removed. After evaluating the environmental, economical, and energy impacts for this permit application and considering the limited number of hours of operation to be permitted (2,000 hours per year per turbine), oxidation catalyst was eliminated as BACT for CO control.

Combustion Control

Good combustion practices include turbine design and operational elements to control the amount and distribution of excess air in the turbine combustion section and turbine exhaust gas. Good combustion practices applied to the Siemens Westinghouse Model 501D5A turbines can achieve CO emissions of 25 ppmv when corrected to 15% oxygen on a dry basis, during steady state operation.

Selection of CO Control Technology for Turbines

The control technologies were evaluated considering control effectiveness, expected emission rate, expected emission reduction, energy impacts, environmental impacts, economic impacts, and the limited number of hours of operation (2,000 hours per turbine). For this project, consisting of three stationary gas turbines operating in simple cycle mode for generation of electrical power during peak electricity demand periods and considering the 2,000 hours per year per turbine operational limitation, a CO emission limit of 25 ppmvd when corrected to 15% oxygen on a dry basis using combustion control is considered BACT. This limitation is based on a three-hour rolling average, and is not applicable during periods of start-up and shutdown.

Selection of CO Control Technology for Gas Heater
The RBLC does not list gas heater BACT determinations for control of CO emissions from gas heaters, however, one control vendor has indicated that a CO catalyst system may be used on a gas heater this size. The CO catalyst system is an add-on control that converts CO to CO_2 by use of a catalyst. The system is further described in the Oxidation Catalysts section above. On an annual basis, only 3.2 tons per year of CO would be removed at a cost of close to $12,700 per ton. This cost is considered to be economically unfeasible, therefore, add-on controls for CO emissions from the gas heater are not considered BACT. BACT for CO emissions from the gas heater is good combustion practices.

Selection of CO Control Technology for Emergency Diesel Fire Pump
The RBLC does not list CO add-on controls for emergency engines of this size. CO catalyst systems are available from vendors, however. A discussion of CO catalyst systems can be found in the Oxidation Catalysts section above. Because only 0.019 tons of CO would be removed, the cost per ton is over $756,000. These costs are considered economically infeasible, therefore, add-on controls for the emergency diesel fire pump are not considered for BACT. BACT for the fire pump is good combustion practices.

PM_{10} Control Technology

The conditioned potential emissions of PM_{10} resulting from the project permitted herein are significant (i.e. greater than 15.0 tons per year). Therefore, a BACT analysis is required for this pollutant.

PM_{10} emissions resulting from the combustion of natural gas are due to oxidation of sulfur contained in the fuel. Due to its low ash and sulfur content, natural gas combustion generates inherently low PM_{10} emissions. Available technologies used for controlling PM_{10} are centrifugal (cyclone) collectors, electrostatic precipitators, wet scrubbers, and fabric filters (baghouse).

While all of these post-process technologies would be technically feasible for controlling PM_{10} emissions from combustion turbines, none of the previously described control equipment has been applied to combustion turbines exclusively burning natural gas since exhaust gas PM concentrations are inherently low. Combustion turbines operate with a significant amount of excess air that generates large exhaust gas flow rates. Aquila's combustion turbines will generate low PM emissions in comparison to other fuels due to the low ash and sulfur content of natural gas. Exhaust stream PM_{10} concentrations of such low magnitude are not amenable to control using available technologies since removal efficiencies would be unreasonably low and cost excessive. Along the same vein, units as small as the gas heater and emergency fire pump are not designed. Because post-process stack controls for PM/PM_{10} are not economical for combustion turbines used exclusively in simple cycle peaking service, it was determined that BACT for PM_{10} is the use of good combustion practices for all equipment permitted in this project.

AMBIENT AIR QUALITY IMPACT ANALYSIS

Aquila submitted a refined modeling analysis that estimates the ambient impact of NO_X, CO, PM_{10}, and formaldehyde. This analysis was performed with the Industrial Source Complex Short Term (ISCST3) dispersion model. This is an EPA approved model that is appropriate for the refined modeling required for major source review.

Emissions are generated from three combustion turbines, the natural gas heater, and the emergency diesel fire pump. The emission rate from the turbine stack will depend on the mode of operation. The turbines were modeled for operation at the ambient temperature, which corresponds to the maximum emission rate at 75%, 85%, and 100% loads. The maximum emission rate for each load occurs at an ambient temperature of 0.0°F. The following tables contain the release parameters and the emissions rates for emission points from Aquila that were considered in the modeling.

Table 4: Aquila Modeled Stack Parameters

Unit	Source ID	Operating Loads	Stack Height (ft)	Stack Diameter (ft)	Stack Temperature (K)*	Stack Exit Velocity (ft/s)*
Turbine Number 1	EP-01	100% 85% 75%	55	24	786 (766) 745 (725) 727 (708)	58.1 (56.6) 51.8 (50.5) 47.7 (46.5)
Turbine Number 2	EP-02	100% 85% 75%	55	24	786 745 727	58.1 51.8 47.7
Turbine Number 3	EP-03	100% 85% 75%	55	24	786 745 727	58.1 51.8 47.7
Gas Heater	EP-04	100%	43	2.5	616	31.7
Fire Pump	EP-05	100%	17	0.5	804	0.33**

*Temperature and exit velocity of Turbine 1 are less when wastewater is injected.
**Rain cap on end of stack.

Table 5: Aquila Modeled Emission Rates

Unit	Operating Loads	CO (lb/hr)	NOx (Note 1) (lb/hr)	PM_{10} (lb/hr)	Formaldehyde (lb/hr)
Turbine Number 1	100% 85% 75%	82.70 71.00 63.00	18.61 15.96 14.16	All Loads 10.00 (15.25)	1.03 0.88 0.79
Turbine Number 2	100% 85% 75%	82.70 71.00 63.00	18.61 15.96 14.16	All Loads 10.00	1.03 0.88 0.79
Turbine Number 3	100% 85% 75%	82.70 71.00 63.00	18.61 15.96 14.16	All Loads 10.00	1.03 0.88 0.79
Gas Heater	100%	0.80	0.31	0.07	7.21×10^{-4}
Fire Pump	100%	0.17	2.06	0.04	3.67×10^{-5}

Note 1: Emission rate based on 2,000 hours of operation per year per turbine, 6,000 hours per year for the gas heater and 250 hours per year for the fire pump.
Note 2: Emission rate in parenthesis indicates use of wastewater injection.

In each case considered in the modeling, the significance levels were not exceeded for NO_X, CO, or PM_{10}. The modeling also demonstrated that the 24-hour and annual Risk Assessment Level (RAL) for formaldehyde would not be exceeded. For the criteria pollutants (NO_X, CO, PM_{10}), the significance level is the trigger point for an increment consumption analysis and an overall ambient impact analysis. The demonstration that the significance levels are not exceeded is the only modeling requirement for this review. The insignificant modeled impacts also eliminate the need for pre-construction monitoring for NO_X, CO, or PM_{10}.

Upon further internal review, the Special Conditions contained in this permit were revised as described below to more accurately represent the data used in the modeling analysis. Load-based limits for the turbines were found to be redundant, when coupled with a concentration-based limit and an hourly limit. The pound per hour emission limitations that were part of the draft permit have been removed to minimize record keeping while preserving a cap on emissions. The hourly limits, paired with the concentration limits, insures that the annual emissions shall not exceed the level that was used in the ambient air quality analysis. The emissions used in the modeling analysis assumed the 15 ppmvd for NO_x and 25 ppmvd for CO at base load, providing the worst-case scenario. Finally, the CO concentration limitation has been revised from a three hour to a one hour rolling average to insure that the hourly CO standards are not violated.

Additionally, a condition was added limiting the emergency fire pump to a maximum of 250 hours of operation in any consecutive 12-month period. No annual emission limits were placed on the fire pump or the gas heater, however, for NO_x, CO or PM_{10}. Both the hourly and annual potential emission rates are relatively insignificant in comparison to the turbines. Additional limits and record keeping would be burdensome and provide no additional benefit to the environment.

The following table lists the maximum modeled impact as well as the significance level or RAL for NO_X, CO, PM_{10} and formaldehyde in units of micrograms per cubic meter ($\mu g/m^3$). For a detailed description of the modeling analysis, along with a discussion of additional impact analyses conducted, please see the attached memorandum, *Revised Aquila – Cass County Air Dispersion Modeling*, dated October 19, 2004.

Table 6: Maximum Modeled Concentrations

Pollutant	Maximum Modeled Impact ($\mu g/m^3$)	Significance Level/RAL ($\mu g/m^3$)	Time Period
NO_X	0.39	1.0	Annual
CO	76.34	2,000	1-hour
	24.83	500	8-hour
PM_{10}	2.59	5.0	24-hour
	0.05	1.0	Annual
Formaldehyde (CAS Number: 50-00-0)	0.024	0.8	24-hour
	0.0005	0.08	Annual

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (8), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

Lina Klein
Environmental Engineer

12/28/04
Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated March 26, 2004, received March 29, 2004, designating Aquila, Incorporated as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Kansas City Regional Office Site Survey, dated March 1, 2004.
- Stack tests submitted along with the application, dated March 26, 2004.
- Notification of facility name change, dated April 13, 2004.
- Revised permit application for new site, received September 13, 2004.

ATTACHMENT A: Operational Schedule of the Three Siemens-Westinghouse Model 501D5A Turbines

South Harper Peaking Facility
Cass County, S29/32, T45N, R32W
Installation ID Number: 037-0063
Project Number: 2004-03-143
Permit Number: _____

This sheet covers the period from _____ (month/year) to _____ (month/year).

Copy this sheet as needed.

Hours that Aquila is Producing Electricity = Electricity Hours		
A. Total Electricity Hours for this Month	(Note 1)	
B. 12-Month Total Electricity Hours From Previous Month's Worksheet	(Note 2)	
C. Monthly Total Electricity Hours From Previous Year's Worksheet	(Note 3)	
D. Current 12-Month Total Electricity Hours	(Note 4)	

Note 1: Total number of hours that this installation had any of the three or combination of the three turbines (Emission Points EP-01, EP-02, EP-03) connected to the utility grid by closure of the generator breaker.
Note 2: Running 12-month total of electricity hours from previous month's worksheet.
Note 3: Electricity hours reported for this month in the last calendar year.
Note 4: Amount reported in Note 2 minus amount reported in Note 3 plus amount reported in Note 1 (D = B – C + A). Less than 5,000 hours indicates compliance.

APPENDIX 7

ATTACHMENT B: Individual Turbine Operational Schedule

South Harper Peaking Facility
Cass County, S29/32, T45N, R32W
Installation ID Number: 037-0063
Project Number: 2004-03-143
Permit Number: _____

This sheet covers the period from _____ (month/year) to _____ (month/year).

This sheet is for Turbine Emission Point EP-_____

Copy this sheet as needed.

Hours that a Turbine is Burning Natural Gas = Unit Gas Hours		
A. Total Unit Gas Hours for this Month	(Note 1)	
B. 12-Month Total Unit Gas Hours From Previous Month's Worksheet	(Note 2)	
C. Monthly Total Unit Gas Hours From Previous Year's Worksheet	(Note 3)	
D. Current 12-Month Total Unit Gas Hours	(Note 4)	

Note 1: Total number of hours that this turbine was burning natural gas for this month (unit gas hours).
Note 2: Running 12-month total of unit gas hours from previous month's worksheet.
Note 3: Unit gas hours reported for this month in the last calendar year.
Note 4: Amount reported in Note 2 minus amount reported in Note 3 plus amount reported in Note 1. ($D = B - C + A$). Less than 2,000 hours indicates compliance.

APPENDIX 7

ATTACHMENT C: Gas Heater Operational Schedule

South Harper Peaking Facility
Cass County, S29/32, T45N, R32W
Installation ID Number: 037-0063
Project Number: 2004-03-143
Permit Number: _____

This sheet covers the period from _____ (month/year) to _____ (month/year).

This sheet is for Turbine Emission Point EP-_____

Copy this sheet as needed.

A. Total Hours of Operation for this Month	(Note 1)	
B. 12-Month Total Hours of Operation From Previous Month's Worksheet	(Note 2)	
C. Monthly Total Hours of Operation From Previous Year's Worksheet	(Note 3)	
D. Current 12-Month Total Hours of Operation	(Note 4)	

Note 1: Total number of hours that the gas heater was operating for this month.
Note 2: Running 12-month total of operational hours from previous month's worksheet.
Note 3: Hours of operation reported for this month in the last calendar year.
Note 4: Amount reported in Note 2 minus amount reported in Note 3 plus amount reported in Note 1. (D = B – C + A)
Less than 6,000 hours indicates compliance.

APPENDIX 7

ATTACHMENT D: Fire Pump Operational Schedule

South Harper Peaking Facility
Cass County, S29/32, T45N, R32W
Installation ID Number: 037-0063
Project Number: 2004-03-143
Permit Number: _____

This sheet covers the period from _____ to _____.
(month/year) (month/year)

This sheet is for Emission Point EP-_____

Copy this sheet as needed.

A. Total Hours of Operation for this Month	(Note 1)	
B. 12-Month Total Hours of Operation From Previous Month's Worksheet	(Note 2)	
C. Monthly Total Hours of Operation From Previous Year's Worksheet	(Note 3)	
D. Current 12-Month Total Hours of Operation	(Note 4)	

Note 1: Total number of hours that the fire pump was operating for this month.
Note 2: Running 12-month total of operational hours from previous month's worksheet.
Note 3: Hours of operation reported for this month in the last calendar year.
Note 4: Amount reported in Note 2 minus amount reported in Note 3 plus amount reported in Note 1. (D = B – C + A)
Less than 250 hours indicates compliance.

APPENDIX 7