Impact of Emerging Environmental Regulations on Naughton Unit 3 Decision-making

Mercury and Air Toxic Standards

To effectuate extended operation of a coal fueled Naughton Unit 3 beyond April 16, 2015 (effective date of the MATS rule), will require a MATS compliance plan for the unit. The MATS standard requires compliance with three emission limits.

The output of Naughton Unit 3 will be restricted from the effective date (April 16, 2015) of the MATS rule through December 31, 2017 as the unit continues to be coal fueled. The interim operating restriction and emissions will be managed by imposing enforceable operating and emissions limits.

The MATS emission limits and compliance requirements as published in the February 16, 2012 *Federal Register* are:

- Mercury ("Hg") - Hg not to exceed 1.2 pounds per trillion British thermal units ('lb/TBtu") based on the average of 30-boiler operating days.
- Non-mercury metals - emit less than 0.030 lb/mmBtu for front-half PM or a combined emission rate of 0.000050 lb/mmBtu for the total specific metals identified in the standard.
- Acid gases - emit less than 0.20 lb/mmBtu SO_2 or emit less than 0.0020 lb/mmBtu for hydrogen chloride ("HCl").

Naughton Unit 3, based on the Company's recent testing, can meet the acid gases MATS limit, but will have difficulty meeting the mercury and non-mercury metals MATS limits without additional equipment and/or derating of the unit.

Multiple units at a plant site are allowed under the MATS rule to be averaged together to demonstrate compliance with individual emissions limits. For mercury, averaging would require the plant-wide average mercury emissions to be less than 1.0 lb/TBtu. Compliance parameters for non-mercury metals and acid gases would not change with a plant-wide averaging approach. Based on the potential to average Naughton Unit 3 emissions with those from Naughton Units 1 and 2, tests were performed in March and April of 2012 to understand how the emissions rates changed between these units. Unfortunately, Naughton Unit 1 was off-line, and only Units 2 and 3 were tested.

Mercury

While specific testing of mercury emissions reduction equipment/systems has not been completed at Naughton, current unit performance and mercury emissions testing at the Company's Jim Bridger plant provides confidence that mercury compliance can be achieved through the installation of a coal oxidizer system combined with a FGD additive system on Naughton Unit 3, similar to what is anticipated for Naughton Units 1 and 2. Current mercury emissions are close to complying with the federal standard without additives. While the older Naughton Units 1 and 2 will install a permanent system, a temporary system would be installed on Naughton Unit 3 to minimize costs for a system only expected to be in service for approximately three years.

Non-mercury Metals

Recent testing at Naughton Units 2 and 3 was completed as various loads. Results indicate that non-mercury metals MATS limits will be difficult to meet at full

load and will be subject to considerable variability due to difficulty in reliably measuring trace elements, limiting confidence in maintaining compliance. After April 16, 2015, it will be necessary to demonstrate compliance with the non-mercury MATS through quarterly emission tests that may be difficult to meet in either direct measurements on Unit 3 or averaging with all units on the plant site. It will be difficult to meet the non-mercury metals MATS limit on Unit 3 without averaging this unit's emissions with the emissions from Units 1 and 2. Potential ramifications for failing to pass a quarterly test could involve a combination of fines and equipment additions to insure future compliance. Putting Naughton Units 1 and 2 at risk of failure to comply with the non-mercury metals MATS limit by averaging them with Unit 3 was not recommended.

A comparison of PM testing completed in March 2012 was compared to testing done in April 2012. The data indicates that there is considerable variability in the measured PM emissions even when the tests are conducted only a month apart. This variability raises significant concerns with the unit's ability to consistently meet the PM MATS limit. Not only is compliance questionable at full load, but the results would indicate that load would need to be restricted to approximately 70% in order to have confidence in being able to meet the 0.030 lb/mmBtu standard. For Naughton Unit 3, a 30% derate is equivalent to a net reliable 99 MW restriction. It is anticipated that a permanent 30% load restriction when firing coal would need to be imposed on the unit in order to meet the MATS PM limit. Such a restriction would be enforced by limiting the hourly heat input

or MW output of the unit. Validation of compliance with the PM rate and the established load restriction would be done by conducting quarterly PM tests.

Another option that should be considered is the use of continuous PM monitoring on Naughton Unit 3 to allow operating flexibility. The state of Wyoming has required the use of a continuous PM monitor on Naughton Unit 3 as a condition of the baghouse permit. If the installation of the PM CEMS was completed, such a system would allow the unit to be derated based on actual PM performance, and theoretically, would increase the ability to operate with fewer unit derates. The continuous PM monitor would be more expensive than quarterly testing, but could pay for itself with increased MW production compared to a fixed 30% derate. It is equally possible that continuous emission information could result in greater derates than the 30% estimates. Industry utilization of PM monitors is limited, and as such, reliability and accuracy of the monitors is somewhat unknown and will likely result in an operational learning curve both by the Company and the WDEQ.

If stand-alone non-mercury metals MATS compliance (PM surrogate) for Naughton Unit 3 emissions is pursued, it is recommended that normal ESP maintenance be conducted during any scheduled overhaul as required to maximize the PM emission reduction capabilities of the existing ESP. It is not recommended that significant capital be invested in the ESP to maximize the performance due to the short period of additional coal fueled operation anticipated.

Acid Gases

The testing conducted in March 2012 demonstrates that acid gases can be complied with through HCl testing even if controlling SO_2 emissions to 0.20 lb/mmBtu is difficult. No incremental cost to current operation is anticipated since the Unit 3 fuel coal sulfur content is expected to drop from 2012 levels by 2015.

With the new FGD installation on Naughton Units 1 and 2, the fuel supply will no longer be segregated between the units based on coal sulfur content. All coal comes from the same mine and other coal quality issues do not vary significantly between coal seams other than coal sulfur. It is not expected that homogenizing the coal supply to all three units will affect the ability of the units to meet the new MATS standards or increase the desirability to average the units together for MATS compliance.

Conclusions on Extending Coal Operation and Meeting MATS

If continued coal operation of Naughton Unit 3 is allowed through 2017, the following additional operating issues for each of the MATS pollutants must be addressed:

- Mercury - installation of coal oxidizer and FGD additive. Temporary injections systems for reagents would be used.
- Non-mercury metals - derate Naughton Unit 3 by approximately 99 MW (approximately 30%). Compliance with the 0.030 lb/mmBtu PM emission rate will be demonstrated with a new continuous PM monitor. Normal ESP maintenance would be conducted during a normal 2014 overhaul to prepare the unit for an additional 3-year run on coal. Alternatively, agree to an

operating limit of 231 MW net reliable output, a gross output limit commensurate with that derate, or a heat input limit and use quarterly PM testing to demonstrate compliance.

- Acid gases - quarterly HCl testing for MATS compliance (combined with SO_2 removal in the 0.20 lb/mmBtu range but not relied on for MATS compliance). No incremental cost to current operation since coal sulfur to Unit 3 is expected to drop by 2015.

CO_2

In its original economic analysis used to support the CPCN application, the Company analyzed low and high CO_2 market price scenarios around the Company's June 2011 official forward price curve ("OFPC") base alternative. The low market price scenario paired a low natural gas price forecast with a zero CO_2 price assumption, and the high market price scenario paired a high natural gas price forecast with a CO_2 price assumption of $25 per ton starting in 2015 and escalating at five percent plus inflation.

In the Company's updated rebuttal economic analysis of the SCR and baghouse investments at Naughton Unit 3, the scenario analysis was broadened to cover six different combinations of natural gas and CO_2 price assumptions as variations to the assumptions used in the updated base case alternative. Table NT3-7-1 below summarizes the directional changes to base case assumption among the six scenarios, with the scenario description indicating CO_2 price assumption for the first year that CO_2 prices are assumed. Two scenarios assume low and high natural gas prices with base case CO_2 assumptions held constant;

two scenarios assume low and high CO_2 price assumptions with the underlying base case natural gas prices held constant; and two scenarios pair different combinations of natural gas price and CO_2 price assumptions to serve as bookends around the base case. In any scenario when the CO_2 assumption varies from those used in the base case, the underlying natural gas price assumption is adjusted to account for any natural gas price response from changes in the electric sector natural gas demand.

Table NT3-7-1: Natural Gas and CO_2 Price Scenarios

Description	Natural Gas Prices	CO_2 Prices
Base Case	December 2011OFPC	$16 per ton in 2021, escalating at 3% plus inflation
Low Gas, $16 CO_2	Low	$16 per ton in 2021, escalating at 3% plus inflation
High, Gas, $16 CO_2	High	$16 per ton in 2021, escalating at 3% plus inflation
Base Gas, $0 CO_2	Base Case Adjusted for Price Response	No CO_2 Costs
Base Gas, $34 CO_2	Base Case Adjusted for Price Response	$34 per ton in 2018, escalating at 5% plus inflation
Low Gas, $34 CO_2	Low Case Adjusted for Price Response	$34 per ton in 2018, escalating at 5% plus inflation
High Gas, $0 CO_2	High Case Adjusted for Price Response	No CO_2 Costs

The Company assumed a zero CO_2 price for the low scenario recognizing that there had been limited activity in the CO_2 policy arena at the time of the updated rebuttal analysis. For the high CO_2 price scenario, prices were assumed to remain consistent with the upper limit that would have been established under the American Power Act of 2010 with an assumed start date in 2018. The high CO_2 price scenario start date aligns with the earliest start date assumed by the third party price forecasts reviewed by the Company. Figure NT3-7-1 below shows the

three CO_2 price assumptions used in the market price scenarios in the updated analysis of SCR and baghouse investments at Naughton Unit 3.

Emissions Performance Standards

An additional constraint on operation of the unit natural gas conversion will involve complying with greenhouse gas Emissions Performance Standards ("EPS"), particularly those required by the state of Washington. Under regulations applicable to a Naughton Unit 3 gas conversion, in order to service the Company load in the state of Washington, if the converted unit is defined as a base load resource, it will need to emit less than 1,100 lbs. of CO_2 per net megawatt-hour ("MWh"). As shown in Table NT3-8-1, the use of natural gas in the existing Naughton Unit 3 boiler will result in CO_2 emissions above this standard. For this reason, the annual capacity factor will be required to be less than 60% in order for Naughton Unit 3 to be defined as a peaking resource in the state of Washington.

Table NT3-8-1: Naughton Unit 3 Natural Gas Conversion Assumpitons

Fuel Alternative	Gross Generation Capacity (MWg)	Auxiliary Power Consumption (MW)	Net Reliable Generation Capacity (MWn)	Full Load Net Plant Heat Rate (Btu/kWh)	Full Load CO_2 Production (lb/MWh)
Current Naughton Unit 3 on Coal	354	24	330	10,342	2,120
Naughton Unit 3 after natural gas conversion	354	16	338	10,859	1,281

On March 27, 2012, the EPA proposed new emission regulations for CO_2. These regulations are specific to *new* generation facilities and do not impose new standards for existing units or for proposed modification or reconstructions of existing units. Natural gas fuel conversion projects are not specifically addressed, while simple cycle gas turbines are addressed but excluded from the proposed

rule, because these units are not base load machines. While "modifications" to existing units are specifically excluded, there is a risk that on a case-by-case basis the conversion of a facility could trigger the new standard or the standard could be broadened in the future. The exclusion of simple cycle machines though is a sign that converting Naughton Unit 3 to natural gas and to operate as a peaking unit would not be viewed to fall under the regulation. The new CO_2 emission regulation under the proposed rule for new generation is 1,000 lbs of CO_2 per net MWh generation. A refueled Naughton Unit 3 could not meet this standard, as shown in Table NT3-8-1.

Coal Combustion Residuals

While the Company will be faced with certain CCR storage, handling, and long-term management costs at its Naughton plant whether individual units at the plant continue to operate with coal as the fuel supply or not, natural gas conversion of Naughton Unit 3 would effectively eliminate the production of CCR from that unit. With elimination of the Unit 3 CCR waste steam, the Company would be obligated to begin closure of CCR infrastructure dedicated to Naughton Unit 3 and no longer in service. These CCR closure costs would be accounted for as an Asset Retirement Obligation ("ARO") expense.

Clean Water Act § 316(b)

Due to the preliminary status of the 316(b) rulemaking process, the Company has not completed specific detailed studies to fully ascertain and verify that intake structure retrofits or new technologies will be necessary to comply with the currently proposed 316(b) water intake regulations, particularly since a key

element of the proposed rule is to conduct plant-specific studies and assessments. The Naughton plant utilizes cooling towers and closed-cycle cooling, significantly reducing potential 316(b) rulemaking exposure. Nonetheless, modifications may be needed at the Naughton raw water intake structure, located at the Hams Fork River diversion located north of the town of Frontier, Wyoming, to comply with the proposed impingement mortality standards. Since the raw water intake structure is a common system serving all units at the site, conversion of Naughton Unit 3 to natural gas is not expected provide material benefit to any such compliance costs.

Effluent Limitation Guidelines

The EPA proposed effluent limit guidelines for wastewater discharges from steam electric plants in April 2013, with final action currently expected by May 2014. Regardless of the EPA's final action, Naughton plant effluent is primarily managed as a common system serving all units at the site. As such, conversion of Naughton Unit 3 to natural gas may have only nominal benefit to any such compliance costs.