

## CHAPTER 5 ENVIRONMENTAL

### Environmental Trends that Influence the 2015 Plan

#### **Introductory Statement**

Environmental considerations continue to be a critical aspect of NorthWestern’s resource planning process. We are committed to providing utility services that cost-effectively meet our customer’s needs, while protecting the quality of the environment. We are vigilant in monitoring the impacts of our operations on the environment, in complying with the spirit, as well as the letter, of environmental laws and regulations, and in responsibly managing the natural resources under our stewardship.

The electric utility sector is heavily regulated by state and federal environmental laws such as the Clean Air Act, the Clean Water Act, the Endangered Species Act, the Migratory Bird Treaty Act, and laws regulating waste generation and disposal. Title 69, Chapter 8 of the Montana Code, Electric Utility Industry Generation Reintegration, also includes environmental requirements we must consider.

#### **Greenhouse Gas Emissions**

No single law or public policy issue has had as great an influence on resource planning as the Clean Air Act. The current attempt to regulate greenhouse gas (“GHG”) emissions from existing electric generating units vividly demonstrates the potential impacts of the Act and has injected substantial uncertainty into the planning process. Efforts by the U.S. Environmental Protection Agency (“EPA”), states, and others to regulate GHGs have created risks which our planning processes have prudently incorporated in past planning cycles. For example, in 2013, NorthWestern’s planning included a proxy cost for carbon emissions, specifically a carbon tax, implemented within the planning horizon.

Coal-fired generating plants are under particular scrutiny due to their level of GHG emissions. In Montana, we have a 30% joint ownership interest in Unit 4 of the coal-fired Colstrip electric generating plant. Talen Energy has a 30% joint ownership interest in Colstrip Unit 3. We have a risk sharing agreement with Talen Energy regarding the operation of Colstrip Units 3 and 4, in which each party receives 15% of the respective combined output and is responsible for 15% of the respective operating and construction costs, regardless of whether a particular cost is specified to Unit 3 or Unit 4. Three carbon price scenarios were modeled as part of this Plan to incorporate the risk associated with GHG emissions and the possible associated effect on resource optimization. Colstrip is assumed economically viable under the modeling scenarios.

On October 23, 2015, the final standards of performance to limit GHG emissions from new, modified, and reconstructed fossil fuel generating units and from newly constructed and reconstructed stationary combustion turbines were published in the Federal Register (“FR”). The standards reflect the degree of emission limitations EPA believes are achievable through the application of their best systems of emission reduction which EPA determined have been demonstrated for each type of unit.

In a separate action that dramatically affects existing power plants, the final rule titled, “Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Generating Units” was published in the FR on the same day. This rule establishes guidelines for states to follow in developing plans to reduce GHG emissions from existing electric generating units under Section 111(d) of the Clean Air Act. EPA refers to this rule as the Clean Power Plan (“CPP”). The CPP specifically establishes carbon dioxide (“CO<sub>2</sub>”) emission performance rates for fossil-fuel fired electric utility steam generating units and stationary combustion turbines. States have the option to develop their own implementation plans or adopt a federal implementation plan. The EPA gave states the

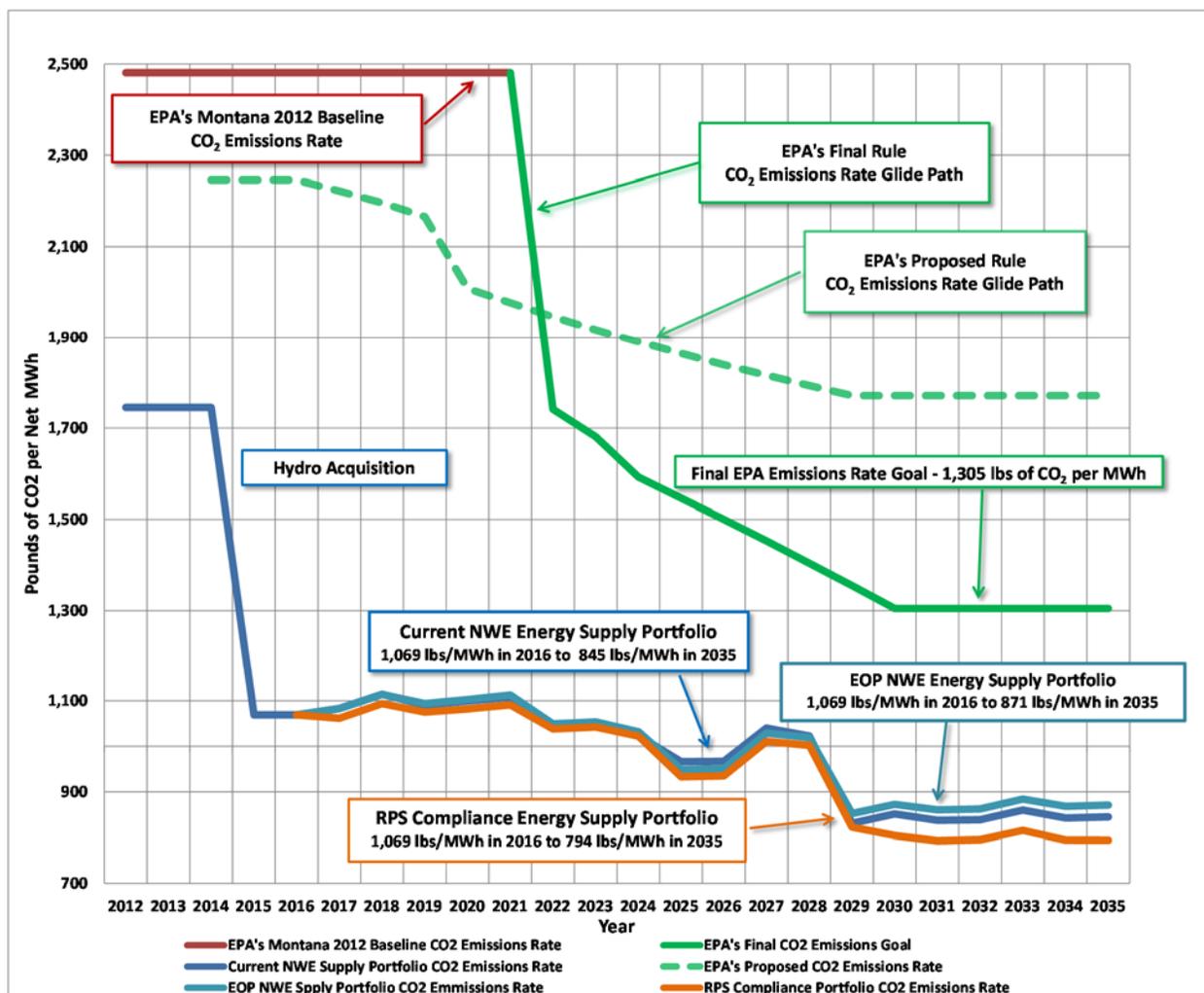
option to develop compliance plans based on CO<sub>2</sub> emissions rates (pounds (“lbs.”) of CO<sub>2</sub> per MWh) or CO<sub>2</sub> mass (tons) emissions. The CPP establishes dates by which states are required to submit plans with initial plans due to EPA by September 2016, with the option to seek additional time to finalize state plans by September 2018.

The U.S. Supreme Court issued a stay of the implementation of the final CPP on February 9, 2016. The stay will remain in effect until the U.S. Court of Appeals enters a decision on the substantive challenges to the CPP and the Supreme Court either denies a petition for certiorari following that decision or enters a judgment following grant of a petition for certiorari. We are monitoring this situation closely and are hopeful EPA takes this opportunity to address Montana’s serious concerns with the 47% reduction required in the final CPP and recognize the low carbon intensity of the portfolio we have assembled and reward rather than punish our customers for their low carbon energy use. The stay does not however alleviate uncertainty from a planning perspective.

The 2030 rate-based requirement in the CPP for Montana is 1,305 lbs. CO<sub>2</sub>/MWh resulting in about a 47% CO<sub>2</sub> emissions rate reduction from the 2012 baseline emissions rate calculated by EPA. A mass-based plan would require a reduction of about 41% from the 2012 baseline mass emissions level calculated by EPA for Montana.

The figure below depicts the changes from the draft and final versions of the CPP and a comparison of EPA’s requirements for “existing sources” (those that commenced construction on or before January 8, 2014) to NorthWestern’s estimate of CO<sub>2</sub> emissions from our existing resource supply portfolio, EOP, and RPS Compliance portfolio.

Figure 5-1 Implications of the CPP



Unlike many other states, Montana’s obligation to reduce carbon emissions dramatically increased from the draft to the final CPP, an increase from about 21% to 47%. As is indicated in the figure, with the acquisition of the hydro units, the carbon emissions rate of our Montana supply portfolio fell significantly. The CO<sub>2</sub> emissions rates of our existing portfolio, EOP, and RPS Compliance portfolios are currently well below the 2030 requirement for Montana established by EPA in the CPP. The following table shows the estimates of CO<sub>2</sub> emissions from the Current plus Market, EOP, and RPS Compliance scenarios. Estimated variations from year to year are due to maintenance cycles at Colstrip,

market purchases, and the expiration of contracts with fossil-fueled facilities in 2024 and 2028 and Judith Gap in 2026.

**Table 5-1 Estimated EOP Carbon Emissions with CPP Regulated Sources**

<b>NorthWestern Estimated Carbon Emissions (lbs of CO<sub>2</sub> per MWh)</b>			
<b>YEAR</b>	<b>Current plus Market</b>	<b>EOP</b>	<b>RPS Compliance</b>
2016	1069	1069	1069
2017	1083	1083	1061
2018	1114	1114	1094
2019	1091	1094	1075
2020	1099	1103	1082
2021	1108	1112	1091
2022	1043	1049	1038
2023	1047	1054	1042
2024	1023	1032	1022
2025	966	949	933
2026	967	951	935
2027	1040	1029	1011
2028	1022	1019	1002
2029	831	852	822
2030	852	873	805
2031	838	860	793
2032	839	862	795
2033	860	884	816
2034	843	868	794
2035	845	871	794

In its current form, the CPP does not recognize portfolio-based carbon emissions rates. The CPP instead focuses on unit specific emissions rates to calculate state emissions requirements.

On October 23, 2015, EPA also published in the FR a proposed rule titled, “Federal Plan Requirements for Greenhouse Gas Emissions from Electric Utility Generating Units Constructed on or Before January 8, 2014; Model Trading Rules; Amendments to Framework Regulations”. In this action, EPA proposed a federal plan that would be imposed if a state fails to submit a satisfactory plan under the CPP. The federal plan proposal includes a “model trading rule” that describes how the EPA would establish an emissions trading program as part of the federal plan to allow affected units to comply with the emission rate requirements. EPA proposed both an emission rate trading plan and a mass-based trading plan and indicated that the final federal rule will elect one of the two options. We are working with other industry leaders and have filed comments on these draft regulations.

Despite the Supreme Court’s decision to stay the CPP, there remains significant risk regarding the uncertainty of Montana’s ultimate disposition of carbon emissions reductions. This risk is prudently included in the modeling scenarios used in the Plan for determining future portfolio needs.

## Summary of Key Colstrip Environmental Risks

### **Regional Haze Rule**

The EPA’s regional haze rule, finalized in 1999, requires states to develop and implement plans to improve visibility in certain national park and wilderness areas. On June 15, 2005, the EPA issued final amendments to its Regional Haze Rule. These amendments require emission controls known as the Best Available Retrofit Technology (“BART”) for emissions of certain pollutants that have the potential to impact visibility. These pollutants include fine particulate matter (“PM”), nitrogen oxides (“NO<sub>x</sub>”), sulfur dioxide (“SO<sub>2</sub>”), certain volatile organic compounds, and ammonia. States were given until December 2007 to develop implementation plans to comply with the Regional Haze Rule. Montana did not

develop a plan to comply, and EPA subsequently developed a Federal Implementation Plan (“FIP”) for Montana in September of 2012. The FIP included requirements for upgrades to Colstrip Units 1 & 2 but did not include immediate requirements for Units 3 & 4.

The Regional Haze Rule, which requires “reasonable progress” analyses every 5 years, may drive incremental SO<sub>2</sub> and NO<sub>x</sub> reductions at Colstrip in the future. We assume Colstrip Units 3 and 4 will not require additional material upgrades to comply with the Regional Haze Rule during the 20-year planning period. This information was factored in to the modeling scenarios for this Plan.

### **Mercury and Air Toxics**

The Mercury and Air Toxics Rule (“MATS”) became effective April 16, 2012. The MATS rule requires that new and existing coal-fueled facilities achieve emissions standards for mercury, acid gases, and other hazardous pollutants. Existing sources were required to comply with the new standards by April 16, 2015. The Colstrip facility requested a one-year extension to become compliant as allowed by the rule to allow time for all the units at Colstrip to become compliant as a facility. That request was granted, and the Colstrip facility needs to be compliant by April 16, 2016.

The existing mercury control system at the Colstrip facility was installed to comply with Montana’s mercury rule, which is more stringent than the federal rule. Additional equipment on Units 1 and 2 was required to comply with the particulate matter requirements of the rule, and installation of this equipment will be complete prior to the April 16, 2016 compliance deadline. Units 3 and 4 did not require additional equipment. Therefore, we assume in the Plan there will be no additional material upgrades required for additional MATS compliance obligations for Colstrip.

## **Coal Combustion Residuals**

Coal Combustion Residuals (“CCRs”) including coal ash, are byproducts from the combustion of coal in power plants. CCRs have historically been considered exempt wastes under an amendment to the Resource Conservation and Recovery Act (“RCRA”). However, the EPA issued a final rule in April 2015 to regulate CCRs as a nonhazardous waste under Subtitle D of RCRA and establish minimum nationwide standards for the disposal of coal combustion residuals.

A plan is being developed by Talen Energy to comply with the CCR Rule within the required timeframes. The compliance plan will involve closing some ponds, installing liners, separating solids from slurry, ongoing monitoring, and a final remedial plan.

NorthWestern’s share of the estimated capital costs for compliance is expected to be approximately \$27 million, a significant portion of which will be incurred over seven or more years depending on the amount of ash waste. These costs were incorporated in the cost structure for Colstrip in this Plan.

## **New Source Review (“NSR”) / Prevention of Significant Deterioration (“PSD”)**

There is ongoing litigation regarding alleged Clean Air Act violations at Colstrip. The Plaintiffs allege some equipment changes made at Colstrip between 2001 and 2012, (a) have increased emissions of SO<sub>2</sub>, NO<sub>x</sub> and particulate matter and (b) were “major modifications” subject to permitting requirements under the Clean Air Act (New Source Review). On December 1, 2015, the U.S. Magistrate Judge Jeremiah C Lynch heard oral arguments in the U.S. District Court for the District of Montana on motions for summary judgment pending before that court on Case 1:13-cv-00032-DLC-JCL which involves a Sierra Club and Montana Environmental Information Center case against the Colstrip Owners. The pending motions are as follows: (1) Plaintiffs’ Motion for Partial Summary

Judgment Regarding Routine Maintenance, Repair and Replacement; (2) Plaintiffs’ Motion for Partial Summary Judgment that the redesign Projects for the Unit 1 and 4 Turbines and the Unit 1 Economizer Were Not “Like-Kind Replacements”; (3) Defendants’ Motion for Partial Summary Judgment Regarding Use of “Actual-To-Potential” Emissions Test; (4) Plaintiffs’ Motion for Partial Summary Judgment Regarding the Allowable Period From Which to Select a Baseline for the Unit 3 Reheater Project; (5) Defendants’ Motion for Partial Summary Judgment on Baseline Selection; (6) Defendants’ Motion for Partial Summary Judgment on Emissions Calculation for Alleged Aggregated Turbine and Safety Valve Project. Judge Lynch issued a proposed decision in December 2015. The proposed decision found as follows on each of the motions identified above: (1) Denied, (2) Denied, (3) Granted, (4) Granted in Part and Denied in Part, (5) Granted in Part and Denied in Part, and (6) Granted. A final decision is expected in the near future. Due to these rulings, NorthWestern did not feel it was appropriate to include any additional material cost-related impacts for NSR/PSD related issues in our modeling scenarios. Should the final decision vary significantly from the proposed decision, we will review our modeling and determine if any changes are necessary.

### **National Ambient Air Quality Standards (“NAAQS”)**

The Clean Air Act sets allowable ambient air quality standards for six “criteria” pollutants. The rule requires periodic review of the science used to establish the standards and the standards themselves. With each review, the standards are compared to ambient air quality in each state or part of each state to determine if the state or part of each state is in “attainment” or “non-attainment.” If a state contains any areas of “non-attainment”, the state must propose a plan and schedule to reduce emissions to achieve attainment. Currently, the Colstrip area of Montana is in attainment for all criteria pollutants. Further reductions in emissions resulting from compliance with MATs are expected to keep the Colstrip area in attainment with future NAAQS reviews/revisions. NorthWestern does not

expect additional material cost impacts related to NAAQS compliance. Therefore, we did not include any additional costs related to NAAQS compliance in our modeling scenarios.

### **Wastewater**

In August 2012, Talen Energy, the Colstrip Plant Operator, and the Montana Department of Environmental Quality (“MDEQ”) signed an Administrative Order of Consent Regarding Impacts from Wastewater Facilities (“AOC”). The AOC sets up a comprehensive program for investigation, interim response, and remediation of any wastewater seepage or spills, and closure of the holding ponds. The AOC provides for preparation of a Site Report for any identified area of the plant site where seepage or spills have occurred. A separate plan for closure of the wastewater ponds must be prepared and submitted by August 2017. This closure plan will include requirements for wastewater pond closure which must be completed when operations cease. No additional costs associated with the AOC for Colstrip 4 are included in our modeling scenarios in this Plan. Costs associated with compliance with the CCR Rule, which addresses the same facilities associated with the AOC, are discussed in the CCR section above.

## Summary of Key Hydro Risks

### **Hydroelectric License Compliance**

NorthWestern’s hydroelectric facilities consist of ten generating plants and one storage reservoir that are operated under three licenses from the Federal Energy Regulatory Commission (“FERC”). FERC typically issues licenses for 40 to 50 years. The nine developments on the Missouri and Madison Rivers operate under one license: FERC Project #2188 which has a term through 2040. The Mystic Project (FERC #2301) license expires in 2050, and the Thompson Falls Project (FERC #1869) expires in 2025.

For the purpose of long-term resource planning, NorthWestern does not assume material changes to the licenses, such as changes in ownership or operational changes affecting generation output, over the planning period.

### **Relicensing**

The FERC licenses require that the hydroelectric projects be operated to reflect the Federal Power Act’s mandate to give equal consideration to generation and non-power benefits including fisheries, wildlife, public recreation, flood control, cultural resources, and water quality. NorthWestern’s licenses have specific parameters regarding reservoir elevations, minimum downstream river flows, and river flow rate changes. In addition, extensive environmental Protection, Mitigation, and Enhancement (“PM&E”) programs must be implemented over the terms of the licenses. NorthWestern complies with these obligations through a collaborative and consultative strategy with the resource agencies and other stakeholders which involves funding Technical Advisory Groups, monitoring studies, effects assessments, and mitigation projects. All costs associated with license compliance are incorporated in the planning process.

The listing of bull trout under the Endangered Species Act in 1999 led to the installation of a fish ladder at Thompson Falls in 2010 (after numerous years of required consultation and study) and ongoing monitoring and evaluation of project impacts on fisheries. Relicensing of the Thompson Falls Project will involve a new and focused examination of power generation and all non-power benefits to reassess the aforementioned “equal consideration” balance. NorthWestern anticipates initiating this process in the 2018-2020 timeframe. It will involve various studies with significant agency and public input. While the relicensing process has the potential to decrease available generation capacity and increase requirements for proposed measures and plans to protect, mitigate, or enhance environmental resources, no reduction of the available capacity or operational flexibility

has been assumed in this planning effort since the primary resource potentially affected by operations (fisheries) has already been mitigated for and actively managed.

### **River Flow and Reservoir Management**

For purposes of this planning process, NorthWestern used the 2010 to 2014 historical five year average as the basis for projecting monthly hydroelectric generation.

The FERC licenses have various requirements for river flows and reservoir levels. NorthWestern operates the hydro facilities to maximize generation within the conditions and constraints of the FERC hydro licenses and in pursuing required protection, mitigation, and enhancement of river and public recreation resources. An example is the Lower Madison River Pulse Flow Protocol, which affects Hebgen and Madison developments.

The pulse flow protocol requirement is designed to protect lower Madison River fisheries. It involves releasing water from Ennis Lake (Madison Dam) at specified times based on a predictive model that projects the temperature of the water at Blacks Ford in the lower Madison River. There is documented fish mortality if the river temperature reaches 82.5 degrees Fahrenheit. The goal of the Pulse Flow Protocol is to maintain the lower Madison River below 80 degrees Fahrenheit during the summer months while balancing the need to keep upstream Hebgen Reservoir (which supplies water for Ennis Lake refill and downstream minimum pulse flows) at a level suitable for recreation and maintaining FERC license-required downstream minimum flows. The Madison Plant hydraulic capacity is approximately 1,400 cubic feet per second (about 8 MW). When pulse flow requirements are above that level, the excess water is spilled. The pulse flow protocol is constantly monitored and updated for fisheries protection while maximizing water conservation. The pulse flow program has been very effective in protecting the lower Madison River trout fishery while not negatively impacting generation output.

## **Hydrologic Uncertainty**

Hydrologic characteristics (e.g., runoff rate and timing, precipitation events, weather conditions) vary from year to year and may differ from the assumptions used in this Plan. For example, 2012 was an exceptional hydro generation year due to above average precipitation. While 2015 was a low water year, output from the hydro assets slightly exceeded forecasted output as set forth in the hydro filing. Low precipitation will, at times, cause hydro generation to be less than average.

Diversification in different watersheds over a large geographic area and conservative assumptions regarding generation output can help reduce risks associated with changes in hydrologic characteristics. The modeling scenarios in the Plan incorporate risk associated with varying hydrologic characteristics.

## **Other Environmental Considerations**

### **Wind Generation**

In order to comply with Renewable Portfolio Standards, NorthWestern has a substantial amount of intermittent renewable generation in its portfolio, including owned wind generation (Spion Kop), qualifying facilities, and power purchase agreements with wind facilities.

Intermittent resources create environmental risks, including impacts to wildlife and wildlife habitat. Intermittent resources also require backup from dispatchable fossil-based generation which also has environmental risk.

In the development and management of the Spion Kop Wind Farm, NorthWestern follows the U.S. Fish and Wildlife Service’s (“USFWS”) Land-Based Wind Energy Guidelines which are voluntary guidelines for addressing wildlife conservation concerns. The Bird

and Bat Conservation Plan for the project is being implemented through coordination and consultation with the Spion Kop Technical Advisory Committee (“TAC”) made up of representatives of Montana Fish, Wildlife and Parks, the USFWS, Montana Audubon, the University of Montana, and NorthWestern. Post construction monitoring is underway to determine impacts of operations on birds and bats. Results of the monitoring will help inform the TAC of any operational or other mitigation that may be necessary. At this time we do not foresee additional material mitigation at our wholly owned wind facility. NorthWestern does not assume environmental liabilities or responsibilities associated with Qualifying Facilities (“QFs”) and other non-owned wind resources.

The USFWS has regulatory authority to administer the following regulations that could affect siting or operating a wind farm in Montana: the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, the Endangered Species Act as amended, the National Wildlife Refuge System Improvement Act of 1997, and the National Environmental Policy Act. Siting and operating wind generation facilities in Montana are also subject to the Management Plan and Conservation Strategies for Sage Grouse. While NorthWestern does not assume environmental liabilities or responsibilities associated with QFs and other non-owned wind resources, new wind generation will be subject to the aforementioned regulations.

### **Dave Gates Generating Station (“DGGS”)**

NorthWestern operates DGGS under a Title V Operating Permit (Montana Air Quality Permit) and associated Acid Rain Permit. NorthWestern operates water injection and selective catalytic reduction (“SCR”) as NO<sub>x</sub> control equipment for the combustion turbine generating units. Catalytic oxidizers are used for carbon monoxide (“CO”) control equipment. A Continuous Emission Monitoring System (“CEMS”) is installed at the combined stacks for each generating unit. The CEMS measures NO<sub>x</sub> and CO concentrations and the Data Acquisition and Handling System (“DAHS”) calculates

lbs./hour of each pollutant. This information is used to assure proper SCR, water injection, and catalytic oxidizer operation and to assess compliance with the applicable standards.

### **Basin Creek**

The nine natural gas-fired Caterpillar reciprocating internal combustion engines (“RICE”) at Basin Creek totaling 52.5 MW of generating capacity are permitted under a Title V Permit and a Montana Air Quality Permit. Emission limits apply to NO<sub>x</sub>, CO and volatile organic compounds (“VOC”). The engines combust pipeline-quality natural gas and incorporate an oxidation catalyst for control of CO, VOC, and Hazardous Air Pollutant (“HAP”) emissions. Combustion of pipeline quality natural gas in lean-burn RICE inherently results in low NO<sub>x</sub> emissions, and the limit of 34,200 combined operating hours during any 12-month rolling period also limits NO<sub>x</sub> emissions. Further, add-on controls for SO<sub>2</sub> and particulate matter less than 10 microns aerodynamic diameter (“PM<sub>10</sub>”) emissions are not required as Basin Creek is combusting only pipeline quality natural gas, which, similar to the previously discussed inherent NO<sub>x</sub> control, results in reduced SO<sub>2</sub> and PM<sub>10</sub> emissions. NorthWestern does not own the Basin Creek facility. However, dispatch of the units is controlled by NorthWestern under a long-term contract. We do not expect any material environmental costs associated with the long-term Basin Creek contract.

### **Transmission Line Permitting**

New generation sources or changes to customer load may require new natural gas pipeline construction and/or new or upgraded electric transmission lines. NorthWestern is in the third year of a five-year project to upgrade a 69-kilovolt (“kV”) transmission line to 161 kV to serve the ever-expanding load in the Big Sky, Montana area. The project took almost eight years to permit even though it was an existing line because the U.S. Forest Service required an Environmental Impact Statement.

Customer load in Stillwater County, Montana requires additional transmission. A new 100-kV transmission line from Chrome Junction to a substation near Nye is expected to be constructed under an exemption to the Montana Major Facility Siting Act as 75% of the landowners have already granted easements for the 54-mile project. Permits to cross public lands have been acquired from the State of Montana, U.S. Forest Service, and the Bureau of Land Management. Construction on the line is planned to begin in 2016.