STATE OF WISCONSIN
DEPARTMENT OF ADMINISTRATION
d)a-2019 (R03/2012

DIVISIONOF EXECUTIVE BUDGET AND FINANCE
101 EAST WILSON STREET, 10TH FLOOR
P.O. BOX 7864
MADISON, WI 53707-7864
FAX: (608) 267-0372

ADMINISTRATIVE RULES
Fiscal Estimate & Economic Impact Analysis

1. Type of Estimate and Analysis

☒ Original ☐ Updated ☐ Corrected

2. Administrative Rule Chapter, Title and Number

NR 404 – Ambient Air Quality and NR 484 – Incorporation by Reference

3. Subject

Incorporation of federal 1-hour National Ambient Air Quality Standards (NAAQS) for sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) into the Wisconsin administrative code.

4. Fund Sources Affected

☐ GPR ☐ FED ☒ PRO ☐ PRS ☐ SEG ☐ SEG-S

5. Chapter 20, Stats. Appropriations Affected

s. 20.370 (2) (bg), (bh), and (ci), Stats.

6. Fiscal Effect of Implementing the Rules

☐ No Fiscal Effect ☐ Increase Existing Revenues ☒ Increase Costs
☐ Indeterminate ☐ Decrease Existing Revenues ☐ Could Absorb Within Agency's Budget
☐ Decrease Cost

7. The Rule Will Impact the Following (Check All That Apply)

☐ State's Economy ☒ Specific Businesses/Sectors
☐ Local Government Units ☒ Public Utility Rate Payers
☐ Small Businesses **(if checked, complete Attachment A)**

8. Would Implementation and Compliance Costs Be Greater Than $20 million?

☐ Yes ☒ No

9. Policy Problem Addressed by the Rule

Section 285.21, Wis. Stats., requires the Department of Natural Resources to promulgate by rule a similar, but no more restrictive, air quality standard whenever the U.S. EPA promulgates a new or revised NAAQS. On February 9, 2010 and June 22, 2010 the U.S. EPA promulgated 1-hour primary NAAQS for NO_2 and SO_2, respectively. The Department is proposing to promulgate these same standards by rule consistent with state law.

10. Summary of the businesses, business sectors, associations representing business, local governmental units, and individuals that may be affected by the proposed rule that were contacted for comments.

In September 2012, a request for information and advice on the economic effects of the proposed rule was sent to approximately 600 businesses, business associations, environmental advocacy groups, and other interested stakeholders. This request was also posted on Department internet pages and other internet pages related to state agency rulemaking. Comments and information were received from 5 organizations; two environmental engineering consulting firms, one company from the pulp and paper industry, one company from the electric utility sector, and one statewide business association. See Appendix A to the attached Economic Impact Analysis for Board Order AM-08-11 for the specific information and comments provided.

11. Identify the local governmental units that participated in the development of this EIA.

No local governmental units requested the opportunity to coordinate with the Department in preparation of the EIA.

12. Summary of Rule's Economic and Fiscal Impact on Specific Businesses, Business Sectors, Public Utility Rate Payers, Local Governmental Units and the State's Economy as a Whole (Include Implementation and Compliance Costs Expected to be Incurred)

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See attached Economic Impact Analysis for Board Order AM-08-11.

13. Benefits of Implementing the Rule and Alternative (s) to Implementing the Rule

See attached Economic Impact Analysis for Board Order AM-08-11. Since state statute mandate the promulgation of these ambient air quality standards, no alternatives were evaluated.

14. Long Range Implications of Implementing the Rule

Implementing these rules will result in progress towards meeting the National Ambient Air Standards for SO_2 and NO_2. In addition, there will be less exposure to these respiratory irritants, reductions in ozone and particulate matter exposures and lowered health costs associated with exposure to air pollution.

15. Compare With Approaches Being Used by Federal Government

The Department is proposing to promulgate the same 1-hour standards for SO_2 and NO_2 that were promulgated by the U.S. EPA.

16. Compare With Approaches Being Used by Neighboring States (Illinois, Iowa, Michigan and Minnesota)

All states must meet these Federal National Ambient Air Quality Standards without exception.

17. Contact Name	18. Contact Phone Numbers
Jeff Myers	608.266.2879

This document can be made available in alternate formats to individuals with disabilities upon request.

ATTACHMENT A

1. Summary of Rule's Economic and Fiscal Impact on Small Businesses (Separately for each Small Business Sector, Include Implementation and Compliance Costs Expected to be Incurred)

The Department found no evidence that specific small businesses or small business sectors would be impacted by the proposed rule. See the attached Economic Impact Analysis for Board Order AM-08-11 for discussion of small emission units or sources. The Department did not received any information or comments from specific small businesses or small business sectors in response to its request for information for the preparation of this EIA.

2. Summary of the data sources used to measure the Rule's impact on Small Businesses

3. Did the agency consider the following methods to reduce the impact of the Rule on Small Businesses?

☐ Less Stringent Compliance or reporting Requirements

☐ Less Stringent Schedules or Deadlines for Compliance or Reporting

☐ Consolidation or Simplification of Reporting Requirements

☐ Establishment of performance standards in lieu of Design or Operational; Standards

☐ Exemption of Small Businesses from some or all requirements

☐ Other, describe:

4. Describe the methods incorporated into the Rule that will reduce its impact on Small Businesses

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5. Describe the Rule's Enforcement Provisions

6. Did the Agency prepare a Cost Benefit Analysis (if Yes, attach to form)

☐ Yes ☐ No

Adoption of the Proposed 1-Hour Nitrogen Dioxide and Sulfur Dioxide National Ambient Air Quality Standards into the State Administrative Code

Economic Impact Analysis
For
Board Order AM-08-11

Prepared
January 29, 2015

By
The Wisconsin Department of Natural Resources
Bureau of Air Management

Table of Contents

Executive Summary

The U.S. Environmental Protection Agency (EPA) issued revised National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO_2) on February 9, 2010, and sulfur dioxide (SO_2) on June 22, 2010. The Wisconsin Department of Natural Resources must adopt these standards into the state administrative code (state rule) in accordance with s. 285.21, Wis. Stats. Before incorporating the SO_2 and NO_2 NAAQS into state rule, the Department must also prepare an economic impact analysis (EIA) addressing the economic effect on specific businesses, business sectors, public utility ratepayers, local governmental units, and the state's economy as a whole in accordance with s. 227.137, Wis. Stats. The Department developed this report to fulfill the EIA requirement.

In preparing the EIA, the Department solicited information from approximately 600 businesses, business associations, public utility ratepayers and local governments. The Department then estimated the number of facilities that may potentially exceed the NAAQS. A number of variables affect whether a facility may exceed the NAAQS, including pollutant emission rates, flue stack heights, exit gas velocities, and the number of emission units at the facility. Due to the complex interaction of these factors, the Department cannot identify which specific facilities will have to take actions and the exact extent of that action in meeting the NAAQS without first conducting air quality (AQ) modeling specific to each facility. In place of site specific modeling, the Department used general AQ trends related to various emission levels and factors (derived from existing modeling results) to estimate which facilities could potentially exceed the NAAQS. The Department then assumed actions necessary to reduce pollutant concentrations. The Department used this information to estimate a range of annualized cost associated with reducing pollutant concentrations. The Department also estimated benefits (using EPA identified factors) of avoided health care (benefit) that could potentially have resulted from exposure to fine particulates formed from the SO_2 and nitrogen oxide (NO_x) emissions that are avoided under the analysis. The Department's estimate of affected facilities and the annual cost and benefit are summarized in Table ES1. The addition of the cost and benefit yields the net economic impact (a positive economic impact means there is a net benefit).

Table ES1. Annualized Economic Impact of the NO_2 and SO_2 NAAQS ($/year).

NAAQS	No. of Facilities Performing Assessments	No. of Facilities Implementing Mitigation	Total Annualized Cost	Total Annualized Benefit	Total Annualized Net Economic Impact
NO_2	319 – 947	231 – 319	$644,408 – $2,771,127	$1,051,444 – $5,315,000	$407,036 - $2,543,873
SO_2	231 - 319	51 – 55	$111,893 - $4,838,020	ND - $35,520,000	($111,893) – $30,681,980

ND – Not determined.
Methodology – see EPA Costing methods used in refs. 4, 5, and 6, and sections 4, 5, and 6 in this report.
Note: The costs and benefits are presented as ranges due to uncertainties in the analysis, including significant uncertainty regarding which sources will actually need to reduce emissions in order to meet the NAAQS. The total benefits do not include the benefits related to actions which reduce pollutant concentrations through better dispersion (raising stack heights). Therefore benefits are under-estimated in all cases for both pollutants. For SO_2, there is no lower benefit determined as raising stack heights is the sole action applied for this range.

Currently, the Department reviews the status of NAAQS compliance when renewing operating permits every five years. Therefore, the full economic impact of adopting the NAAQS identified in Table ES1 could be fully realized within five years. However, the Department is currently proposing a rule change where smaller, lower emitting facilities (minor sources) will not renew operating permits. As a result, these minor facilities would only be subject to review of NAAQS compliance when obtaining

construction permits to increase emissions. Under the proposal to eliminate operating permit renewals for minor sources, the Department estimates that major sources could potentially incur 35 percent of the economic impact identified in Table ES1 within five years and minor sources, based on historic permitting activity, could incur the remaining 65 percent of economic impact over 22 years for NO_x-emitting facilities and over eight years for SO_2-emitting facilities.

1. Introduction

The U.S. Environmental Protection Agency (EPA) issued a revised National Ambient Air Quality Standard (NAAQS) for nitrogen dioxide (NO_2) on February 9, 2010, and for sulfur dioxide (SO_2) on June 22, 2010. Both of these revised NAAQS are primary 1-hour standards with maximum NO_2 concentrations not to exceed 100 parts per billion (ppb) and maximum SO_2 concentrations not to exceed 75 ppb.

The Wisconsin Department of Natural Resources must adopt the new SO_2 and NO_2 NAAQS into the state administrative code (state rule) in accordance with s. 285.21, Wis. Stats. To fulfill this state requirement, the Department initiated rulemaking under Board Order AM-08-11. The Department must also prepare an economic impact analysis (EIA) addressing the economic effect on specific businesses, business sectors, public utility ratepayers, local governmental units, and the state's economy as a whole in accordance with s. 227.137, Wis. Stats. The economic impact must address implementation and compliance cost as required under s. 227.137(b), Wis. Stats., and actual and quantifiable benefits as required under s. 227.137(c), Wis. Stats. The Department developed this report to fulfill the EIA requirement.

Note: This document refers to both NO_2 and NO_x. For clarification, NO_2 is the pollutant regulated by the federal 1-hour NAAQS. However, NO_2 is not emitted directly from emission units, but is the result of NO_x emissions being converted to NO_2 by ozone and sunlight or other similar oxidation pathways. Therefore, NO_x is the pollutant controlled for purposes of meeting the NO_2 NAAQS.

2. Overview of Methods and Rationale

To prepare an EIA, the Department is required to solicit and consider information from potentially affected facilities, businesses and associations, local units of government, utility ratepayers and individuals. The Department contacted over 600 entities, requesting information concerning the potential economic impact of the new NAAQS. The Department received a limited number of responses: two from engineering consultant firms representing a number of affected sources, two from potentially affected facilities, and one from a business association. These entities commented on efforts needed to determine their facilities' air quality impacts, the types of emissions units at their facilities that may exceed the NAAQS, potential emission reduction strategies and control equipment that might be needed to reduce pollutant air concentrations, and the costs associated with these strategies and controls. The comments also highlighted that many sources are not certain what compliance actions, if any, would be needed to meet the NAAQS. The comments received are provided in Appendix A.

Due to the limited nature of the information received under the solicitation, the Department prepared an analysis to more comprehensively estimate the statewide economic impact of adopting the NAAQS into state rule. The information received from the stakeholder solicitation informed the analysis. The general methods of the extended Department analysis and a summary of results are presented in this document.

In preparing the analysis, the Department identified which facilities statewide might potentially be affected by the NAAQS by comparing actual facility emissions to the results of various existing air

quality modeling results and studies. The Department then applied actions at these facilities to reduce pollutant concentrations consistent with meeting the NAAQS. For this pool of affected facilities, the Department estimated the costs and benefits associated with meeting these targeted pollutant concentrations. Two primary costs are estimated: 1) the cost of engineering assessments and air quality modeling which would potentially be needed to determine whether a facility would exceed the NAAQS; and 2) the cost of reducing pollutant concentrations by raising stack heights, installing control equipment, fuel switching or a combination of these measures. The Department refers to these options for reducing pollutant concentrations as "mitigation" measures throughout the analysis. The Department also estimated the monetized benefit of reducing pollutant emissions. EPA identified that reducing NO_x and SO_2 will reduce exposure to fine particulate and associated health care costs. These benefits are estimated following EPA methodologies (see references 6 and 7).

The Department annualized both the costs and benefits for each pollutant. "Annualized" means that the one-time up-front (capital) cost, such as the cost of determining a facility's air quality status or implementing mitigation measures, is broken into a stream of annual payments over an appropriate timeframe (e.g., a five year business cycle, the life of equipment, etc…). The annualization of capital costs is similar to obtaining a loan and establishing a payment schedule. The annual cost of operating and maintaining the mitigation measures is added to the annualized capital costs to yield a total annualized cost. The monetized benefits are by default annualized as they are based on the amount of emissions reduced each year on an ongoing basis. The total annualized costs and benefits are then compared to estimate the total net economic impact for each pollutant.

The Department evaluated the rate at which facilities will potentially incur the economic impact estimated in this analysis. Under current state requirements, facilities will have to assess compliance with the NAAQS when renewing operating permits every five years. This theoretically means that the economic impact would be realized within five years of adopting the NAAQS into the state administrative code. However, the Department prioritizes the review of operation permit renewal applications based on status under Title V of the Clean Air Act. As a result, operation permit renewals for lower emitting sources are unlikely to be reviewed on the five year schedule. To align with this reality and more closely reflect federal requirements for the permitting program, the Department is currently proposing to modify the renewal requirement such that facilities that potentially emit below federal thresholds for major sources will not renew their operating permits. These permits will still need to be periodically revised to incorporate new construction permit requirements or when modifying the facility to increase emissions and such revisions will include an evaluation of the NAAQS. Therefore, an assessment of how this proposed change affects the rate of economic impact is included in this analysis.

3. Potentially Affected Facilities

The Department first identified which facilities may be affected by the NAAQS. To do this, the Department reviewed results of air quality modeling analyses for emission sources that have recently undergone permitting actions. The review served as the basis for identifying types of emission units, as identified in Table 1, which have the potential to produce substantial ambient air concentrations of NO_2 or SO_2 and may produce conditions at a facility exceeding the NAAQS. This review also showed that emission units have different characteristics of emission rates, flue gas velocities and temperatures, and stack heights, etc… which affect the ambient air concentrations of NO_2 or SO_2. In these exercises, NO_2 concentrations were extrapolated from the modeled NO_x emissions. The Department also reviewed generic air quality modeling of various surrogate emission sources as part of this evaluation.[1, 2, 3]

Table 1. Source Types Evaluated for NO_2 and SO_2 Ambient Air Concentrations.

NO_2 NAAQS	SO_2 NAAQS
Solid-fuel-fired boilers	Boilers firing coal or petroleum coke
Metal furnaces	Metal furnaces firing coal
Boilers, heaters and processes	Boilers, heaters and processes firing distillate or residual oil
Asphalt plants	Asphalt plants firing distillate or residual oil
Oil refinery processes	Oil refinery processes
Reciprocating engines	Reciprocating engines firing distillate oil or biogas
Combustion turbines	
Lime kilns	
Glass furnaces	
Waste incinerators	

The Department's review of air quality modeling results and studies indicated several major trends:

- High emission rates for short periods can cause a facility to exceed the 1-hour NAAQS.
- Units emitting at relatively low levels can exceed the NAAQS if the flue stack is too low or dispersion conditions are poor (e.g. reciprocating engines).
- Emission units can emit relatively large amounts of pollutants and not exceed either NAAQS if emission stacks are of sufficient height (e.g. coal fired boilers).
- Even if individual emission units at a facility do not exceed a NAAQS, multiple emission units operating simultaneously at the same facility may cause pollutant concentrations to exceed the NAAQS.

The Department used the findings of the air quality analyses for the different source categories to screen for facilities in Wisconsin whose emission levels indicate that they may need to take steps to reduce SO_2 or NO_2 concentrations to meet the respective NAAQS. The number of emission units and facilities identified by this evaluation are summarized in Table 2.

In identifying these potentially affected facilities, the Department also applied the following assumptions:

- The Department assumed that no facility emitting less than one ton of either NO_x or SO_2 in 2011 would exceed the respective standard, and excluded these facilities from the analysis.
- The Department determined facilities' potential to exceed the NAAQS using their emissions units' actual emission levels reported in 2011. In some cases, adjustments were applied to account for the fact that higher short-term emission rates may occur that could exceed the standards.
- The Department excluded facilities/emission units from the analysis if the relevant pollutant is already controlled or will be controlled under existing regulations such as the Clear Air Interstate Rule, Mercury and Air Toxics (MATS) rule, or the Industrial, Commercial and Institutional (ICI) Boiler rule in a manner that is anticipated to address the NAAQS. Specifically, for the SO_2 analysis, coal fired boilers are excluded if reductions in hydrochloric acid (HCl) emissions needed to meet the ICI Boiler rule appear to be comparable to the needed SO_2 NAAQS reductions.
- Small boilers and processes, process heaters, oil-fired asphalt plants, and reciprocating engines tend to have shorter stacks and poor air dispersion characteristics. The Department assumed that these sources have the potential to exceed the NAAQS regardless of emission levels.

Table 2. Wisconsin Facilities That May Potentially Need to Reduce Pollutant Emissions to Meet the NAAQS.

NO_2 NAAQS			SO_2 NAAQS		
Source Category	No. of Facilities	No. of Emission Units	Source Category	No. of Facilities	No. of Emission Units
Boilers – solid fuel	15	24	Boilers – solid fuel	1	2
Lime kilns	4	8	Metal furnaces – solid fuel	2	4
Waste incinerators	1	2	Refinery Processes	1	1
Glass furnaces	2	2	Boilers, asphalt plants, processes – distillate oil	22	27
Metal furnaces	14	23	Boilers, asphalt plants – residual oil	20	26
Boilers – gaseous and oil	71	135	Engines - diesel	6	8
Processes	35	52	Engines - biogas	3	8
Process heaters	64	111			
Combustion turbines	19	33			
IC (internal combustion) engines	94	150			
Total	319	540	Total	55	76

Note: this screening level analysis identifies likely emissions trends among potentially affected facilities. The Department cannot accurately identify whether any individual facility will exceed the NAAQS without performing detailed air quality analysis that takes into account the processes and site conditions specific to the facility.

4. Costs

The Department estimated two main types of cost associated with facilities' compliance with the NO_2 and SO_2 NAAQS. The first is that of assessing and modeling the air quality status of a facility to determine whether it exceeds the NAAQS. The second estimated cost is for the actions that may be needed in reducing (mitigating) pollutant concentrations to levels meeting the standard.

4.1. Air Quality Assessment and Modeling

Several comments received from stakeholders in response to the Department's solicitation for information suggested that facility operators will have to perform air quality assessments and modeling to determine whether they need to reduce emissions in meeting the NAAQS. While it is not a requirement for facilities to perform and submit air quality modeling results with permit applications, most applicants prefer to have an idea of their air quality modeling results before submitting an application to the Department. For this reason, the Department estimated the assessment cost of the facility operators performing all of the necessary air quality modeling.

Based on past experience and working with private consultants performing modeling analyses, the Department estimated cost factors for calculating the assessment and air quality modeling costs. The cost factors are presented in Table 3.

Table 3. Cost Factors for Applicability Assessment and Air Quality Modeling.

Cost Factor	NO_2	SO_2
Facility Time (Hr)	27	4
Facility Pay Rate ($/Hr)	100	100
Consultant Time (Hr)	9	2
Consultant Pay Rate ($/Hr)	150	150

For each pollutant, the Department estimated the number of facilities that may perform engineering assessments and air quality modeling under two cases. The high cost case assumes that all facilities with emissions greater than one ton per year (in 2011) will undertake a full assessment. The Department believes this scenario is highly unlikely and that many sources will identify their air quality compliance status based on available information. This high cost case is used to bracket the upper end of the cost. The low cost case assumes that only those facilities that need to mitigate emissions (as indicated by this analysis) would have a full assessment performed.

The number of facilities included in the high and low cost cases is shown in Table 4, along with the calculated cost of performing assessments. The total cost was derived by multiplying the number of facilities by the cost factors in Table 3. The total cost was then annualized using a capitalization factor of 23 percent which assumes paying the debt over five years at an interest rate of 5%. The capitalization factor is calculated using the capitalization equation provided in the EPA Control Cost Manual, Sixth Edition (Document Number EPA/452/B-02-001).

Table 4. Estimated Cost of Air Quality Modeling Assessments and Planning.

Cost Case	NO_2		SO_2	
	Low	High	Low	High
No of Facilities	319	943	55	297
Total Cost ($)	1,219,950	3,819,150	38,500	207,900
Annualized Cost ($)	298,408	882,127	8,893	48,020

4.2. Mitigation Cost

The Department estimated the mitigation cost for all facilities statewide, as identified in Section 3 that may exceed the NAAQS. The emission level targeted in meeting the NAAQS for each facility took into account the type of emission units at each facility and their associated pollutant concentration trends indicated by existing air quality modeling. Using this information the Department developed two cost cases for mitigating emissions.

The first, lower cost case estimated by the Department consists of the measures most likely needed and potentially adequate in mitigating (reducing) pollutant ambient air concentrations to meet the NAAQS. This case is referred to as the "Moderate" mitigation case. For most emission sources, the first least cost mitigation measure employed is increasing stack heights to increase dispersion and reduce pollutant concentrations at ground level. Consistent with guidance for good engineering practices (GEP), the Department assumed that no stack would be raised higher than 213 feet. If stacks cannot be raised to a

height sufficient to meet the NAAQS as indicated by AQ modeling trends, the Department assumed additional control equipment would be installed to reduce pollutant emissions to the necessary level.

The Department also developed a second "High" cost case to address uncertainties in the analysis including those associated with determining actual emission levels, the feasibility and cost of mitigation options, and uncertainties of pollutant concentrations in meeting the NAAQS. For the majority of facilities, the high cost case applies emission controls in addition to the low cost mitigation measures.

Additional elements of the cost analysis include the following:

- When multiple emission units are located at one facility, the Department applied presumptive controls in order of least capital cost and to the extent that an emissions unit contributes to exceeding the NAAQS. For example, a coal-fired boiler at a facility, while emitting in higher quantities, typically disperses emissions well and likely would not exceed the NAAQS by itself. A reciprocating engine at a facility may add enough emissions under poor air dispersion conditions to cause the facility, in combination with the boiler, to exceed the NAAQS. In this case, if controlling the reciprocating engine costs less in total, the Department first applies mitigation to the reciprocating engine to attempt to reduce pollutant concentrations to acceptable levels.
- In many cases, the Department applied stack modifications as the primary means of reducing NO_2 concentrations. For the SO_2 standard, the Department assumed the stacks were already modified for the NO_2 standard, in order to avoid double counting the costs of stack modifications.
- The Department assumed that individual emission units emitting less than one ton of NO_x per year are backup or emergency units. Therefore, mitigation strategies are not applied to these units.
- The Department annualized capital costs using a capitalization factor based on the expected lifetime of the equipment and an interest rate of 9.7 percent. The capitalization factor is calculated according to the EPA Control Cost Manual, Sixth Edition (Document Number EPA/452/B-02-001). Operating costs are included where appropriate.

Table 5 summarizes the estimate of potential mitigation costs. It should be noted that the primary option used in all cases is to increase the stack height. This action results in better dispersion, thereby reducing the pollutant concentration in the air and thus reduces human exposure. However, this reduction in concentration by raising stack heights does not result in a reduction in total pollutant emitted. Therefore emission reductions in Table 5 are only related to actions which reduce the amount of pollutant being emitted by either installing control equipment or switching to lower emitting fuels. This is evident in the "Moderate" SO_2 case which relies solely on increasing stack heights and does not include actions to reduce emissions. Therefore, emission reductions and cost-effectiveness are not applicable for this case as shown in Table 5. The use of actions which reduce pollutant concentrations, but not total emissions, is a limiting factor in the ability to estimate the benefit for all of the mitigation cases. The impact of this issue is further discussed in Section 5.

Further details of the estimated mitigation costs by source category, including the number of affected facilities, applied mitigation measures, emission reductions, and cost are provided in Appendix B.

Table 5. Summary of Estimated Mitigation Cost.

Cost Case	NO_x		SO_2	
	Moderate	High	Moderate	High
No. of Facilities w/ Mitigation	231	319	51	55
Capital Cost	$3,032,000	$8,386,000	$818,000	$1,706000
Annualized Mitigation Cost	$346,000	$1,883,000	$103,000	$4,790,000
Reduced Emissions (tons/year)	332	1,063	Not Applicable	1,184
Cost Effectiveness ($/ton reduced)	1,042	1,772	Not Applicable	4,044

4.3. Costs Not Addressed in the Analysis

This analysis may not account for all significant costs of a facility complying with the NAAQS. For example, there may be cases where facilities that do not currently monitor NO_2 or SO_2 emissions will need to install equipment capable of monitoring these pollutants. As another example, a facility could potentially take a permit restriction to curtail operation to avoid exceeding the NAAQS. The Department cannot estimate the cost of curtailing unit operation as part of this analysis, but assumes that this cost would be less than the cost of the mitigation measures evaluated in the analysis. Regardless, the Department acknowledges that there are likely costs that have not been or cannot be quantified in the analysis at this point.

5. Benefits

EPA indicates that one of the main benefits of adopting the new NAAQS is the avoided health care costs associated with human exposure to fine particulate formed in the atmosphere from NO_x and SO_2 emissions. Fine particulate (also called $PM_{2.5}$) affects respiratory and cardiovascular health and is associated with premature mortality among people with lung or heart disease.[4] Due to the severity of this health effect, the health care benefits from reducing fine particulate emissions are relatively large compared to the health effects related to direct NO_x and SO_2 exposure. Avoided fine particulate health care cost factors for each ton of NO_x or SO_2 reduced are provided in Tables 6 and 7. These factors are obtained from EPA's regulatory impact assessments used to support adoption of the more stringent 2010 NAAQS[5, 6] The factors differ broadly across major source categories because, on the whole, EGUs emit pollutants from very tall stacks with good dispersion thereby reducing human exposure to each ton of pollutant. Whereas on the other extreme, area and mobile sources typically emit at relatively low heights, and many times, under poor dispersion conditions which results in high pollutant concentrations at heights yielding direct human exposure.

Table 6. Avoided Fine Particulate Health Care Cost Associated with Reducing SO_2 Emissions ($/ton reduced in 2006$).

Source Type	Low	High
EGU	$42,000	$100,000
Point (Non-EGU)	$30,000	$74,000
Area	$19,000	$47,000

Source: Table 5.9, US EPA's regulatory impact assessment for meeting the SO_2 NAAQS.[4]
EGU – electric generating unit.
Point – refers to non-EGU stationary sources.
Area – small sources that typically exhaust emissions at low elevations.

Table 7. Avoided Fine Particulate Health Care Cost Associated with Reducing NO_x Emissions ($/ton reduced in 2006$).

Source Type	Low	High
EGU	$7,600	$19,000
Point (Non-EGU)	$5,000	$12,000
Mobile Sources	$5,200	$13,000
Area[a]	$3,167	$7,600

Source: Table 5.7, US EPA's regulatory impact assessment for meeting the NO_2 NAAQS.[5]
EGU – refers to electric generating unit.
Point – refers to non-EGU stationary sources.
Mobile Sources – refers to emissions from automobile and truck traffic and other sources that emit while on the move.
a) The values for area sources are extrapolated based on the point (non-EGU) values and the difference between the stationary and area source avoided-cost factors presented in Table 6.

The Department believes that the "point" and "area" source cost factors for each pollutant in Tables 6 and 7 most closely represent the stationary sources in Wisconsin that may need to reduce emissions in meeting the NAAQS. To avoid overestimating benefits, the Department opted to use the "low" cost factors in this analysis. One reason to use the low cost factors is because the high cost factors are more likely to represent facilities that lie in densely populated areas where more people are affected by the pollutant. Wisconsin is a less urbanized state with many facilities operating in the more rural areas of the state.

The avoided health care cost is calculated in Table 8. The health care cost factors chosen from Tables 6 and 7 are multiplied by the amount of emissions reduced each year under the moderate and high mitigation approaches described in Section 4.2.

Table 8. Estimated Benefit of Reducing NO_x and SO_2 Emissions.

Parameter	NO_x		SO_2	
	Low Benefit	High Benefit	Low Benefit	High Benefit
Benefit Factor ($/ton-reduced)	$3,167	$5,000	$19,000	$30,000
Reduced Emissions Under Each Mitigation Case (tons/year)	Moderate 332	High 1,063	Moderate Not Determined	High 1,184
Total Annual Benefit	$1,051,444	$5,315,000	Not Determined	$35,520,000

Moderate = Moderate Mitigation, High = High Mitigation.

Since this analysis relies on the amount of pollutant reduced, it does not account for the benefit associated with reducing pollutant concentrations by raising stack heights. Because raise stacks is the first, most widely applied least cost option all of the cases shown in Table 8 underestimate the total benefit. This is evident for the "Moderate" SO_2 case where mitigation relies solely on decreasing pollutant concentrations by raising stack heights.

Note: the benefits estimated in this analysis do not account for the avoided costs associated with other effects of SO_2 or NO_x emissions such as acid rain, nutrient enrichment, mercury methylation, visibility, or ozone formation.

6. Net Economic Impact

6.1. Total Net Economic Impact

Table 9 summarizes the costs estimated in Section 4 and the benefits estimated in Section 5 of this analysis. The net economic impact is the result of summing the cost and benefits. As previously discussed in Section 2, this estimate represents a case where all potentially affected facilities become subject to the NAAQS. A positive value in the table under "net economic impact" represents a net benefit.

Table 9. Summary of Economic Impact for All Facilities Statewide.

Evaluated Economic Impacts	NO_x		SO_2	
	Moderate	High	Moderate	High
FACILITY COST				
Assessment Cost:				
No. of Facilities	319	947	55	297
Capital Cost	$1,291,950	$3,819,150	$38,500	$207,900
Annual Cost[1]	$298,408	$888,127	$8,893	$48,020
Mitigation Cost:				
No. of Facilities	231	319	51	55
Capital Cost	$3,032,000	$8,386,000	$818,000	$1,706,000
Annualized Mitigation Cost	$346,000	$1,883,000	$103,000	$4,790,000
Reduced Emissions (tons/year)	332	1,063	ND	1,184
Total Cost (Assessment + Mitigation):				
Capital Cost	$4,251,950	$12,205,150	$856,500	$1,913,900
Annualized Cost	$644,408	$2,771,127	$111,893	$4,838,020
Reduced Emissions (tons/year)	332	1,063	NA	1,184
Cost Effectiveness ($/ton reduced)	1,529	2,221	NA	4,068
AVOIDED HEALTH COSTS (BENEFIT)				
Annual Benefit[2]	$1,051,444	$5,315,000	Not Determined	$35,520,000
NET ECONOMIC IMPACT (Annual Cost + Annual Benefit)				
Annual Economic Impact[3] **(positive values = net benefit)**	$407,036	$2,543,873	(111,893)	$30,681,980

1) The annualized assessment cost only lasts for five years until the one-time cost is paid. Therefore, the total annual cost will be zero after five years.
2) All of the mitigation cases included actions for reducing the concentration of emissions and therefore exposure to the pollutant. However, a factor was not available to attribute a benefit to these actions that only reduced concentrations without reducing the amount of pollutant emitted. A benefit was only determined in cases where total emissions were reduced. Therefore the benefit in all cases is underestimated. In the moderate case for SO_2, the actions solely rely on reducing pollutant concentrations. Therefore no benefit was estimated as represented by the "not determined" insert.
3) This net economic impact does not include the economic benefit of actions that reduce pollutant concentrations but which do not reduce total emissions as described in note 2.

6.2. Rate of Economic Impact

According to current state regulations and permitting policy, facilities in Wisconsin must be assessed for compliance with the NAAQS when renewing operation permits or obtaining a minor construction permit to increase allowable emissions. Facilities are required to renew operating permits every five years. The Department deems the renewal of operating permits as presenting the fastest potential schedule for incurring the full NAAQS economic impact as identified in Table 9. However, the Department is currently proposing to modify state requirements such that only facilities with Title V permits (major sources) must renew their operating permits every five years. The remainder of facilities (minor sources) will not have to renew their operating permits, but a NAAQS evaluation would be done when a minor construction permit is requested in order to increase permitted emissions. Currently there are 488

facilities in the state that are major sources with a Title V permit and 894 facilities that have minor source operating permits. This equates to 35 percent of total facilities across both permit categories holding Title V permits and 65 percent holding a minor operating permit.

The Department assessed the rate of economic impact under the proposed change to operating permit renewal requirements. Because of the noted difficulties in identifying which facilities may actually need to take action in complying with the NAAQS, the Department simply applied these percentages in estimating the rate at which the economic impact in Table 9 will be realized under the proposed modification of operating permit renewal requirements. Under this approach, 35 percent of facilities would incur the economic impact within five years. The remaining 65 percent of facilities would not be assessed for compliance with the NAAQS until they obtain a minor construction permit.

To estimate the timeframe over which the 65 percent of facilities may incur NAAQS related economic impact, the Department reviewed minor construction permit activity from 2010 through 2012. An average of 43 facilities emitting NO_x and 34 facilities emitting SO_2 obtained a minor construction permit each year over that period. The Department assumed that the pool of facilities statewide that may eventually obtain a minor construction permit is limited to those that emitted more than one ton of either pollutant in 2011. The Department further assumed that any facility incurring cost due to the NO_2 or SO_2 NAAQS would be a subset of this population. Based on this information and assumptions, only 4.6 percent of facilities emitting NO_x would obtain a minor construction permit each year. At this rate, it would take approximately twenty two years (100%/4.6%) before all facilities in the pool would have requested a minor construction permit. Using this same methodology for SO_2, the Department determined that an average 11.4 percent of facilities emitting SO_2 obtained a minor construction permit each year. This is equivalent to an eight year (100%/11.4%) timeframe.

Table 10 shows the results of the two cases discussed for realizing economic impact: (1) based on the current state requirements for renewing operating permits every five years; and (2) based on the proposal that facilities with minor source permits only renew operating permits when obtaining a minor construction permit. This latter case proportions the economic impact by the amount of facilities under minor source permits (65%) and applying the rate of realization for NO_2 (22 years) and SO_2 (8 years).

As noted, the WDNR cannot accurately determine, as part of this analysis, the number of major or minor source facilities that will need to take actions in complying with the NAAQS. Therefore, the percentage of facilities that are major and minor can only be used to illustrate the potential impact to the rate of economic impact after modifying operating permit renewal requirements as proposed.

Finally, there is potential that some facilities affected by the NAAQS are or will be permitted through registration or general operating permits. These facilities would be assessed for compliance with the NAAQS as part of the review for coverage under the registration or general permit or when emission units at these facilities are modified. It is difficult to estimate when these types of permitting actions may occur. However, the number of facilities affected through registration or general operating permits and which may have to take mitigation action in complying with the NAAQS is expected to be small and therefore the impact on the rate of realizing economic impact minimal. Therefore, the Department did not evaluate this potential pathway further.

Table 10. Cases for Realizing Total Net Annualized Economic Impact[1].

Case	NO_2 NAAQS		SO_2 NAAQS	
	Moderate	High	Moderate	High
Case 1:				
Total Net Economic Impact for all facilities potentially realized over 5 years.	$407,036	$2,543,873	(111,893)	$30,681,980
Case 2:				
Major Sources - 35% of Total Net Economic Impact realized over five years.	$142,463	890,356	(39,163)	10,738,693
Minor Sources - 65% of Total Net Economic Impact realized over 22 years for NO_2 and 8 years for SO_2.	$264,573	1,653,517	(72,730)	19,943,287

1) All of the mitigation cases included actions for reducing the concentration of emissions and therefore exposure to the pollutant. However, a factor was not available to attribute a benefit to these actions. A benefit was only determined in cases where total emissions were reduced. Therefore the benefit in all cases is underestimated. In the moderate case for SO_2, the actions solely rely on reducing pollutant concentrations.

References

1. AERMOD Implementation Workgroup. *Draft - Summary of AERMOD Implementation Workgroup (AIWG) Case Studies for 1-hour NO_2 and SO_2 NAAQS*. Provided by modeling staff, Bureau of Air Management.

2. Wisconsin Department of Natural Resources (June, 2012). *Dispersion Modeling Analysis in Support of Economic Impact Analysis for the One-Hour Nitrogen Dioxide (NO_2) Ambient Air Quality Standard*. Memo from John Roth to Joe Hoch, Bureau of Air Management.

3. Wisconsin Department of Natural Resources (March, 2011). *Air Dispersion Analysis of Sulfur Dioxide Sources in Support of the One-Hour NAAQS*. Memo from John Roth to Joe Hoch, Bureau of Air Management.

4. U.S. Environmental Protection Agency (2009). *Integrated science assessment for particulate matter* (EPA/600/R-08/139F). Research Triangle Park, NC: National Center for Environmental Assessment. Retrieved from http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546

5. U.S. Environmental Protection Agency (2010). *Final regulatory impact analysis (RIA) for the SO_2 National Ambient Air Quality Standards (NAAQS).* Research Triangle Park, NC: U.S. EPA Office of Air Quality Planning and Standards. Retrieved from http://www.epa.gov/ttnecas1/regdata/RIAs/fso2ria100602full.pdf

6. U.S. Environmental Protection Agency (2009). *Proposed NO_2 NAAQS regulatory impact analysis (RIA).* Research Triangle Park, NC: U.S. EPA Office of Air Quality Planning and Standards. Retrieved from http://www.epa.gov/ttnecas1/regdata/RIAs/proposedno2ria.pdf

Appendix A

Economic Impact Analysis
For
Board Order AM-08-11

Comments Received During the EIA Solicitation

Geosyntec consultants

1787 Sentry Parkway
Building 18, Suite 120
Blue Bell, PA 19422-2200
PH 610-410-2639
www.geosyntec.com

14 November 2012

Submitted via email to: DNRam1hrSO2NO2Naaqs@wisconsin.gov

Mr. Michael Friedlander
WDNR
PO Box 7921
Madison, WI 53707-7921

Subject: Response to Request for Information
Regarding Proposed Rules in Natural Resources Board Order AM-08-11
Sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) National Ambient Air Quality Standards

Dear Mr. Friedlander:

On behalf of Malteurop North America (Malteurop), Geosyntec Consultants, Inc. (Geosyntec) is pleased to submit comments in response to the WDNR's request for information regarding the proposed rules in Natural Resources Board Order AM-08-11, relating to the adoption of the 2010 1-hour National Ambient Air Quality Standards (NAAQS) for NO_2 and SO_2. The WDNR has indicated that responses to the Department's solicitation will be considered when preparing the Economic Impact Analysis (EIA) for the proposed rules. Our comments are as follows:

1. The fiscal estimate included in the background memo on the Board Order AM-08011, included an evaluation of applicant costs to address the proposed regulation. For the SO_2 NAAQS, the costs include 6 hours of private consulting time and applicant time per project (900 additional hours divided over 150 projects) to address the additional requirements resulting from the SO_2 NAAQS rule revision. In contrast, the NO_2 NAAQS includes an additional 108 hours of private consulting time and applicant time per project (8640 additional hours over 80 projects). It is unclear why the WDNR has assumed that SO_2 will not require a substantial amount of additional time to address the proposed rule change. The WDNR's estimate states that it is assumed that facilities will meet the SO_2 requirements through restrictions on fuel use, fuel switching, or source modification, while NO_2 requirements will be met through restrictions on fuel use or source modification. It appears that the SO_2 estimate does not include sufficient time to complete the evaluation and prepare the appropriate material for the application. Thus, it is requested that the Department revisit the estimate.

2. Sources located within the nonattainment areas for either NO_2 or SO_2 will be required to reduce emissions. It is unclear how the required reductions will be achieved. The Department has not indicated that it will undertake additional rulemaking efforts to develop regulations that will address particular source types and either impose an emission standard (lbs/MMBtu, for example) or require a specific level of emission control (i.e. 90% reduction of SO_2 emissions). Rather, it appears that the Department intends to apply the standards to every source as each source undertakes a permitting action. The Department issued a Guidance Memo detailing the "Revised Approach to Dispersion Modeling for Permits" in April 2011, which outlined modeling procedures for permitting actions. The memo indicates that for operation permits, NAAQS

modeling should be performed. Therefore, a case-by-case modeling analysis will be required for each permitting action to determine if the modeling demonstrates attainment with the NAAQS. If reductions are required, a source-specific evaluation of the options will need to be conducted and additional time will be spent to select a method to reduce emissions on a case-by-case basis. This approach will have a significant impact on the length of time to process permits. Without clear direction from the Department (i.e. technology based requirements or emission standards), permittees may spend inordinate amounts of time to evaluate options to reduce emissions to levels which are determined based on a facilities location. In addition, the Department will be overwhelmed with the increased workload resulting from the source-specific evaluations. It is requested that the WDNR determine the source categories that contribute most significantly to nonattainment with the standard and evaluate the option to develop source specific regulations which will create sufficient reductions to establish attainment with the standards for NO_2 and SO_2.

3. The Department has not identified how the background concentrations will be determined for NAAQS modeling. In the EIA, it is requested that the Department consider establishing the background concentrations based on actual monitoring data as well as source specific emission rate modeling. It is requested that the WDNR document their approach to setting the background concentrations in a technical document that is made available for public review and comment prior to finalization of the document.

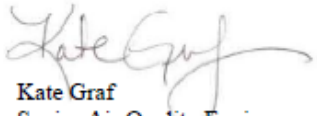
4. The impacts of pending regulations, including: the Cross State Air Pollution Rule (CSAPR) or the Clean Air Interstate Rule (CAIR), Mercury Air Toxics Standards for Electric Generating Units (MATS), Boiler Maximum Achievable Control Technology Rules (Boiler MACT) should be evaluated to determine if emission reductions from these regulatory actions will result in attainment determinations for current nonattainment areas. These regulations apply to electric generation and boiler operations, which are the largest emitters of NO_2 and SO_2 in the state. Specifically, CSAPR requires reductions in annual SO_2 and NO_x emissions in Wisconsin as well as in neighboring states. EPA has estimated that by 2014, CSAPR will reduce power plant SO_2 emissions by 73% from 2005 levels and NO_x emissions by 54%. It is requested that in preparing the EIA, the Department review the impact of these regulatory actions to determine whether attainment may be achieved through implementation of these regulations and provide this information for public review and comment.

5. The Background Memo on Board Order AM-08-11 dated September 12, 2011 (to Members of the Natural Resources Board, from Cathy Stepp, Secretary) includes a small business analysis discussion. Within this portion of the memo, the statement is made that "Permit applicants for minor construction and operation permits will require additional modeling and engineering analysis as a result of this action." This statement implies that minor sources will only require modeling and engineering analysis as a result of the regulation. The Department should further explore this analysis in the EIA, as it is possible that businesses may not be able to demonstrate compliance with the NAAQS standards through their modeling and engineering analysis. Thus, the source may be required to install control technology to reduce emissions, switch fuels, or restrict their operations to levels below what their current permit allows. Each of these options would have a significant economic impact on businesses, well beyond the modeling and engineering analysis costs. In the EIA, the Department should examine the potential for minor sources to require steps beyond the analysis and should include the associated costs for small businesses.

Geosyntec appreciates this opportunity to submit this information on behalf of Malteurop for this important regulatory effort. If you have questions regarding the comments and information provided, please contact the undersigned at (267) 464-2800 x 9027.

Sincerely,

Geosyntec Consultants,



Kate Graf
Senior Air Quality Engineer

CC: John Roth, WDNR
Dave Brunette, Malteurop North America

708 Heartland Trail
Suite 3000
Madison, WI 53717

October 30, 2012

Mr. Michael Friedlander
Wisconsin DNR (AM/7)
P.O. Box 7921
Madison, WI 53707-7921

Subject: Comments and Economic Evaluation of Proposed Rules Regarding the Proposed 1-hr Sulfur Dioxide and Nitrogen Dioxide Air Quality Standards (Natural Resources Board Order AM-08-11)

Dear Mr. Friedlander:

Enclosed please find comments concerning the proposed rules regarding the 1-hr sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) air quality standards. These comments are made on behalf of a client that operates more than 10 processing facilities in Wisconsin. The client has chosen to remain anonymous. In this case, most comments are made on the basis of some air quality modeling analyses that have been conducted to assess how the proposed standards may impact the client's facilities.

Facility Descriptions

Each facility has one or more boilers and also in some cases process water heaters that are fired primarily by natural gas. Five facilities use process heaters fired by natural gas. Some facilities have propane or fuel oil as back-up. Some facilities also have emergency generators powered by diesel engines. It is understood that current Wisconsin Department of Natural Resources (WDNR) policy would apply and the WDNR would not consider emergency generator units in modeling analyses for the proposed 1-hr standards.

Two facilities were chosen for modeling analyses to see if compliance with the proposed 1-hr air quality standards was likely. The first facility has about 3 times higher permitted boiler capacity (just under 100 mmbtu/hr on natural gas or oil) than the second facility (about 35 mmbtu/hr on natural gas or oil). While the smaller facility utilizes one boiler at a given time with that rating, it actually has two boilers present of similar size. The first facility is assumed to be representative of the client's larger facilities. The second facility is assumed to be representative of the client's smaller facilities.

In general, the facilities that have oil capability utilize ultra-low sulfur content fuel oil so the 1-hr SO_2 air quality standard is not likely to be a significant issue, although many are permitted to burn a higher sulfur content fuel oil.

Modeling Assessment

This client will be primarily affected by the 1-hr NO_2 standard. The facilities were evaluated with the AERMOD dispersion model for compliance with the proposed 1-hr NO_2 air quality standard. Standard WDNR-prescribed modeling procedures were used in the analysis. A representative set of meteorological data obtained from the WDNR's website were used for each site. Regulatory default model options for the AERMOD model were used. For the conversion of NOx to NO_2, a generic factor of 0.80 was used consistent with current United States Environmental Protection Agency (USEPA) guidance. Emissions rates for the combustion sources were based upon emission factors found in the USEPA's AP-42 document.

Air quality modeling results depend on many variables, including the following items.

- **Stack height:** For both facilities, the stacks are not at GEP height. The heights range from 45 feet to 63 feet tall. The stacks are subject to building downwash.
- **Receptor location:** Current WDNR modeling policy would require relatively close placement of receptors due to a lack of fence lines even though facility property boundaries can be considerably further away.
- **Emission rates:** Emissions of NOx per unit of heat input are higher for oil than for natural gas. Current WDNR policy is to model the worst-case fuel, although for this assessment both natural gas and fuel oil were considered.

The AERMOD model predicted the following results.

- **Small facility:** The worst-case impact was greater than the proposed NO_2 standard by a factor of 2-3 depending on fuel type. The facility's impact when combusting natural gas was above the proposed NO_2 standard.
- **Large facility**: The worst-case impact was greater than the proposed NO_2 standard by a factor of 2-3 depending on fuel type. The facility's impact when combusting natural gas was above the proposed NO_2 standard.

Mitigation of Predicted High Impacts

We are aware of three ways to reduce the predicted impacts (short of not combusting any fuel).

1. Lower emissions by using low-NOx burners.
2. Lower emissions by eliminating back-up fuel (oil).
3. Increase dispersion by adding stack height.

Additional analyses has shown that some combination of these three methods would likely be necessary.

Costs of Mitigation

- **Install low-NOx burners – Boilers:** A January 2009 document produced by NESCAUM (Northeast States for Coordinated Air Use Management), titled "Applicability and Feasibility of NOx, SO_2, and PM Emissions Control Technologies for Industrial, Commercial, and Institutional (ICI) Boilers," has estimated that the cost of low-NOx burners ranges from $3,021 (for a 50 MMBTU/hr boiler) to $7,617 (for a 10 MMBTU/hr boiler) per MMBTU/hr heat input (from Table 2-4 in the referenced document).

  The capital cost for this client to install low-NOx burners for the facilities that were modeled (using an average cost figure) is $372,330 for the small facility and $500,000 for the larger facility.

  Note that a switch to low-NOx burners alone (generally reducing emissions by ½) would not result in predicted compliance with the 1-hr NO_2 standard in these cases.

- **Install Low NOx burners – Process Heaters:** The client operates process heaters fired by natural gas for 5 facilities that vary in total rating from 10 to 30 MMBTU/hr per facility. Should low NOx burners be needed to come into compliance (likely), the additional cost would range from $53,000 to $160,000 per facility. Additional stack heights could be needed as well (cost addressed below).

- **Eliminate back-up fuel:** This change could significantly increase the cost a facility would pay for its primary fuel. It would also not be advisable for a facility to not have an emergency back-up fuel.

- **Increase stack heights:** The cost of this option is highly variable depending on the size of the stack, the number of stacks, the extent of the increase in height needed, and the underlying structural support. For this client, it is generally considered that the

costs may range from $20,000 to $50,000 per facility for boilers and $50,000 per facility for process heaters. In addition, local zoning requirements may limit the amount of additional height that can be added in a given situation. It is also likely in many cases that stack height alone will not solve the NO_2 impacts due to the practical and engineering considerations of increasing the height.

- **Additional costs of mitigation:** In some cases, a WDNR permit modification may be necessary to make the required changes to come into compliance. WDNR permit fees could range from $6,000 to $15,000.
- **Consultant Fees:** Fees to assess what changes are required and to prepare the necessary documentation and permit applications could range from $3,000 to $7,000 per facility.

Total Cost of Mitigation

If current WDNR modeling policies are followed, the solutions to the predicted unacceptably high 1-hr NO_2 values will likely be a combination of the use of low-NOx burners and stack heights.

On the basis of data in the NESCAUM report, to switch to low-NOx burners, the client may have to spend an average of $350,000 per facility (low of $93,000, high of $530,000) for boilers alone, and $53,000 to $160,000 per facility (5 facilities) for process heaters. If all facilities were to need modifications, the total cost could be in excess of $4,800,000. Additional stack heights and permit/consultant fees may add another $25,000 to $105,000 per facility.

Recommendations for Implementation

It is understood that the WDNR must adopt the 1-hr NO_2 and SO_2 standards.

On behalf of its client, TRC presents the following recommendations for consideration in the implementation phase of the standards. These comments are supported by the simple fact that natural gas is a clean fuel by any reasonable definition and does not have any practical substitute for industrial energy generation applications.

- Allow air quality modeling to be based on property lines and not fence lines for state-only permits. In the case of this client, this switch in policy (all facilities are minor sources) could make the difference between needing the expensive low NOx burners or using the less expensive option of simply modifying stack heights.

- Consider for non-major source permitting that modeling of emissions from clean fuels, such as natural gas or propane, is not required if the stacks used are vertical and taller than the surrounding buildings.
- Preserve the exemption in modeling policy for emergency generators.
- Exempt emissions from back-up fuels used in case of interruption or emergency from an air quality modeling requirement for the 1-hr NO_2 or SO_2 standard. A policy like this is consistent with the statistical nature of the standards. The standards are based on more or less continuous emissions through the course of a year, which is something that would not happen with a back-up fuel. Such a policy is also consistent with the policy for emergency generators.

We appreciate the opportunity to comment on, and present information concerning, the proposed rules.

Sincerely,

TRC Environmental Corporation

David J. Fox, CCM
Senior Environmental Specialist

APPLETON Coated

October 8, 2012

Mr. Michael Friedlander
Wisconsin Department of Natural Resources (AM/7)
PO Box 7921
Madison, Wisconsin 53707-7921

Re: Request for Information and Advice on the Economic Effect of the Proposed NAAQS – Natural Resources Board Order AM-08-11

Dear Mr. Friedlander,

This letter is in response to your request for information and advice on the economic effect of the proposed 1-hour National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO_2) and sulfur dioxide (SO_2). We understand that you will be using this information in an economic impact analysis for the proposed NAAQSs.

Appleton Coated LLC (Appleton Coated) produces high-end coated paper at a facility located at 540 Prospect Street in Combined Locks, Wisconsin. We employ over 600 people. Our facility has a Standard Industrial Code (SIC) of 2621 and operates under WDNR Permit No. 445031290-P01 as well as several construction permits. Our operations include paper machines, coating operations, boilers, a combustion turbine generator, a water filtration plant, and a wastewater treatment plant. One of our boilers is permitted to burn coal, wood, paper pellets, natural gas, and wastewater treatment sludge. Two other boilers are permitted to burn natural gas and fuel oil. Various processes use natural gas for heating.

Please note that it is very difficult to accurately quantify the impact of the proposed NAAQSs on our company at this time because of the following:

- The attainment status of our facility location with the proposed standards is not known.
- Our impact on ambient air quality with respect to emissions of NO_2 and SO_2 is uncertain.
- Regulations for facilities in non-attainment areas relative to the proposed standards have not been established.

As a result, we have made assumptions based on the characteristics of our emission units and our professional judgment regarding potential emission control units and costs. The cost estimates presented should be considered preliminary and are subject to change.

ITEM A

The following are our responses to Item A on page 2 of your request.

Combined Locks Mill

540 Prospect St., P.O. Box 129
Combined Locks, WI 54113-0129
920-788-3550

1. Economic Impact of The Proposed Rules Including Implementation and Compliance Costs

Proposed SO_2 NAAQS

The impacts associated with the proposed SO_2 NAAQS relate primarily to coal burning operations at our Boiler No. 10. We anticipate that implementation of the standard could result in the need for a scrubber unit in addition to our current controls at Boiler No. 10. The estimated capital cost for the scrubber unit is $10 million. Annual operation and maintenance costs are estimated to be $500,000.

We anticipate that our use of low sulfur fuel oil will be sufficient to achieve the SO2 NAAQS source requirements for oil burning at our Boiler Nos. 9 and 11.

Proposed NO_2 NAAQS

The proposed NO_2 NAAQS will likely have a significant impact on our emission units that burn natural gas.

At Boiler No. 10, the standard may require installation of an ammonia injection system having a potential capital cost of $3 million and an annual operation and maintenance cost of $250,000. The cost could be significantly higher if it is necessary to install a selective catalytic reduction (SCR) unit in order to meet the NO_2 NAAQS at Boiler No. 10.

At Boiler No. 9, we anticipate it may be necessary to install a low NOX burner and a SCR unit having a capital cost of $3 million and an annual operation and maintenance cost of $100,000.

At Boiler No. 11, we anticipate it may be necessary to install a SCR unit having a capital cost of $2 million and an annual operation and maintenance cost of $100,000. Boiler No. 11 already has a low NOX burner.

There are also various emission units other than boilers that use natural gas as a fuel source. The stacks associated with these sources are closer to the ground than the boiler stacks. It may be necessary to raise the stacks of these other sources at an estimated capital cost of $500,000.

Combined Impacts of the Proposed NO_2 and SO_2 NAAQSs

In order to assess the impact of the proposed NAAQSs on our facility, we anticipate it will be necessary to hire a consultant to complete extensive air emission dispersion modeling for the various sources of NO_2 and SO_2 emissions. The estimated cost for air dispersion modeling is $100,000.

In addition, we anticipate that it will be necessary for an engineering consultant to evaluate our emissions, complete feasibility studies, preliminary design, and final plans and specifications for new emission control units and stacks. We estimate the cost for engineering design services will be approximately $500,000.

2. Assessment of How Effective the Proposed rule will be in Addressing the Policy Problem that the Rule is Intended to Address

We anticipate that the rule will result in reducing SO_2 and NO_2 emissions. We are not able to assess the impact of the proposed rule on meeting the ambient air quality standards.

3. Alternatives to the Proposed Rule

We are committed to reducing the amount of coal used for combustion at Boiler 10. Our efforts over the last five years have resulted in significantly lower actual emissions of SO_2. To reduce coal usage we are using alternative fuel sources such as paper pellets and wood. Our air permits currently restrict the amount of paper pellets and wood that we can use at Boiler No. 10. We believe that our SO_2 emissions will continue to significantly decline if we have more flexibility with regards to the amount of wood and paper pellets we can burn.

4. Adverse Effects of the Proposed Rule

Appleton Coated cannot afford the anticipated costs listed above for the new emission control units. Implementation of the rule could force us to increase our prices and be less competitive in the market. This could potentially force us out of business with a resulting loss of over 600 jobs.

ITEM B

The following are our responses to Item B on page 2 of your request.

1. Distinguish Whether Economic Impact is caused by NAAQS for NO_2, SO_2, or both

The economic impacts described in response to Item A1 distinguish between those impacts related to the proposed NAAQS for NO_2, SO_2, and both.

2. Differentiate Between the Economic Impact Caused by Other Federal Air Pollution Rules and the Proposed 1-hour NAAQSs for NO_2 and SO_2

The economic impacts described above in Item 1A do not include anticipated impacts from other federal rules, including the Boiler Maximum Achievable Control Technology (MACT) rules. We anticipate that compliance with the Boiler MACT rule would likely result in additional controls other than what are described above because of the different pollutants targeted by the Boiler MACT rule.

3/4. Name and Title of the Person Preparing the Information, Contact Person, and the Name of the Business

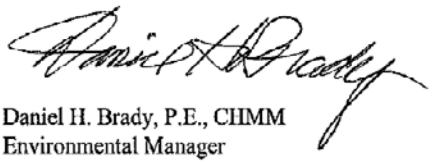
The information in this letter was prepared by Dan Brady, P.E., CHMM. He is the contact person and his title is Environmental Manager. The business name is Appleton Coated LLC.

5. E-Mail Address of Contact Person

The email address for Dan Brady is dbrady@appletoncoated.com.

Please contact Dan Brady if you have questions or need additional information. Thank you for your consideration of our information in preparing the economic impact assessment.

Sincerely,
APPLETON COATED LLC



Daniel H. Brady, P.E., CHMM
Environmental Manager

c: Angela James, Wisconsin Paper Council

DAIRYLAND POWER
COOPERATIVE

September 20, 2012

Bart Sponseller, Director
Bureau of Air Management
Wisconsin Department of Natural Resources
101 S. Webster St.
P.O. Box 7921
Madison, WI 53707-7921

Dear Mr. Sponseller:

SUBJECT: Economic Impact of New NAAQS for NO_2 and SO_2

In multiple recent emails to Dairyland Power Cooperative (DPC) personnel, the WDNR asked for feedback concerning the economic impact that might be realized by DPC as a result of Wisconsin's adoption of the new 1-hour National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO_2) and sulfur dioxide (SO_2).

Most notably, DPC is in the design engineering phases of a series of projects, including ones specifically for reducing emissions of NO_2 and SO_2. These include dry sorbent injection for control of SO_2 and other acid gases to be installed initially at our J.P. Madgett (JPM) unit and eventually installed at our Alma 4 & 5 units; selective catalytic reduction for control of NO_2 to be installed at JPM, and selective non-catalytic reduction for control of NO_2 to be installed at our Genoa 3 (G-3) unit. DPC also plans to install fabric filtration systems for control of particulate matter at one or both Alma units, and activated carbon injection for control of mercury at multiple units. The last of these system installations is planned to be completed by the end of 2015.

Due to the extensiveness of the above additional controls and the associated reductions in emissions, DPC does not anticipate adding more controls for NO_2 and/or SO_2 in the foreseeable future. DPC cannot, however, predict each upcoming project that might require permitting, and most importantly, it cannot anticipate what the emissions impact of any given project will be when evaluated against the NAAQS. It is reasonable to expect a limited number of projects to

trigger PSD permitting, but DPC has no plans or expectations on which to base any specific projection of such projects and, therefore, has no basis for projecting the magnitude of any economic impact.

Sincerely,

Doug Erwin
Manager, Air Quality Programs

DLE:krm

cc: Mike Friedlander, WDNR - Madison

Don Huff
Steve Hynek
Rob Palmberg
Lane Peters
Brian Treadway

Mike Friedlander
Department of Natural Resources (AM/7)
PO Box 7921
Madison, WI 53707-7921

RE: Economic Impact Analysis for AM-08-11

Dear Mr. Friedlander,

Thank you for the opportunity to provide input on the economic impacts of proposed administrative rule AM-08-11, which would codify the federal national ambient air quality standards (NAAQS) for sulfur dioxide (SO2) and nitrogen dioxide (NO2) in Chapter NR 404 of the Wisconsin Administrative Code. WMC greatly appreciates the opportunity to provide input on this analysis.

In response to the request for information, WMC contacted members in the manufacturing, transportation and energy sectors of our economy to assess projected costs of the proposed rule. Each of these sectors expects to experience increased costs as a result of the new standards. Quantifying these costs with precision is difficult because there are many unknown factors related to implementation of the rule at this time. How the department chooses to implement these standards from an air permitting perspective will have significant bearing on the cost to industry.

For example, our members indicated that the cost of modeling each of the new standards for a given facility will range from $6,000 to $20,000 or more depending upon the complexity of the facility. Many of these facilities are minor source/small manufacturers that either do not need a permit in other states, or that do not undergo modeling in other states. If the Wisconsin DNR chooses to routinely require modeling for these types of facilities for the proposed SO2 and NO2 standards, many small businesses are likely to see increased costs in the range noted above. Similar facilities in other states are not likely to incur those costs because other states typically require far fewer sources to be modeling than does Wisconsin.

Other implementation issues that may significantly impact compliance costs relate to modeling inputs and assumptions. For example, the values the Department uses for urban and rural background may have significant impacts on modeling results, which in turn can have significant implications relative to costly compliance burdens. Similarly, choosing to model only the primary fuel used at a facility is very likely an opportunity for the Department to help contain compliance costs.

If modeling for either the SO2 or NO2 standard predicts a need for changes at the facility to demonstrate compliance, those costs could be considerable. For example, businesses could face hundreds of thousands of dollars in capital costs to raise the height of their emission stack to achieve better dispersion. If pollution control equipment is required, the costs would be measured in the millions of dollars for each facility.

Other potential compliance options to "pass" modeling include permit limits to reduce operational capacity in terms of the number of hours of operation, reduced production shifts, etc. In addition to the opportunity cost and lost revenue associated with forced reductions in production capacity, there would be an economic impact to employees who would experience fewer hours or days of work.

WMC appreciates that these are federal standards that are required by law to be adopted in Wisconsin's administrative code. It is clear from our members that the new standards are extremely likely to increase costs for Wisconsin businesses. Those impacts will vary widely – some businesses will see higher costs measured in thousands of dollars, while others may face multi-million dollar costs.

Although Wisconsin does not have any choice but to adopt the new standards, we will have discretion as it relates to the manner in which the standards are implemented. The Wisconsin DNR has an opportunity to minimize many of these costs based upon implementation decisions. WMC urges the DNR to implement the rules in a manner that recognizes the financial impact to Wisconsin businesses, and which attempts to minimize those cost impacts. Our organization stands ready to work with Department staff toward that end.

Thank you again for the opportunity to provide these comments. Please feel free to contact me if you have any further comments or questions.

Sincerely,

SCOTT MANLEY
Director of Environmental & Energy Policy

Appendix B

Economic Impact Analysis
For
Board Order AM-08-11

Estimated Cost for Mitigating Measures
For
Wisconsin Facilities in Meeting
The
SO_2 and NO_2 NAAQS

Table B1. Mitigation Options and Estimated Cost if SO_2 NAAQS Applies to All Facilities.

Source category	Mitigation Option	No. of facilities	No. of units	Baseline Emissions (tpy)	Control Efficiency	Reduced Emissions (tpy)	Capital (1000$)	Annual Cost (1000$)	Cost Effective-ness ($/ton)
Cost Case - Estimated									
Boilers - solid fuel fired		-	-	-	-	-	-	-	-
Metal Furnaces - solid fuel fired		-	-	-	-	-	-	-	-
Refinery Processes		-	-	-	-	-	-	-	-
Boilers, Asphalt Plants, Processes - distillate oil	Stack Modification	22	27	27	NA	NA	177	22	NA
Boilers, Asphalt Plants - residual	Stack Modification	20	26	94	NA	NA	541	68	NA
Engines - diesel fired	Stack Modification	6	8	96	NA	NA	51	6	NA
Engines - biogas	Stack Modification	3	8	220	NA	NA	50	6	NA
Total		**51**	**69**	**437**	**NA**	**NA**	**818**	**103**	**NA**
Cost Case - High									
Boilers and Furnaces - solid fuel fired	DSI	1	2	1,908	45%	858	687	858	1,000
Metal Furnaces - solid fuel fired	Stack Modification	2	4	277	NA	NA	163	20	NA
Refinery Processes	Stack Modification	1	1	247	NA	NA	114	14	NA
Boilers, Asphalt Plants, Processes - distillate oil	Ultra-Low Sulfur Dist	22	27	27	97%	26.5	-	1,456	54,941
Boilers, Asphalt Plants - residual	Dist	20	26	94	10%	8.9	541	880	98,486
Engines - diesel fired	Ultra-Low Sulfur Dist	6	8	96	97%	93	-	351	3,754
Engines - biogas	Iron Sponge	3	8	220	90%	198	201	1,211	6,127
Total		**55**	**76**	**2,869**	**59%**	**1,184**	**1,706**	**4,790**	**4,044**

NA – Not Applicable: The stack modification is the only option applied in reducing exposure to pollutant concentrations. Stack modifications do not reduce total emissions, therefore "control efficiency", "reduced emissions" and "cost effectiveness" per ton of reduced pollutant are not applicable for stack modifications.

DSI – Dry Sorbent Injection, Dist – Distillate Fuel Oil

Table B2. Mitigation Options and Estimated Cost if NO_2 NAAQS Applies to All Facilities.

Source category	Mitigation Option	No. of facilities	No. of units	Baseline Emissions (tpy)	Control Efficiency	Reduced Emissions (tpy)	Capital (1000$)	Annual Cost (1000$)	Cost Effective-ness ($/ton)
Cost Case - Estimated									
Boilers: Solid Fuels	Stack Modifications	3	8		NA	NA	239	30	NA
Lime Kilns	Stack Modifications	1	2	386	NA	NA	80	10	NA
Waste Incinerators									
Glass Furnaces									
Metal Furnaces	Stack Modifications / Limited LNB	10	18	421	29%	121	803	100	829
Boilers: Gaseous and Oil	Stack Modifications / Limited LNB	71	135	1,026	12%	121	283	3	NA
Processes	Stack Modifications / Limited LNB	35	52	579	16%	90	780	97	1,085
Process Heaters	Stack Modifications	64	111	625	NA	NA	560	70	NA
Combustion Turbines									
IC Engines	Stack Modifications	47	90	1,292	NA	NA	287	36	NA
Total		**231**	**416**	**4,330**		**332**	**3,032**	**346**	**1,042**

NA – Not Applicable: The stack modification is the only option applied in reducing exposure to pollutant concentrations. Stack modifications do not reduce total emissions, therefore "control efficiency", "reduced emissions" and "cost effectiveness" per ton of reduced pollutant are not applicable for stack modifications.

Limited LNB – The applied stack modifications cannot ensure that pollutant concentrations will not exceed the NAAQS. Addition reduction is achieved by applying low NOx burners (LNB).

Table B2. Mitigation Options and Estimated Cost if NO_2 NAAQS Applies to All Facilities – Contd.

Source category	Mitigation Option	No. of facilities	No. of units	Baseline Emissions (tpy)	Control Efficiency	Reduced Emissions (tpy)	Capital (1000$)	Annual Cost (1000$)	Cost Effective-ness ($/ton)
Cost Case - High									
Boilers: Solid Fuels	Stack Modifications	15	24		NA	NA	674	323	NA
Lime Kilns	Stack Modifications	4	8	1,308	NA	NA	320	40	NA
Waste Incinerators	Stack Modifications	1	2	276	NA	NA	154	19	NA
Glass Furnaces	Stack Modifications	2	2		NA	NA	317	40	NA
Metal Furnaces	Stack Modifications / LNB	14	23	486	50%	241	1,193	673	2,800
Boilers: Gaseous and Oil	Stack Modifications / LNB 10%Pop.	71	135	1,026	14%	148	2,494	312	2,103
Processes	Stack Modifications / LNB 10%Pop.	35	52	579	22%	126	1,013	127	1,002
Process Heaters	Stack Modifications / LNB 10%Pop.	64	111	625	5%	31	901	113	3,621
Combustion Turbines	Stack Modifications	19	33	526	NA	NA	263	33	NA
IC Engines	NOx Catalyst (40% control)	94	150	2,583	20%	517	1,057	204	395
Total		**319**	**540**	**7,409**		**1,063**	**8,386**	**1,883**	**1,772**

NA – Not Applicable: The stack modification is the only option applied in reducing exposure to pollutant concentrations. Stack modifications do not reduce total emissions, therefore "control efficiency", "reduced emissions" and "cost effectiveness" per ton of reduced pollutant are not applicable for stack modifications.
LNB – low NOx burner.