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September 5, 2014

Via Hand Delivery

Ms. Angela Dickens
Wisconsin Department of Natural Resources
GEF II Central Office
101 South Webster Street
Madison WI 53703

Subject: Environmental Protection Agency's (EPA) Clean Power Plan Proposal

Dear Ms. Dickens:

Madison Gas and Electric Company (MGE) appreciates the opportunity to provide responses to the questions posed in your August 4, 2014, email. These responses are based on our current understanding of the proposal, and as we continue to review the documentation, our understanding of the rule and potential issues may adapt.

MGE participated in the utility group response to the Wisconsin Department of Natural Resources/Public Service Commission of Wisconsin (PSCW). Our comments below are supplemental to those responses prepared by the group.

We organized our comments in a way that provides a response to each of the main categories of questions rather than answer each question individually. While taking each question into account, we focused our response on areas of particular interest to MGE or where we wanted to expand on the responses made by the utility group.

A. Overarching Issues

1. Electrical Reliability

The EPA's Integrated Planning Model (IPM) assumes the retirement of over 17 coal units in the state, including Columbia 1 and 2 of which MGE is part owner. The IPM assumes most of the remaining coal units in the state will each operate at close to an 80 percent annual capacity factor. For generation and transmission system reliability, it would be more favorable to spread the energy across more units rather than assume the retirement of so many base load coal units.

In order to allow specific units or entire plants to retire early, MISO will need to conduct transmission system studies to determine what transmission improvements will be required. Some units may need to operate as system support resources until enough upgrades to the transmission system are made to allow an entire plant in certain parts of

the state to retire. Units should not be forced to retire to meet an average emission rate unless these MISO studies are considered.

2. Stranded Costs

MGE is part owner of Columbia 1 and 2, both of which are retired in the EPA's 2025 scenario. Significant recent investments have been made in pollution control equipment on both units as well as investments in other improvements. All these projects were approved by the PSCW. The co-owners have made these investments with the intent to operate the Columbia units well past 2025. The proposed rule does not appear to include stranded costs when calculating the cost per ton for each building block.

B. Setting State Goals

1. Baseline Date

The goal calculation and 2012 baseline fail to recognize early actions taken by utilities between 2005 and 2012. Since 2005, MGE has retired one coal boiler at Blount Generating Station (Blount) and switched from coal to natural gas on two other boilers. This equates to 30 megawatts (MW) of coal generation retired and an additional 100 MW switched from coal to natural gas. In addition, renewable resources have been added and demand efficiency programs have been increased. For example, approximately 30 MW of wind capacity were added at MGE's Top of Iowa Wind Farm site beginning in 2008. These early, voluntary actions to reduce carbon dioxide (CO_2) emissions are significant and should be credited to MGE and its customers.

2. Building Blocks

The goal computation does not consider the interaction among the four building blocks. The goals need to be evaluated together rather than individually in order to calculate more appropriate goals. As the goals stand now, the four building blocks alone will not technically be able to achieve the desired outcome. Additionally, there appears to be many errors in the data and assumptions used by the EPA to calculate the goals. For example, the thermal energy produced at MGE's West Campus Cogeneration Facility (WCCF) was not included in the goal calculation for Building Block 2. These will need to be evaluated on a case-by-case basis in order to determine what a more realistic goal for the state should be.

a. Building Block 1: Heat Rate Improvements

MGE is co-owner of two coal-fueled power plants, Columbia Energy Center (Columbia) and Elm Road Generating Station (ERGS). A number of projects at Columbia have been done since 2005 with the goal of improving heat rate and efficiency of the units. These units are continuously evaluated to determine whether there are cost-effective projects available to operate the units as efficiently as possible. Most of the operational "best practices" assumed by Building Block 1 to

increase heat rate by 4 percent are already being done. The equipment upgrades assumed to increase heat rate by 2 percent are already occurring at Columbia because the co-owners deemed them to be cost-effective. Large equipment upgrade projects such as turbine upgrades currently under way at the facility have also been approved by the PSCW. In addition, emission controls at Columbia are currently being installed, which will likely degrade the heat rate of the units. Thus, it may be very difficult for Columbia to be able to achieve an improvement in heat rate of 6 percent from 2012 levels. Similarly, ERGS is one of the newest supercritical plants in the country, and it is unlikely there are any project upgrades available that would improve the heat rate of those units. Consequently, the assumed 6 percent heat rate improvements do not appear realistic for either Columbia or ERGS. Source-specific information needs to be factored into this building block.

b. Building Block 2: Increased Dispatch of Natural Gas Combined-Cycle (NGCC) Units

MGE owns the WCCF which was designed as and is currently operated as a load-following resource. Since it was built in 2005, the maximum annual capacity factor it has reached was 19.5 percent in 2012. It is possible that there are several factors such as water withdrawal permit limits or other operational limits that could prevent the WCCF from reaching 70 percent capacity factor on a long-term basis. These potential limitations require additional evaluation to determine the maximum capacity factor of this facility. If environmental permits require changes to allow for a 70 percent capacity factor, there must be sufficient time allowed for the permits to be changed, which is unlikely to occur prior to 2020 if state plans are not approved until 2018 or 2019. Also, if other environmental restrictions prevent the WCCF's ability to operate at a 70 percent capacity factor and these restrictions cannot be changed, this should be factored into the targets.

Another item of consideration at the WCCF is that duct firing will likely be required to reach a 70 percent capacity factor. If duct firing is included in the heat rate, the overall CO_2 emission rate will be slightly higher than what the EPA assumed when setting the goal for the state.

Finally, it is crucial that NGCC units such as the WCCF get credit for 100 percent of the thermal energy produced when calculating the CO_2 emission rate from the facility. The carbon expended for electric generation can also produce thermal energy that a heating plant would otherwise have to produce at the expense of more carbon.

If the WCCF is no longer available to MGE as load-following capacity, other types of units may be needed to ensure reliability in the service area, such as natural gas boilers at Blount, simple-cycle combustion turbines, coal units, or diesel generators. Some of these types of units are not included in this rule because they are low-utilization units but have very high emission rates. The increased use of these types of units as load-following capacity (often as a supplement to renewables) could result in

an inadvertent increase in actual CO_2 emissions that haven't been quantified in this proposal.

c. Building Block 3b: Increased Generation of Renewable Energy

MGE owns significant renewable resources out of state which is in part because these locations present better wind resources. These out-of-state facilities must be made available for compliance with Wisconsin's goal. MGE has also invested in biogas-fueled generating units such as landfill gas-fueled generators and agricultural digesters. Consistent with how biomass generation is treated in the goal calculation, these projects should maintain a zero-carbon emitting status (including landfill gas and digester gas).

d. Building Block 4: Increased Energy Efficiency

The implementation and tracking of energy efficiency should be decided through the State's implementation plan process and be consistent with the State's Renewable Portfolio Standards program. Full credit should be given to Wisconsin's Focus on Energy program.

C. Compliance With the Rule

1. Compliance Flexibility

There should be as much compliance flexibility as possible. An important item for MGE, which will be essential to meet the goals, is that the WCCF gets credit for 100 percent of the thermal energy produced from the facility. In addition, options that are not the "best system of emission reduction" should be available for compliance such as heat rate improvements or redispatching to other natural gas units such as Blount, which is not a combined-cycle facility and is not included under Building Block 2. MGE should also receive full credit for the boiler retirements and fuel switching done at Blount since 2005, which equates to 30 MW of coal generation retired and an additional 100 MW switched from coal to natural gas. Early action should not be penalized. It also should be recognized that it will be harder for states like Wisconsin that have taken early steps to reduce CO_2 emissions to achieve additional reductions than those states that failed to take those early steps.

2. Responsible Parties

MGE feels that we should be responsible for only those activities which are under our direct control and jurisdiction. The implementation of enforceable programs required to meet the emission goals will need to be determined through the State's implementation plan.

3. **Rate- and Mass-Based Standards**

   To effectively comment on any of the rate- vs. mass-based approaches, the EPA owes the states and regulated community reconciliation of the mass reduction statements (30 percent mass reduction from 2005 to 2030) with the rate-based goals (32 percent reduction in Wisconsin rates from 2012 to 2030). Only then can anyone meaningfully compare approaches and adequately comment.

4. **Expansion of Renewables**

   If wind resources are only allowed to be added within a state's borders for compliance, the cost for compliance in Wisconsin will be higher on a kilowatt-hour-produced basis than if wind is allowed to be built out of state given the limited favorable wind sites in Wisconsin.

   Additionally, two of Wisconsin's primary renewable resources are biomass and biogas. It is important that the expansion of these resources be allowed as a compliance option.

5. **Trading Program**

   The EPA will need to evaluate whether there would be sufficient credits available to make a trading program feasible. A trading program over a larger region would be needed to make this a viable option.

6. **Treatment of Biomass**

   As stated above, biomass and biogas should be available as renewable resources for compliance with the rule. MGE has invested in both landfill gas and agricultural digesters as electrical generation sources, which should be given credit for the methane reduced. At a minimum, these types of sources should be considered zero-carbon emission sources. Since methane has a CO_2 equivalency factor of 25, the use of methane as a fuel further reduces emissions of greenhouse gas by directly removing methane emissions and reducing the amount of fossil fuel used to generate electricity, which should also be given credit as a compliance strategy in the rule.

We hope you find these responses to your questions helpful. If you would like to discuss them, please feel free to contact me at 608-252-7060 or jjaeckels@mge.com.

Sincerely,

Jeffrey M. Jaeckels, P.E.
Director - Safety and Environmental Affairs

bjb
cc: Ms. Delanie Brewer, PSCW (via ERF)