

Date: May 11, 2007

To: Marsha Rummel, District 6 Alder

From: Steven Klafka, P.E., DEE, Environmental Engineer

Subject: Justification for Adoption of a City of Madison Ordinance Limiting Air Pollution Discharges from Madison-Kipp Corporation

Introduction

The City of Madison is considering whether to adopt its own air pollution control ordinance to limit the emissions from Madison-Kipp Corporation. Air pollution from the company's aluminum melting and die casting operations have been a concern to surrounding residents for over 15 years. During this time, particulate matter discharges reported by Madison-Kipp to the Wisconsin Department of Natural Resources (DNR) increased six-fold, from 3 to 18 tons per year.^{1,2} While other industries regulated as air pollution sources are likely to be located in industrial parks, Madison-Kipp is located in the middle of the Schenk-Atwood residential neighborhood with homes and backyards abutting the company's buildings.

The DNR is currently the sole agency responsible for regulating air pollution discharges from Madison-Kipp. Neighborhood residents have been frustrated by DNR approval of new discharges from Madison-Kipp despite ongoing health and odor complaints. In 2005, neighborhood residents challenged a permit issued to Madison-Kipp using the contested case hearing procedure under s. 285.81(2), Wis. Stats. Testimony and exhibits during the hearing identified shortcomings of DNR regulations, the inability of the DNR to account for the close proximity of residents to discharges from Madison-Kipp, and ongoing violations of air quality standards.³ In his decision, the administrative law judge agreed that DNR approval procedures were inadequate and required Madison-Kipp to install air quality monitors and eliminate fugitive emissions from doors and windows.⁴ Madison-Kipp subsequently asked the DNR to revoke this permit, avoiding the new requirements.⁵

Earlier this year, the DNR issued Air Pollution Control Permit #07-BAP-002 to Madison-Kipp, allowing increased emissions from its aluminum melting furnaces.⁶ The DNR made no changes to the permit to address neighborhood comments and concerns, and repeated errors acknowledged by the administrative law judge during the 2005 contested case hearing.^{7,8}

Based on the continued inability of the DNR to respond to concerns raised by neighborhood residents, it is apparent that DNR air pollution control regulations are unable to address the unique location of Madison-Kipp and the close proximity of its neighbors. I conclude there are sufficient reasons for the City of Madison to intervene and limit the company's air pollution discharges.

In his April 19, 2007 memorandum, *Potential City Regulation of Madison-Kipp Corporation Air Emissions*, Assistant City Attorney Voss discusses the requirements and hurdles should the City of Madison pursue an ordinance limiting air pollution emissions from Madison-Kipp Corporation.⁹

Attorney Voss concludes by stating:

“In order to have any reasonable chance of success, I believe that the City would have to: 1) conduct valid scientific tests and studies that would reasonably prove the existence of a public health or safety hazard from the Kipp operation which is not adequately regulated by the state-wide standards and permits; 2) draft an ordinance that would create new local air pollution regulation standards to effectively address the proven public health or safety hazard, but standards that goes no further than reasonably necessary to accomplish this goal; and 3) create an appropriate enforcement system to assure compliance with the new local standards, consistent with the procedural requirements set forth above in Sec. 285.73, Wis. Stats.”

Based on currently available information on the air quality emissions and impacts of Madison-Kipp operations, I believe there is sufficient justification for the City of Madison to adopt an ordinance limiting the air pollution emissions from Madison-Kipp. Each of the conditions proposed by Attorney Voss are addressed below.

1. Existence of Public Health and Safety Hazard

Earlier this year, the DNR issued Air Pollution Control Permit #07-BAP-002 to Madison-Kipp.⁷ As a condition of this permit, the DNR also required Madison-Kipp to make significant improvements to both its Atwood Avenue and Fair Oaks Avenue facilities. These improvements included the following:

- 1) installation of 8 taller stacks at the Atwood Avenue facility;
- 2) installation of 3 taller stacks at the Fair Oaks Avenue facility; and,
- 3) closing of various roof vents at these facilities.

At the time of this memorandum, Madison-Kipp has installed several of the taller stacks and closed some of its roof vents.

Based on the DNR technical support document for Permit #07-BAP-002, the improvements were necessary to assure that Kipp’s air pollution emissions from all of its operations would be sufficiently dispersed so that downwind pollutant concentrations would not violate air quality standards.¹⁰ The required changes were determined by the DNR using an air quality dispersion modeling analysis.

The DNR routinely conducts dispersion modeling analyses to demonstrate that issuance of air pollution permits will not cause or exacerbate a violation of air quality standards. Compliance with air quality standards is a Wisconsin requirement for permit issuance by the DNR under s. 285.63(1)(b), Wisconsin Statutes. Dispersion modeling is described in the DNR guidance used by DNR staff and air pollution control permit applicants:¹¹

A model is a mathematical simulation, designed to predict what can or will happen in real-world scenarios. Atmospheric dispersion modeling is useful in predicting the impact a

particular facility will have with respect to a given pollutant. The major benefit of dispersion modeling is that it is an inexpensive way to determine the impact of a source. This information is vital in assessing a facility's compliance with respect to the National and State Ambient Air Quality Standards (NAAQS and increments) as well as the various Hazardous Air Pollutant (HAP) standards, both federal and state.

Dispersion modeling is also a tool that is widely used by air pollution control professionals and other regulatory agencies throughout the U.S. The use of dispersion modeling to evaluate the air quality impacts of air pollution sources is both required and supported by the U.S. Environmental Protection Agency (EPA).¹²

As shown by the requirements of Permit #07-BAP-002 issued to Kipp, dispersion model analysis results are used by the DNR and other state agencies to mandate that industrial facilities either reduce their air pollution discharges or improve the dispersion of these discharges. Therefore, it can be concluded that a dispersion modeling analysis is *a valid scientific study to determine the existence of a public health or safety hazard.*

It should also be noted that the improvements required at Madison-Kipp by Permit #07-BAP-002 were necessary to assure that Kipp's air pollution emissions would not violate the air quality standards for Total Suspended Particulates (TSP) and Particles less than 10 microns (PM₁₀).¹⁰ The Clean Air Act requires EPA to review the latest scientific information and air quality standards every five years. The air quality standards for TSP and PM₁₀ used by DNR to approve increased discharges from Madison-Kipp are over 20 years old, and have been superseded by standards adopted by EPA in 1997 and then again in 2006. While changes will be made to improve the dispersion of particulate matter from Madison-Kipp's operations, surrounding neighbors will continue to be exposed to concentrations which exceed current and more protective air quality standards which have been adopted by EPA.

The history of air quality standard development for particulate matter is explained further by EPA:¹³

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for six criteria pollutants, particle pollution (also known as particulate matter) is one of these. The Clean Air Act established two types of national air quality standards for particle pollution. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings.

The nation's air quality standards for particulate matter were first established in 1971 [for TSP] and were not significantly revised until 1987, when EPA changed the indicator of the standards to regulate inhalable particles smaller than, or equal to, 10 micrometers in diameter (that's about 1/4 the size of a single grain of table salt) [for PM₁₀].

Ten years later, after a lengthy review, EPA revised the PM standards, setting separate standards for fine particles (PM_{2.5}) based on their link to serious health problems ranging from increased symptoms, hospital admissions and emergency room visits for people with heart and lung disease, to premature death in people with heart or lung disease.

The 1997 standards also retained but slightly revised standards for PM₁₀ which were intended to regulate "inhalable coarse particles" that ranged from 2.5 to 10 micrometers in diameter. PM₁₀ measurements, however, contain both fine and coarse particles.

EPA revised the air quality standards for particle pollution in 2006. The 2006 standards tighten the 24-hour fine particle standard from the current level of 65 micrograms per cubic meter (µg/m³) to 35 µg/m³, and retain the current annual fine particle standard at 15 µg/m³. The Agency decided to retain the existing 24-hour PM₁₀ standard of 150 µg/m³. The Agency revoked the annual PM₁₀ standard, because available evidence does not suggest a link between long-term exposure to PM₁₀ and health problems.

As required by EPA, DNR is monitoring air quality to determine compliance with the latest air quality standards for PM_{2.5} on a regional and metropolitan area basis. However, DNR is not using the PM_{2.5} air quality standards to approve new industrial emissions, such as those from Madison-Kipp. The DNR has been waiting since 1997 for EPA to recommend procedures for applying the PM_{2.5} air quality standards to individual facilities.¹⁴ EPA will eventually adopt these procedures. But in the meantime, hot spots where the PM_{2.5} air quality standards are violated by individual facilities, such as Madison-Kipp, will not be addressed.

This situation is identical to DNR's inability, until this year, to prohibit Madison-Kipp's use of short roof vents to disperse its die casting fumes. Since 1994, both Madison-Kipp and DNR were aware the roof vents were responsible for violations of air quality standards in the neighborhood surrounding Madison-Kipp's operations.^{3,4} DNR waited until EPA adopted national requirements in 2006 and the issuance of Permit #07-BAP-002 earlier this year, before requiring Madison-Kipp to eliminate the short roof vents. While waiting for EPA to adopt national requirements, DNR allowed residents to be exposed to air quality standard violations since 1994, if not earlier.

Table 1 summarizes the results of the DNR dispersion modeling analysis results for Permit #07-BAP-002.¹⁰ For the DNR analysis, the downwind concentrations caused by Madison-Kipp discharges of particulate matter were combined with background concentrations for PM₁₀ then compared with the air quality standards for PM₁₀. This analysis was used by the DNR to show the required improvements to Madison-Kipp were adequate to comply with the 20-year old air quality standard for PM₁₀.

Table 1 Madison-Kipp Compliance with PM₁₀ Air Quality Standard						
<i>Air Pollutant</i>	<i>Averaging Period</i>	<i>Madison-Kipp Impact (µg/m³)</i>	<i>Background Concentration (µg/m³)</i>	<i>Total Concentration (µg/m³)</i>	<i>NAAQS (µg/m³)</i>	<i>Complies with NAAQS?</i>
PM ₁₀	24-hour	75.2	56	131.2	150	Yes
PM ₁₀	Annual	25.5	22.2	47.7	50	Yes

Table 2 starts where the DNR analysis left off and provides a comparison with the 2006 air quality standard for PM_{2.5}. The downwind concentrations due to Madison-Kipp emissions alone are twice the current and most protective air quality standard for PM_{2.5}. When background concentrations for

PM_{2.5} is considered, the downwind concentrations caused by the discharges from Madison-Kipp are nearly three times the air quality standard.

Table 2 Madison-Kipp Compliance with PM_{2.5} Air Quality Standard						
<i>Air Pollutant</i>	<i>Averaging Period</i>	<i>Madison-Kipp Impact (µg/m³)</i>	<i>Background Concentration (µg/m³)</i>	<i>Total Concentration (µg/m³)</i>	<i>NAAQS (µg/m³)</i>	<i>Complies with NAAQS?</i>
PM _{2.5}	24-hour	75.2	29.1	104.3	35	No
PM _{2.5}	Annual	25.5	14	39.5	15	No

Prior to issuance of Permit #07-BAP-002, neighbors surrounding Madison-Kipp did request that the DNR require Madison-Kipp to comply with the current and most protective air quality standard for PM_{2.5}.⁷ In its response to neighborhood comments, DNR states that it is following EPA recommendations from 1997 that the 20-year old PM₁₀ standard be used as a surrogate for compliance with the newer PM_{2.5} standard until EPA adopts procedures for incorporating the PM_{2.5} air quality standards into permit issuance procedures.¹⁴ While DNR waits for EPA to develop these procedures, neighbors surrounding Madison-Kipp continue to be exposed to concentrations of particulate matter which exceed the air quality standards for PM_{2.5}.

The majority of the DNR air pollution control permits are issued to industries located in industrial parks or with a suitable buffer area between them and nearby residential areas. This buffer area minimizes the impacts of not enforcing the newer and most protective air quality standard for PM_{2.5}. However, Madison-Kipp represents a unique situation. While its location is zoned for industrial use, there is no buffer area between Kipp and surrounding residents. Homes and backyards back up to the Madison-Kipp buildings. Based on the DNR dispersion modeling analysis, the locations where maximum particulate matter concentrations occur are the homes and backyards of adjacent neighbors.^{7,10} DNR failure to enforce the newer and most protective air quality standard for PM_{2.5} has caused “*the existence of a public health or safety hazard from the Kipp operation which is not adequately regulated by the state-wide standards and permits.*”

2. Draft Air Pollution Control Ordinance

To assure that residents surrounding Madison-Kipp are not exposed to particulate matter concentrations above the current PM_{2.5} air quality standards, Madison-Kipp must reduce its particulate matter emissions by 92% based on the 24-hour average and 96% based on the annual average. These reductions are based on procedures frequently used by the DNR when a dispersion modeling analysis shows that air quality standards will be exceeded and emission reductions are necessary.

The 96% is calculated as follows:

$$\begin{aligned}
 &\text{Required Emissions Reduction} \\
 &= 1 - [(\text{Air Quality Standard} - \text{Background Concentration}) \div (\text{Facility Contribution})] \\
 &= 1 - [(15 \mu\text{g}/\text{m}^3 - 14 \mu\text{g}/\text{m}^3) \div (25.5 \mu\text{g}/\text{m}^3)] \\
 &= 1 - [1/25.5] = 0.96 = 96\%
 \end{aligned}$$

The reductions in particulate matter emissions necessary to protect city residents can be used to create a City of Madison ordinance which addresses the second of Attorney Voss' requirements: *"draft an ordinance that would create new local air pollution regulation standards to effectively address the proven public health or safety hazard, but standards that goes no further than reasonably necessary to accomplish this goal."*

Permit #07-BAP-002 allows Madison-Kipp to increase its emissions to 98 tons per year.¹⁰ After a 96% reduction, acceptable emissions from Madison-Kipp would be 3.9 tons per year or 7,840 lbs per year. It is proposed that a City of Madison ordinance is necessary to require Madison-Kipp to reduce its facility emissions of particulate matter to less than 7,840 lbs per year. To comply with this limitation, Madison-Kipp could use readily available air pollution control systems for the aluminum die casting industry to filter the particulate matter from its operations including the aluminum melting furnaces and die casting operations. In their comments on Permit #07-BAP-002, neighborhood residents vendor quotations for air pollution control equipment designed to filter the particulate matter emissions from die casting operations such as those generated by Madison-Kipp.⁷

3. Appropriate Enforcement System

The last of Attorney Voss' requirements to create a City of Madison ordinance is: *"create an appropriate enforcement system to assure compliance with the new local standards, consistent with the procedural requirements set forth above in Sec. 285.73, Wis. Stats."*

Under Table 1 of Chapter NR 438, Wis. Adm. Code, Madison-Kipp and all industrial facilities must report their annual emissions of particulate matter to the DNR if actual emissions exceed 10,000 lbs per year.

Rather than limit particulate matter emissions from Madison-Kipp to 7,840 lbs per year, the city ordinance could require Madison-Kipp to maintain actual annual emissions of particulate matter below the emissions reporting threshold in Table 1 of Chapter NR 438, Wis. Adm. Code. This will simplify the enforcement system for the new air pollution control ordinance. If Madison-Kipp does not report its particulate matter emissions to the DNR, it can be concluded that the company is complying with the ordinance. If Madison-Kipp exceeds this threshold, it will be required to report its emissions to the DNR or be subject to enforcement action by the DNR. If Madison-Kipp does report its emissions to the DNR as required by NR 438, then the City of Madison would have sufficient evidence to prosecute the company for violating the city's air pollution control ordinance.

Suggested ordinance language is as follows:

Effective January 1, 2009, annual particulate matter emissions from Madison-Kipp Corporation located on Atwood and Fair Oaks Avenues shall not exceed the 10,000 pound per year reporting threshold under Table 1 of Chapter NR 438, Wisconsin Administrative Code.

Delaying the start of the ordinance will provide Madison-Kipp time to purchase and install the necessary air pollution control equipment.

References

¹ Wisconsin Department of Natural Resources, 1995 Air Emissions Inventory Report for Madison-Kipp Corporation.

² Wisconsin Department of Natural Resources, 2005 Air Emissions Inventory Report for Madison-Kipp Corporation.

³ Clean Air Madison, *Brief in Chief in the Matter of Air Pollution Control Permit #03-POY- 328 dated April 26, 2004 Issued to Madison-Kipp Corporation, Case No: IH-04-02*, August 22, 2005.

⁴ Jeffrey D. Boldt, Administrative Law Judge, Wisconsin Division of Hearings and Appeals, *Findings of Fact, Conclusions of Law, and Order In the Matter of an Air Pollution Control Construction Permit Issued to Madison-Kipp Corporation, Located in Madison, Wisconsin, Permit No. 03-POY-328*, October 27, 2005.

⁵ Letter from Bradford Pyle, Wisconsin Department of Natural Resources, to Robert Johnson, Madison-Kipp Corporation, May 3, 2006.

⁶ Wisconsin Department of Natural Resources, *Air Pollution Control Permit #07-BAP-002*, March 30, 2007.

⁷ Letter from V. Hestad, Clean Air Madison, to B. Patel, Wisconsin Department of Natural Resources, Comments on Permits #07-BAP-002 and 113125320-F10, March 23, 2007.

⁸ Wisconsin Department of Natural Resources, Memorandum from Biren Patel to Thomas Roushar, Summary of and Responses to Public Comments on the Air Pollution Control Permit Application for Madison-Kipp Corp., Madison, Dane County (Permit #07-BAP-002 and 113125320-F10), March 28, 2007.

⁹ James M. Voss, Assistant City Attorney, *Memorandum to former Alderperson Judy Olson, District 6 and Alderperson Marsha Rummel, District 6, Subject: Potential City Regulation of Madison-Kipp Corporation Air Emissions*, April 19, 2007.

¹⁰ Wisconsin Department of Natural Resources, *Analysis and Preliminary Determination for the Construction Permit For the Proposed Construction/modification and Initial Operation Of an Aluminum Die Casting Facility And Analysis and Preliminary Determination for the Renewal of Operation Permit 113014220-p01 And Analysis and Preliminary Determination for the Revision of Construction Permit(s): 00-BSP-929 For Madison-Kipp Corporation, Located at 2824 Atwood Avenue, Madison, Dane County, Wisconsin*, February 15, 2007.

¹¹ Wisconsin Department of Natural Resources, *DNR Dispersion Modeling Guidelines*, February 2007.

¹² <http://www.epa.gov/ttn/scram/>

¹³ <http://epa.gov/PM/standards.html>

¹⁴ EPA, John S. Seitz, Director Office of Air Quality Planning & Standards, *Memorandum on Interim Implementation of New Source Review Requirements for PM_{2.5}*, October 23, 1997.