

Sent via email

April 25, 2003

Ms. Carol A. Stemrich
Public Service Commission
P.O. Box 7854
Madison, Wisconsin 53707

RE: Docket 05-CE-121
Comments on Air Quality Analysis
March 2003 Environmental Impact Statement
West Campus Cogeneration Facility
Madison, Wisconsin

Dear Ms. Stemrich:

The Public Service Commission released a draft environmental impact statement (EIS) for the proposed 150 MW West Campus Cogeneration Facility. I have reviewed the EIS and the supporting February 11, 2003 Wisconsin Department of Natural Resources (WDNR) modeling memorandum and provide the following comments and questions on the modeling analysis. The purpose of the comments is to encourage the WDNR to complete the best possible air quality analysis for this project. A thorough review is an important step in protecting the future air quality in Dane County.

Urban air quality throughout the country is in decline due to an increasing number of emission sources and rising urban temperatures. National Ambient Air Quality Standards (NAAQS) were established by the USEPA to protect human health. In the Madison area, ozone levels have reached 99% of the 8-hour standard. The ambient background concentration of PM_{2.5} is 88% of the annual standard. The WDNR air modeling analysis for the proposed WCCF predicted a maximum SO₂ concentration of 99% of the 24-hour standard. These are all indications of deteriorating air quality in Dane County.

In 2001, total actual particulate matter emissions from stationary sources in Madison were about 800 tons. MGE has asked the WDNR to approve an additional 220 tons of particulate matter. Although actual MGE emissions will be less than the predicted maximum, the proposed facility will significantly increase the amount of air pollution in our city.

With five power plants already located in the Isthmus and campus area, and the continual increase in pollution due to automobile traffic, I hope that the PSC will approve the power plant alternative that best serve the needs of the University and minimizes the impact to our urban air quality.

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Thank you for considering these comments and questions as you continue your review of this project.

Sincerely,

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Enclosure

**Comments on March 2003 Draft Environmental Impact Statement
for the Proposed West Campus Cogeneration Facility
April 25, 2003**

SO₂ NAAQS Analysis

An SO₂ NAAQS analysis was completed for the proposed facility. For the 24-hour averaging period, the predicted impacts were 98.7% of the standard. This evaluation was based on a background concentration of 35.2 ug/m³ measured at Green Bay East High School in Brown County. The results are shown below:

Maximum impact	325.3 ug/m ³
Background (Brown)	<u>35.2 ug/m³</u>
Total	360.5 ug/m ³
NAAQS	365 ug/m ³
% of Standard	98.7%

In 1998, the WDNR completed a similar NAAQS analysis for the Walnut Street Heating Plant in support of Permit #98-POY-099. As reported in the preliminary determination, this analysis used a background concentration of 40.8 ug/m³ from a monitor at East High School in Madison, Wisconsin. If the background concentration measured at the Madison monitor was used in the WCCF analysis rather than the Brown County monitor, the NAAQS analysis would predict an exceedence of the NAAQS for SO₂ as shown below:

Maximum impact	325.3 ug/m ³
Background (Madison)	<u>40.8 ug/m³</u>
Total	366.1 ug/m ³
NAAQS	365 ug/m ³
% of Standard	101.6%

Please explain why the Brown County monitor is more representative of the campus area than the Madison monitor used in the 1998 and other WDNR air quality analyses.

The WDNR document, *Wisconsin 1997 Air Quality Report*, reports a goal of 15% precision and 20% accuracy for the monitoring network. **Please explain why the predicted impact of 98.7% of the NAAQS is considered in compliance with the standard based on the use of the Brown County monitor and the stated level of monitor accuracy reported by the WDNR.**

Annualized NO_x Emission Rates

For the air quality analysis, NO_x emissions from the turbines were based on an annual average emission rate. **Please provide the supporting calculation. If the calculation included assumptions regarding the operating conditions of the turbines, such as number of start-up and shutdown periods per year and fuel use, please provide these assumptions.**

Facility HAP Emissions

Table 6-9 of the March 2003 EIS summarizes HAP emissions from the facility. The fire pump is a source of HAP emissions. **Please explain why this source was not included in Table 6-9.**

Great Lakes Agreement, NR 445 Watch List Pollutants

The facility has the potential to emit acetaldehyde covered under the Great Lakes Agreement or under the ch. NR 445, Watch List. For the Badger Generating facility in Pleasant Prairie, an air quality impact analysis was completed by the WDNR for this pollutant. **Please explain why a similar analysis was not completed for the proposed WCCF project.**

WCCF Stack Parameters

Based on the WDNR modeling files, the proposed WCCF cooling tower air velocities range from 1600 to 3069 ft/min. The BT², Inc. construction permit application (page 38) indicated that the tower velocities range from 462 to 695 ft/min. Generally, lower exhaust velocities increase predicted pollutant impacts. **Please explain why higher velocities were used in the WDNR analysis.**

Based on the WDNR modeling files, the cooling tower exhaust temperature is 366 degrees K. The turbine exhaust temperature is only slightly higher at 377 degrees K. Because the turbines create the heat that is later removed in the cooling towers, it seems likely that the cooling tower exhaust temperature would be significantly lower than the turbine exhaust temperature. Generally, lower temperatures would increase the predicted pollutant ambient impacts. **Please confirm that the temperature of the cooling towers and turbine exhaust are correct.**

Particulate emissions from the cooling towers are a function of circulating water flow rate. MGE consultant s TRC and BT², Inc. provided different estimates of drift rate from the cooling towers.

TRC estimated maximum drift of 1872 gallons/day for the turbine cooling towers. This is equivalent to 1.46 lbs/hr of PM emissions. The TRC discussion of drift was included in Appendix H of the air quality permit application. BT² estimated drift at a much lower rate of 78.55 gallons per day with PM emissions of 0.0612 lbs/hr. **Please provide an explanation of the correct PM emission rate from the cooling towers.**

PSD and NAAQS Regional Inventories

The PSD regional inventory should include minor and major sources constructed after the baseline date for each pollutant with impacts greater than their respective significant impact levels (SIL). The NAAQS regional inventory should include point sources and quantifiable fugitive emissions which could impact the SIA.

The Walnut Heating Plant Cooling Towers should be included in the NAAQS and PSD inventories. The Charter Street Heating Plant Cooling Towers and other university sources should be include in the NAAQS inventory. The University of Wisconsin sources described below were not included in the regional inventories.

Cooling Towers

The proposed WCCF cooling towers were included in the NAAQS and PSD increment analyses for PM. Emission calculations for the towers were provided by BT², Inc. in their June 2002 construction permit application.

The Walnut Street Heating Plant also includes cooling towers. These emission sources were not included in the NAAQS or PSD increment analyses. Similarly, PM emissions from the Charter Street Heating Plant cooling towers were not included in either the NAAQS or increment analyses.

PM emissions from the cooling towers are significant. Estimated emissions for the Walnut cooling towers are as follows:

$3,180,000 \text{ gallons per hour} \times 0.02\% \text{ drift (USEPA AP42 emission factor)} \times 0.0187 \text{ lbs/gallon (BT2 report)} = 11.9 \text{ lbs/hr.}$

The capacity of the cooling towers was provided by University of Wisconsin staff. The USEPA provides a conservative emission factor drift factor of 0.02% for cooling towers. University of Wisconsin staff have indicated that drift is a problem when the towers are over pumped. Therefore, the conservative emission rate from the cooling towers is warranted.

The WDNR prepared a document entitled The Environmental Analysis and Decision of the Need for an Environmental Impact Statement in support of Air Quality Permit #98-POY-099 for the Walnut Street Heating Plant. This document indicates that the steam supply capacity and water handling systems were upgraded as part of the Walnut Street modification project. This project was completed after the PSD baseline date. As a result, PM emissions from the cooling towers consume increment and should be included in the increment analysis for the proposed WCCF project. Similarly, if modifications were made to the Charter Street Heating Plant which would increase emissions from the cooling tower after the PSD baseline date, then these emissions should also be included in the WCCF increment analysis.

The USEPA has provided a memorandum in support of including cooling tower particulate emissions in PSD increment analysis. A copy of this memorandum is provided as an Attachment

The dispersion characteristics of the PM emissions from the cooling towers are different from those of the turbine stacks. The location of the predicted maximum impact from the cooling towers is likely to occur at a different receptor than the turbine emissions. Also, emissions from the cooling towers are unlikely to be included in the background concentrations measured at the Rodefild Landfill monitoring site due to the large distance between the towers and the monitoring site.

Please explain why PM emissions from the proposed WCCF cooling towers were included in the NAAQS and increment analyses, but emissions from the Walnut and Charter Street Heating Plant cooling towers were not included.

Other University of Wisconsin Campus Sources

A recent NAAQS analysis was conducted by the WDNR for University of Wisconsin draft operation permit #113103430-P01A. This analysis included 33 emission sources on campus. The NAAQS analysis for the proposed WCCF included only seven campus sources. The following table provides a comparison of sources included in each analysis.

The SO₂ NAAQS analysis for the proposed WCCF project predicted impacts of 98.7% of the SO₂ 24-hour standard. Many University of Wisconsin sources of SO₂ were omitted from the analysis. These sources were most likely within the significant impact area (SIA) for this pollutant.

Please explain why the campus sources identified in the following table were excluded from the WCCF NAAQS analysis.

Comparison of UW Campus Sources included in Recent NAAQS Analysis						
<i>STACK ID</i>	<i>2/18/03 NAAQS Analysis for UW Operating Permit</i>			<i>2/11/03 NAAQS Analysis for Proposed WCCF</i>		
	<i>PM (#/HR)</i>	<i>SO₂ (#/HR)</i>	<i>NO_x (#/HR)</i>	<i>PM (#/HR)</i>	<i>SO₂ (#/HR)</i>	<i>NO_x (#/HR)</i>
HERRICK	1.73	0.54	0.89	1.73	0.54	0.89
SLOH	1.09	0.09	0.15	1.09	0.09	0.15
SMI	2.54	0.22	0.36	2.54	0.22	0.36
WALNUT	23.17	577.7	240.3	23.17	577.7	240.2
WALNUT GENERATOR	1.173	6.78	0.918	0.31	6.78	0.92
CHARTER	133.6	3300.8	457.8	133.6	3300.8	457.8
CHARTER GENERATOR	3.830	3.58	1.250	3.83	3.58	7.47
BUS	0.483	2.79	0.378	Not Included	Not Included	Not Included
COM	0.164	0.95	0.129	Not Included	Not Included	Not Included
MED	0.188	1.08	0.147	Not Included	Not Included	Not Included
MEM	0.141	0.81	0.110	Not Included	Not Included	Not Included

Comparison of UW Campus Sources included in Recent NAAQS Analysis						
<i>STACK ID</i>	<i>2/18/03 NAAQS Analysis for UW Operating Permit</i>			<i>2/11/03 NAAQS Analysis for Proposed WCCF</i>		
	<i>PM (#/HR)</i>	<i>SO2 (#/HR)</i>	<i>NO_x (#/HR)</i>	<i>PM (#/HR)</i>	<i>SO2 (#/HR)</i>	<i>NO_x (#/HR)</i>
VIL	0.094	0.54	0.073	Not Included	Not Included	Not Included
KOH	1.408	8.13	1.102	Not Included	Not Included	Not Included
ENG	0.141	0.81	0.110	Not Included	Not Included	Not Included
LIV	0.282	1.63	0.220	Not Included	Not Included	Not Included
CHM	0.469	2.71	0.367	Not Included	Not Included	Not Included
FLU	0.249	1.44	0.195	Not Included	Not Included	Not Included
PRI	0.469	2.71	0.367	Not Included	Not Included	Not Included
BIO	0.657	2.28	0.514	Not Included	Not Included	Not Included
LAW	0.216	1.25	0.169	Not Included	Not Included	Not Included
RED	0.352	2.03	0.275	Not Included	Not Included	Not Included
WAI	0.563	3.25	0.441	Not Included	Not Included	Not Included
PHA	0.938	5.42	0.735	Not Included	Not Included	Not Included
HO1	0.235	1.36	0.184	Not Included	Not Included	Not Included
HO2	0.422	2.44	0.331	Not Included	Not Included	Not Included
HO3	0.422	2.44	0.331	Not Included	Not Included	Not Included
HO4	0.422	2.44	0.331	Not Included	Not Included	Not Included
HO5	0.366	2.11	0.286	Not Included	Not Included	Not Included
HO6	0.328	1.90	0.257	Not Included	Not Included	Not Included
HO7	0.328	1.90	0.257	Not Included	Not Included	Not Included
HO8	0.563	3.25	0.441	Not Included	Not Included	Not Included
HO9	0.469	2.71	0.367	Not Included	Not Included	Not Included

Comparison of UW Campus Sources included in Recent NAAQS Analysis						
<i>STACK ID</i>	<i>2/18/03 NAAQS Analysis for UW Operating Permit</i>			<i>2/11/03 NAAQS Analysis for Proposed WCCF</i>		
	<i>PM (#/HR)</i>	<i>SO2 (#/HR)</i>	<i>NO_x (#/HR)</i>	<i>PM (#/HR)</i>	<i>SO2 (#/HR)</i>	<i>NO_x (#/HR)</i>
HO0	1.408	8.13	1.102	Not Included	Not Included	Not Included
Total	179	3956	711	166	3890	708

Turbine/Boiler Load Analysis

The WDNR modeling memorandum included a load analysis for WCCF, which predicts pollutant concentrations based on variable turbine operating conditions.

The WDNR did not indicate that a load analysis was conducted for the Walnut Street Heating Plant and Charter Street Heating plants..

Because load analyses for power generating facilities have been shown to have a significant impact on ambient air quality predictions, please explain why a load analysis was not included for the Walnut Street and Charter Street Heating Plants.

The NAAQS analysis predicted high SO₂ impacts for the 3-hour and 24-hour averaging periods. It is my understanding that the WDNR modeled steady state rates from the University of Wisconsin heating plants. Startup and shutdown emissions may be important in determining compliance with the short-term averaging periods.

Please provide the worst-case criteria pollutant emission rates and duration for start-up and shutdown events for the Walnut Street and Charter Street Heating plants.

If emissions during these events are higher than those modeled for the WCCF analysis, please revise the analysis to include the higher rates.

PM_{2.5} Analysis

Recently the USEPA implemented a new NAAQS for PM_{2.5}. This standard reflects hundreds of scientific studies demonstrating the serious health affects associated with emissions of this pollutant. The WDNR does not currently require compliance with this standard because the USEPA has yet to complete designations and put forth implementation guidance.

The WDNR did not conduct a NAAQS analysis for the PM_{2.5}. A PM_{2.5} analysis conducted by MGE included only emissions from WCCF, and did not include regional sources required for a NAAQS analysis. Furthermore, it is my understanding that the MGE analysis used stack parameters and

building heights which have been subsequently revised. No emission calculations were provided for PM_{2.5}. A worst case load analysis was not completed for this pollutant as was completed for PM₁₀.

For the WCCF project, it is requested that the WDNR conduct a NAAQS analysis for PM_{2.5}. This analysis should include all regional sources required for a NAAQS analysis. It is important to complete this analysis so residents of the area understand the health implications of this pollutant.

Good Engineering Practice (GEP) Stack Height for Walnut Street Heating Plant

Section 123 of the Clean Air Act limits the use of stack heights above Good Engineering Practice (GEP) to meet the NAAQS or PSD increments. GEP stack height means the greater of:

- (1) Sixty-five meters (213 feet)
- (2) For stacks in existence on January 12, 1979, $GEP = 2.5H$, where H = Height of nearby structure(s).
- (3) For all other stacks, $GEP = H + 1.5 L$, where H = Height of nearby structure(s) measured from the ground-level elevation at the base of the stack, and L = Height or projected width, whichever is less, of nearby structure(s).

The Walnut Street Heating Plant boiler stack is 250 feet, which exceeds GEP. It was constructed in 1974. In 1998, the boiler was replaced as part of a major modification under the PSD regulations. The Charter Street Heating Plant boiler stack is also 250 feet.

For the WCCF increment and NAAQS analyses the full stack height of 250 feet was modeled for both the Walnut and Charter Street Heating Plant stacks, rather than a lesser height representing GEP.

We request that the WDNR provide an explanation for modeling emissions from the Walnut and Charter Street Heating Plant using a stack height of 250 feet.

PSD Source Definition

For the purposes of PSD and air toxics compliance, a stationary source is any building, structure, facility, or installation which emits or may emit any air pollutant subject to regulation under the Clean Air Act. "Building, structure, facility, or installation" means all the pollutant-emitting activities which (1) belong to the same industrial grouping, (2) are located on one or more contiguous or adjacent properties and (3) are under common ownership or control.

The proposed WCCF and the Walnut Street Heating Plant are under the same industrial grouping and are located on adjacent properties. The State of Wisconsin will have common ownership and control of both facilities. Therefore, these facilities should be considered a single source for PSD permitting purposes and evaluation of HAP compliance under NR 445, Wis. Adm. Code.

Common ownership and control has not been defined by the USEPA, rather determinations are made on case by case determinations. The University of Wisconsin will have ownership and/or control of the proposed WCCF based on the following criteria:

1. University of Wisconsin has a degree of influence over production levels at the WCCF based on operational decisions at the Walnut Street and Charter Street Heating Plants.
2. University of Wisconsin has ownership interests in the WCCF facilities.
3. WCCF will provide steam and chilled water to the University of Wisconsin. This facility as designed could not be built off campus to serve the same purpose. There is a dependency relationship between the two entities, such that one would not exist but for the other.
4. University of Wisconsin has control of the facility through contract. Control is the possession of the power to direct or cause the direction of the management and policies whether through the ownership of voting shares, contract or otherwise.
5. There is a dependent buyer-seller relationship based on contractual agreements.
6. MGE is dependent on University of Wisconsin for purchase and use of its steam and chilled water production.

To further demonstrate that the WCCF project is under common ownership and control of University of Wisconsin, an open records request was made for copies of the Design and Construction Agreement, Operating and Maintenance Agreement, and Joint Ownership Agreements. This request was denied by DOA. We believe that the WDNR should review these documents to determine source ownership and control.

Please provide an explanation for why the proposed WCCF is a separate facility from the University of Wisconsin power plants and should not be considered a single source for PSD and NR 445 compliance purposes.

To clarify the issue of common control of the two plants, please respond to the following questions:

1. **Who is responsible for determining the amount of steam needed for the University of Wisconsin on a daily basis?**
2. **Who will determine if the steam should be generated from the WCCF or the Walnut Street Heating facility? Is there a contract that defines this relationship?**
3. **Will WCCF be required to provide steam to the University of Wisconsin?**
4. **If the Walnut Street or Charter Street facilities chose to limit steam production, would WCCF be required to increase steam generation to meet required steam demand of the University of Wisconsin?**
5. **Will decisions made by the University of Wisconsin, e.g. more steam is needed from WCCF, influence operation of the WCCF such as an increase use of the duct burners?**

Sulfuric Acid Mist Emissions

SO₂ emissions are formed from oxidation of sulfur in the fuel. A portion of the SO₂ emissions are further oxidized to SO₃ which can react with moisture in the flue gas to form H₂SO₄.

A review of sulfuric acid mist emissions was conducted by the WDNR because emissions of this pollutant exceeded the PSD significant emission threshold of 7 TPY. The air quality analysis indicated that facility emissions would comply with the acceptable ambient concentration (AAC) for this pollutant. However, the analysis included only the WCCF sources of this pollutant. Emissions from other sources such as the those from the Walnut Street and Charter Street Heating Plants were not considered.

The AAC are health based standards. No analysis has been completed to determine the combined health effects of sulfuric acid mist emissions from both the proposed facility and University of Wisconsin Heating Plants.

If the proposed WCCF facility and the two University of Wisconsin heating plants are considered one source under the PSD rules, sulfuric acid mist emissions from all three plants should be included in a facility-wide demonstration of compliance with the AAC.

Please explain why emissions from the Walnut Street and Charter Street Heating Plants were not included in the air quality analysis for sulfuric acid mist.

Use of Fuel Oil as Backup Fuel

According to MGE, the turbines are designed to operate primarily on natural gas. Fuel oil would serve only as a backup fuel. However, MGE has not proposed limitations to the amount of fuel oil used at the facility. Combustion of fuel oil will double or triple emissions of air pollutants.

Please provide answers to the following questions:

- 1. Under what circumstances would fuel oil be used instead of natural gas?**
- 2. What is the maximum number of days per year that fuel oil would be used at the facility?**
- 3. Can MGE choose to burn fuel oil solely for economic reasons, e.g., the price of fuel oil is lower than natural gas?**

Ozone Impacts

The EIS states that ozone is not expected to increase in the vicinity of the proposed project and may actually be reduced near the plant. No description of plant emissions on ozone concentrations further downwind (e.g. 20 miles) of the plant is provided. The absence of this information is misleading.

To clarify the effect of plant emissions on ozone concentrations, please provide a description of the effect these emissions may have on ozone formation further downwind of the plant.

Formaldehyde Compliance Analysis

Formaldehyde is a Title III hazardous air pollutant. Emissions of this pollutant from the proposed facility are 18.7 tons per year. These emissions exceed the Title III major source threshold of 10 tons per year. A case-by-case MACT determination is required for formaldehyde.

For the Badger Generating facility in Pleasant Prairie, also a major source of formaldehyde, a risk assessment was completed by the WDNR. **Please explain why a similar analysis was not completed for the proposed WCCF project.**

If the WDNR determines that the proposed facility and the University of Wisconsin heating plants are a single source, please include all sources of formaldehyde from the combined facility in the risk assessment.

Noise

At a recent meeting with the residents of the Village of Shorewood Hills, MGE indicated that noise from the facility would be below existing background levels.

Current background noise levels in the village are unacceptable due to the University of Wisconsin Pharmacy Building ventilation system. The University of Wisconsin has indicated that they will try to fix the problem and reduce the noise from the building fans. This should reduce background noise levels.

Assuming that the University of Wisconsin will fix the noise problem at the University of Wisconsin Pharmacy building, please explain if the noise from the WCCF will remain below background levels?