**Testimony of Cathy S. Woollums**
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**MidAmerican Energy Holdings Company**
**Committee on Environment and Public Works**
**United States Senate**
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Thank you for the opportunity to testify today to provide you with one electric utility's perspective on the costs to comply with new Environmental Protection Agency ("EPA") regulations. My name is Cathy Woollums, and I am the senior vice president and chief environmental counsel of MidAmerican Energy Holdings Company. My comments today are not meant to represent the industry as a whole, although I believe our experiences are largely consistent with those of other U.S. electric utilities, almost all of which have spent – and continue to spend – considerable dollars and resources in planning to comply with these EPA regulations. Every utility, of course, is implementing its own unique compliance strategy based on myriad factors, including its resource base, system impacts, reliability, capital costs, operating and maintenance costs, age of its existing generation units, cost of replacement generation, and projected load growth. What I hope to do this morning is to give you a sense of how these factors translate into our utility operations' overall compliance costs.

## Background on MidAmerican

MidAmerican Energy Holdings Company ("MidAmerican") is a global energy services provider serving almost 6.9 million customers worldwide. MidAmerican's five U.S. energy business platforms consist of two electric utilities, two natural gas pipelines and an independent power producer. The two regulated utilities are MidAmerican Energy Company, an Iowa-based utility providing regulated electric and natural gas service to customers in Iowa, Illinois, South Dakota, and Nebraska; and PacifiCorp, which operates as Pacific Power in Northern California, Oregon, and Washington, and as Rocky Mountain Power in Idaho, Utah, and Wyoming. The two interstate pipelines are Kern River Gas Transmission Company, providing natural gas transportation from Wyoming to Southern California; and Northern Natural Gas, which operates from Texas to the Upper Midwest. The fifth platform is CalEnergy, an independent power producer with geothermal facilities in California and cogeneration plants in New York, Arizona, Texas, and Illinois.

At the end of 2010, MidAmerican Energy Company had 7,048 megawatts of owned and contracted generating capacity. Approximately 52 percent was fueled by coal; 21 percent by natural gas and oil; 20 percent by wind, hydroelectric and biomass; and 7 percent by nuclear. PacifiCorp's generating plants have a net owned capacity of 10,623 megawatts. The company operates 78 generating facilities across the West. Approximately 58 percent was fueled by coal; 21 percent by natural gas; and 21 percent by wind, hydroelectric, geothermal, or other.

MidAmerican Energy Company and PacifiCorp are number one and number two, respectively, in the U.S. in ownership of wind-powered generation among rate-regulated utilities. As of December 31, 2010, nearly 20 percent of MidAmerican Energy Company's total owned and contracted generation capacity and nearly 12 percent of PacifiCorp's total owned and contracted

generation capacity was powered by wind. When MidAmerican Energy Company's 593 megawatts of wind capacity expansion in Iowa is complete by year-end 2011, approximately 26 percent of its total owned and contracted generation capacity will come from wind.

CalEnergy operates 10 geothermal plants with a cumulative generation capacity of 327 megawatts in California's Imperial Valley. Expansion plans call for six new plants with a total of 470 megawatts of additional geothermal capacity.

# *SECTION I*

## I. MidAmerican's Environmental Control Investments

MidAmerican has undertaken significant efforts with our permitting and regulatory agencies to ensure that our environmental control investments are timely in order to ensure compliance with existing environmental requirements, that they proceed in a reasoned fashion, and that they are coordinated with existing outage schedules to avoid additional outage time associated with equipment tie-in. These coordinated efforts reduce costs associated with replacement power and maintain system reliability.

MidAmerican has made substantial investments in pollution control equipment over the past 10 years and has budgeted for additional pollution control projects in the next 10-12 years. We began planning emission control projects targeting sulfur dioxide ("$SO_2$"), nitrogen oxide ("NOx"), and mercury emissions prior to 2005, when the EPA was developing its Clean Air Interstate Rule ("CAIR") and Clean Air Mercury Rule ("CAMR"). Both rules were ultimately vacated by the D.C. Circuit Court of Appeals, which directed the Agency to rework the regulatory framework underpinning both rules. Ultimately the CAIR was replaced by the Clean Air Transport Rule ("CATR") and the CAMR by the Utility Hazardous Air Pollutants ("HAPS") Maximum Achievable Control Technology ("MACT") rule. While the EPA was reworking these rules, MidAmerican continued planning various emissions control projects. Section II of this document contains a rule-by-rule overview and brief explanation of MidAmerican's compliance strategy.

Through 2010, our Midwest utility, MidAmerican Energy Company, has spent more than $370 million in capital expenditures for required pollution control equipment under these EPA rules. We estimate that the total costs for all pollution control projects (defined as capital, operations and maintenance and other costs) will exceed $1.1 billion by the end of 2020. These total costs are expected to increase annual costs to customers by $130 million per year by 2020.

Our other utility, PacifiCorp, has spent more than $1.2 billion in capital expenditures from 2005 through 2010 to comply with these EPA rules, and we estimate that total capital expenditures will exceed $2.7 billion by the end of 2022. Total costs that will have been incurred by our customers to pay for these pollution control projects during the period 2005 through 2023 are expected to exceed $4.2 billion, and by 2023 the annual costs to customers for these projects will have reached $360 million per year.

It is very difficult at this point to translate these projected costs to comply with the new EPA rules into specific percentage rate increases to our customers in all ten states in which we are subject to state public utility commission regulation, but let me give you one metric to demonstrate the magnitude of these costs. PacifiCorp's fossil steam generation units currently have a cumulative net value (after depreciation) of approximately $3.38 billion. Just compare that current value – $3.38 billion – to the estimated $1.3 billion in additional environmental control project capital costs PacifiCorp will spend between now and 2022, and that gives you a relative sense of the cost of these emissions control devices to our customers.

Due to the large number of our generating units that will be potentially affected by these new EPA regulations, deferring the installation of compliance projects places MidAmerican and our customers at risk of not having access to necessary capital, material, and labor in a compressed time frame concurrent with other utilities. For example, in the eastern United States, utilities are required to install controls under the CATR during the same 2012-2014 time frame within which they are required to comply with the HAPS MACT rule. We have already seen a dramatic rise in these pollution control costs in anticipation of the increased demand for labor and equipment. For example, MidAmerican Energy Company has just negotiated a contract for the installation of scrubbers and baghouses at two of our facilities in 2013 and 2014, and the costs are approximately 20% higher than anticipated. We have no choice, however, but to move forward, in order to ensure that we are in compliance and not subject to penalties for noncompliance or third party lawsuits.

The Department of Energy[1] estimates that between 35-70 gigawatts will shut down nationwide as a result of EPA's new rules. Similarly, a recent study by National Economic Research Associates ("NERA") estimates that 47.8 gigawatts of coal-fueled electricity capacity will likely become uneconomic and retire by 2015. Some of those facilities are also located in key transmission grid areas that provide voltage support that cannot be addressed by the fall of 2014 in order to comply with the anticipated January 1, 2015 implementation date. According to four other independent studies conducted last fall, with which I am sure the Committee is familiar (North American Electricity Reliability Council, Brattle, Credit Suisse, and Sanford Bernstein), this aggressive schedule for implementation of these and other EPA rules will likely result in closures of up to 60 gigawatts of existing U.S. coal capacity by January 2015.

MidAmerican, like many utilities, is concerned about the costs and timetables for the implementation of these EPA rules. These compliance costs will increase rates to our customers at the same time as they see increased rates for other major capital expenditures for new generation to meet increasing demands for electric service and to further diversify our generation portfolios, as well as construct billions of dollars of transmission to be able to deliver energy where it is needed. These rate increases are already occurring at PacifiCorp, with customers seeing annual rate increases, some in double-digit percentages.

Especially in this economic climate, it is critical to minimize the cost impact of these rules, which ultimately will be borne by our customers. If the timetable of the rules remains unchanged, compliance costs will be shouldered by our customers in the form of higher rates in a

[1] "EPA regulations for coal-fired power plants could force shut downs", *Bristol Herald Courier* (May 27, 2011); quoting James Wood, deputy assistant secretary for the U.S. Department of Energy.

very narrow window from 2013-2015. These increases will dramatically increase production costs for industrial plants and could result in job losses. Also, units prematurely retired in response to these EPA rules will have remaining book value issues to address.

Moreover, forcing all U.S. coal plants to comply with these EPA rules during such a short time frame will cause the costs of labor and materials for both retrofits and new generation to rise dramatically as demand for skilled labor and parts will greatly outstrip supply. A boom and bust cycle of craft labor employment created by these proposed EPA deadlines will make it challenging for firms to find, train, and retain skilled domestic craft labor.

## II. MidAmerican's Environmental Compliance Planning Process

First and foremost in the decision to invest in environmental controls is our compliance obligation. If a permit or regulation requires one of our plants to reduce emissions or achieve emission limits that cannot be met with existing equipment, we examine compliance options to ascertain what equipment can be installed to achieve the emission requirements. MidAmerican also monitors state and federal rulemaking activities and legislative proposals that would have an impact on the facilities' operations. Monitoring these future requirements gives us a longer term view of the potential investments that may be required to lawfully continue operation of the facilities.

To assess the potential impacts of new environmental regulatory initiatives, the environmental groups in our business units review proposed and final regulatory requirements and actively engage in the regulatory processes at both the state and at the federal levels. We seek feedback from our environmental regulators to assess their concerns, read and analyze legislation and regulations proposed at the state and federal levels, provide feedback on legislation, and review and comment on proposed regulations. We submit written comments in regulatory proceedings and participate in public hearings on the proposals, ensuring that our concerns or support, as appropriate, are considered in these public forums. We are both well informed and engaged on these issues.

## III. Compliance and Project Timing Considerations

We, like virtually all other electric utilities, examine a multitude of factors to determine the appropriate mitigation measures. For example, if a regulation prescribes a specific emissions limit, our teams review what types of controls may be available to achieve the requisite emissions limit, given the specific characteristics of each unit. We consider system impacts, reliability, capital costs, operating and maintenance costs, the life of the controls, the life of the unit itself, cost of replacement generation, and many other factors. If an emissions trading mechanism is available to achieve compliance, we compare the costs of obtaining the emissions allowances to the costs of installing and operating new equipment, considering the factors noted above.

We also examine the actual and potential compliance time frames and how those time frames may be coordinated with planned plant outage schedules. Coordinating major environmental control projects with existing outage schedules allows MidAmerican to avoid additional outage

time, thus reducing the need for replacement power, minimizing costs, and maintaining system reliability.

Pollution control projects are extremely complex and require a significant amount of evaluation and planning to bring to fruition. Moreover, state environmental agency permitting processes are required to define the technical requirements needed in order to seek competitive bidding and pricing for the work and ultimately executing the projects. The timeline for securing contracts for this type of work through project completion often has a multi-year duration.

## IV. Managing Project Execution and Compliance Risk

The full and final scope of environmental regulations is not easily determined, particularly when rulemakings are often lengthy in their own right and just as often followed by extensive and lengthy litigation before the rule is finalized. Perfect foresight is not possible; the EPA has recently begun to acknowledge that its approach to regulation makes it difficult for companies with compliance obligations to make long-term decisions on compliance. In EPA Administrator Lisa Jackson's remarks prepared on the release of the HAPS MACT standards on March 16, 2011, she stated:

> The proposal and implementation of these standards will also have benefits for American utilities. For the first time in twenty years, they will have certainty about the standards they must meet. And setting national standards for mercury and air toxics will level the competitive playing field and close loopholes for big polluters. Utilities that have already put pollution control technology in place will no longer have to compete with those who have delayed those investments – a group that includes almost half of the nation's coal-fired plants, which lack advanced pollution control equipment. In fact, facilities that have already taken responsible steps to reduce the release of toxins into our air will be at a competitive advantage over their heavy-polluting counterparts. And to ensure cost-effectiveness, we have proposed flexibility in meeting the standards. The technologies being required already exist in abundance, and under the proposal, power providers have four years to comply.[2]

MidAmerican believes it would be imprudent to wait until all the regulations are considered, finalized, and quantified to install controls. Doing so would put the facilities at substantial risk of noncompliance and does not reflect the reality of the multistate operations and planning process for large utilities. Moreover, it would be imprudent to assume a large utility can install all required controls under a "just-in-time" plan. This approach to compliance poses a significant risk to MidAmerican and our stakeholders; as a practical matter, it cannot be economically achieved on a system the size of MidAmerican's utility platforms. Emission reduction projects are complex, multi-year projects. Trying to install multiple controls within the same short time frames poses a significant risk of noncompliance, with penalties that can be substantial. Even if a regulatory agency did not impose penalties for failing to achieve emission reduction deadlines,

[2] Remarks available at:
http://yosemite.epa.gov/opa/admpress.nsf/12a744ff56dbff8585257590004750b6/b7e570d651cadc03852578550057011c!OpenDocument

third parties have not hesitated to bring lawsuits against the operators of those facilities that miss deadlines or are otherwise not in compliance with permit and emission limits. Indeed, the federal Clean Air Act specifically allows for private citizen enforcement of air quality requirements.

## V. Other Factors to Consider

Finally, environmental regulations and the cost of implementation are only one factor that influences whether or not to make investments in environmental projects; MidAmerican also must consider the cost of alternative generation, such as small modular nuclear reactors. Future natural gas prices, construction costs for renewable generation, and associated transmission availability and costs are also among the factors we evaluate in determining whether it is economic to install controls at coal-fueled plants.

## VI. The Role of State Regulators and Stakeholder Feedback

Our state regulators are the consumers' watchdogs, and they apply standards to ensure that only those costs that are prudently incurred and useful in providing service are recovered in rates. This structure does not encourage utilities to become early movers or emission control technology developers. Those responsibilities lie with the vendor community, where the market provides greater potential rewards for successful innovation. Shareholders of these unregulated companies, not utility customers, earn the rewards of success or bear the costs of failure.

Neither utilities nor regulators have perfect foresight regarding the development of future technologies, future market conditions, or changes in environmental laws, but we make the best projections possible in our resource development decisions. We also appreciate that the American public is concerned with environmental issues, including global climate change. The significant concern for electric utilities is carbon dioxide, the byproduct of the combustion of fossil fuels. Although the primary focus has been on coal-based generation, since it produces more carbon dioxide per unit of electric energy than other fossil fuels, natural gas-fired generation also produces carbon dioxide emissions and is at risk as a continuing source of fuel due to uncertainties around climate change and carbon dioxide regulations.

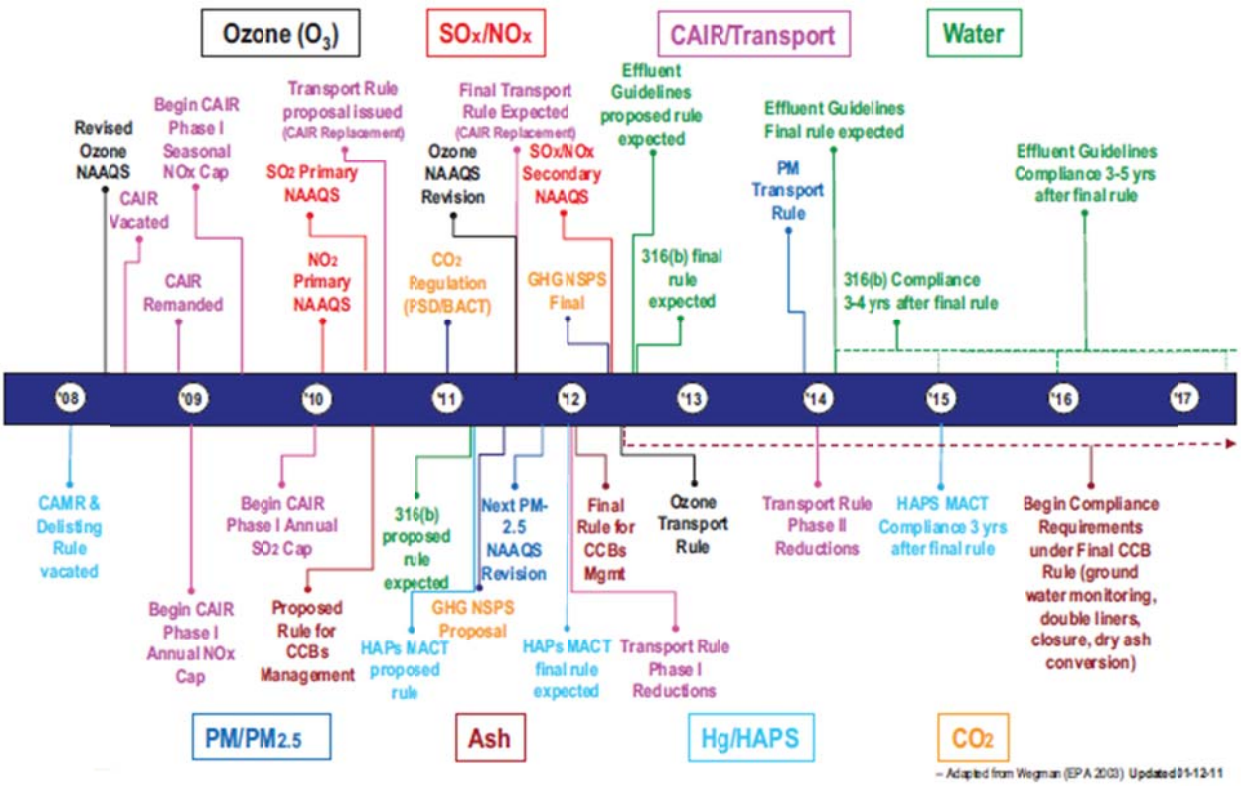
There are many different viewpoints regarding whether MidAmerican should make investments in our existing coal-fueled facilities. Our challenge is to work with these stakeholders and our regulators to come up with solutions that balance state and federal policies, ensure system reliability, maintain 100% compliance with all laws, keep the lights on, meet increasing customer loads, ensure the safety of our employees and customers, and satisfy the obligation to serve, all while maintaining reasonable rates.

# *SECTION II*

## *The So-Called "EPA Regulatory Train Wreck"*

Both MidAmerican Energy Company and PacifiCorp continue to pursue proactive environmental control strategies that are protective of the environment while minimizing cost impacts to our customers. There are a multitude of environmental requirements the electric industry faces over the next several years driving these investments. Figure 1 provides a timeline, referenced colloquially as the so-called "EPA regulatory train wreck" slide. It identifies some of the requirements that are currently underway or in development. There is a great deal of uncertainty associated with future environmental requirements; however, MidAmerican must comply with the requirements that exist today and prepare for the regulations that will be adopted in the future.

**Figure 1 - EPA's "Regulatory Train Wreck"**




The areas of regulation listed below reflect the color-coded "categories" of regulations identified within Figure 1.

1. **PM/PM2.5**
2. **Ozone ($O_3$)**
3. **SOx/NOx**
4. **CAIR/Transport Rule**

These first four categories are grouped together because under the Clean Air Act each of these categories is linked to one or more National Ambient Air Quality Standards ("NAAQS"). These "criteria pollutants" – particulate matter ("PM"), sulfur dioxide ("$SO_2$"), ozone ("$O_3$"), nitrogen oxides ("NOx"), carbon monoxide ("CO"), and hydrocarbons – while undesirable, are not toxic in typical concentrations in the ambient air. Under the Clean Air Act, they are regulated differently from other types of emissions, such as hazardous air pollutants and greenhouse gases.

A NAAQS by itself does not require emissions reductions from specific sources, such as power plants. Rather, the EPA and/or a state will identify various control measures that once implemented, are meant to achieve the NAAQS. A particular control measure may require emissions reductions from certain types of sources. An example of such a control measure would be the EPA's proposed Clean Air Transport Rule, discussed further below.

The Clean Air Act, which was last amended in 1990, requires the EPA to set NAAQS (40 CFR part 50) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. ***Primary standards*** set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. ***Secondary standards*** set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The Clean Air Act requires the EPA to review the latest scientific information and standards every five years. Before new standards are established, policy decisions undergo rigorous review by the scientific community, industry, public interest groups, the general public and the Clean Air Scientific Advisory Committee (CASAC).

**Particulate Matter (PM) and Fine Particulates ($PM_{2.5}$):** The Clean Air Act established NAAQS for particle pollution (i.e., particulate matter or "PM"). The EPA last revised the air quality standards for particle pollution in 2006. The next review is expected in 2011.

**Ozone ($O_3$):** Ozone is a gas composed of three oxygen atoms. It is not usually emitted directly into the air, but at ground-level is created by a chemical reaction between NOx and volatile organic compounds ("VOC") in the presence of sunlight. EPA last revised the NAAQS for ozone pollution in 2008 (at 75 micrograms per cubic meter), putting some counties into non-attainment and requiring states to take steps to reduce emissions to improve the ambient air concentrations. However, EPA is now reconsidering its 2008 decision and may lower the limit (to between 60 and 70 micrograms). EPA expects to make its decision by the end of July 2011.

**Sulfur Dioxide ($SO_2$) and Nitrogen Oxide (NOx):** In 2010, the EPA promulgated new "primary" one-hour NAAQS for $SO_2$ and nitrogen dioxide ("$NO_2$") concentrations, which add a temporal nature to emissions reductions necessary to improve the ambient air concentrations. New "secondary" $SO_2$ and NOx NAAQS are expected in 2012.

**Clean Air Transport Rule ("CATR"):** EPA's proposed CATR would require new reductions in $SO_2$ and NOx emissions from large stationary sources, including power plants, located in 31 states and the District of Columbia beginning in 2012. It is meant to help states attain NAAQS set in 1997 for ozone and fine particulate matter. This rule would replace the Bush

administration's CAIR, which was vacated in July 2008 and rescinded by a federal court because it failed to effectively address pollution from upwind states that is hampering efforts by downwind states to comply with ozone and PM NAAQS.

The EPA has been discussing the possibility of additional emissions reductions via a "PM Transport" rule (2013) or a "Transport II" rule (2014). Justification for such a rule or set of rules would be triggered by the setting of more stringent ozone or PM NAAQS. For example, a more stringent ozone NAAQS may result in an expansion of NOx emissions reduction requirements to stationary sources operating in the non-CATR states.

***MidAmerican's Compliance Strategy:*** The Clean Air Transport Rule only impacts MidAmerican Energy Company's coal units in Iowa and CalEnergy's natural gas facilities in Texas, Illinois and New York. MidAmerican Energy Company has already completed a low NOx burner and overfire air program across its entire coal-fueled fleet. As a result, NOx emissions have dropped from approximately 40,000 tons per year to slightly over 20,000 tons per year – or nearly 50%. In addition, dry scrubbers have been installed at its Louisa and Walter Scott Energy Center unit 4 in 2007, and Walter Scott Energy Center unit 3 in 2009. Additional scrubber projects are being planned for Neal South in 2013, and Neal North units 2-3 and the Ottumwa Generating Station in 2014. Once these projects are complete, MidAmerican Energy Company's $SO_2$ emissions will be reduced from a baseline of over 60,000 tons per year to slightly less than 25,000 tons per year – or nearly 60%.

The EPA intends for this Rule to evolve as additional changes are made to the National Ambient Air Quality Standards for $SO_2$ and NOx. This could lead to significant stranded investments and cause the affected states to also expand to the western coast; if modeling shows those states ultimately contributing to a downwind attainment problem.

**Regional Haze Rule**: While not depicted within the EPA regulatory train wreck slide, an EPA rule meant to address visibility concerns will drive additional NOx reductions particularly from facilities operating in the Western United States. On June 15, 2005, EPA issued final amendments to its July 1999 regional haze rule. These amendments apply to the provisions of the regional haze rule that require emission controls known as Best Available Retrofit Technology ("BART"), for industrial facilities emitting air pollutants that reduce visibility. These pollutants include $PM_{2.5}$, and compounds which contribute to $PM_{2.5}$ formation, such as NOx, $SO_2$, certain volatile organic compounds, and ammonia. The 2005 amendments included final guidelines, known as BART guidelines, for states to use in determining which facilities must install controls and the type of controls the facilities must use. States had until December 2007 to develop their implementation plans. States were responsible for identifying the facilities that would have to reduce emissions under BART and then set BART emissions limits for those facilities. Those facilities are expected to install additional emissions controls usually within five years after the EPA approves a state's regional haze plan (2014-2017).

***MidAmerican's Compliance Strategy:*** PacifiCorp operates 19 coal-fueled generating units; 14 of these units are BART or BART-eligible units. Between 1999 and 2014, PacifiCorp will have installed low-NOx burners at 15 units, reducing NOx emissions by 36,800 tons per year. The capital cost of these projects is $125 million; annual operating and maintenance expenses

associated with the equipment are $1.6 million. Beginning in 2014, PacifiCorp will install selective catalytic reduction ("SCR") to achieve additional NOx emission reductions. Between 2014 and 2022, five units will have SCR installed, reducing NOx emissions by 21,000 tons at a cost of $951 million; operating and maintenance costs will increase by $25.8 million annually.

Unfortunately, recent discussions with the Utah and Wyoming Departments of Environmental Quality suggest that EPA Region 8 believes it may be necessary, for purposes of Regional Haze BART requirements, to install another five SCR in Wyoming and four SCR in Utah, combined with the five planned installations, within a five-year time period—potentially requiring 14 SCR by 2017 and an additional $1.7 billion to $2 billion in costs. PacifiCorp maintains its outage schedule on a four-year cycle; major projects such as the addition of emission control require a significant outage. Installing controls during times outside of the normal outage schedule creates significant electric reliability and availability concerns and imposes significant additional costs for replacement power. The costs of controls, replacement power, and other project-related costs are reflected in increased costs to customers.

The Regional Haze program does not require that emission reductions occur on a date certain; to the contrary, the Regional Haze program is a long-term program designed to improve visibility in Class I areas with the national goal of achieving natural visibility conditions by 2064. States are required to establish reasonable progress goals to achieve the required visibility improvements. States are required, under Section 169A(b) of the Clean Air Act to consider the following when making their BART determinations:

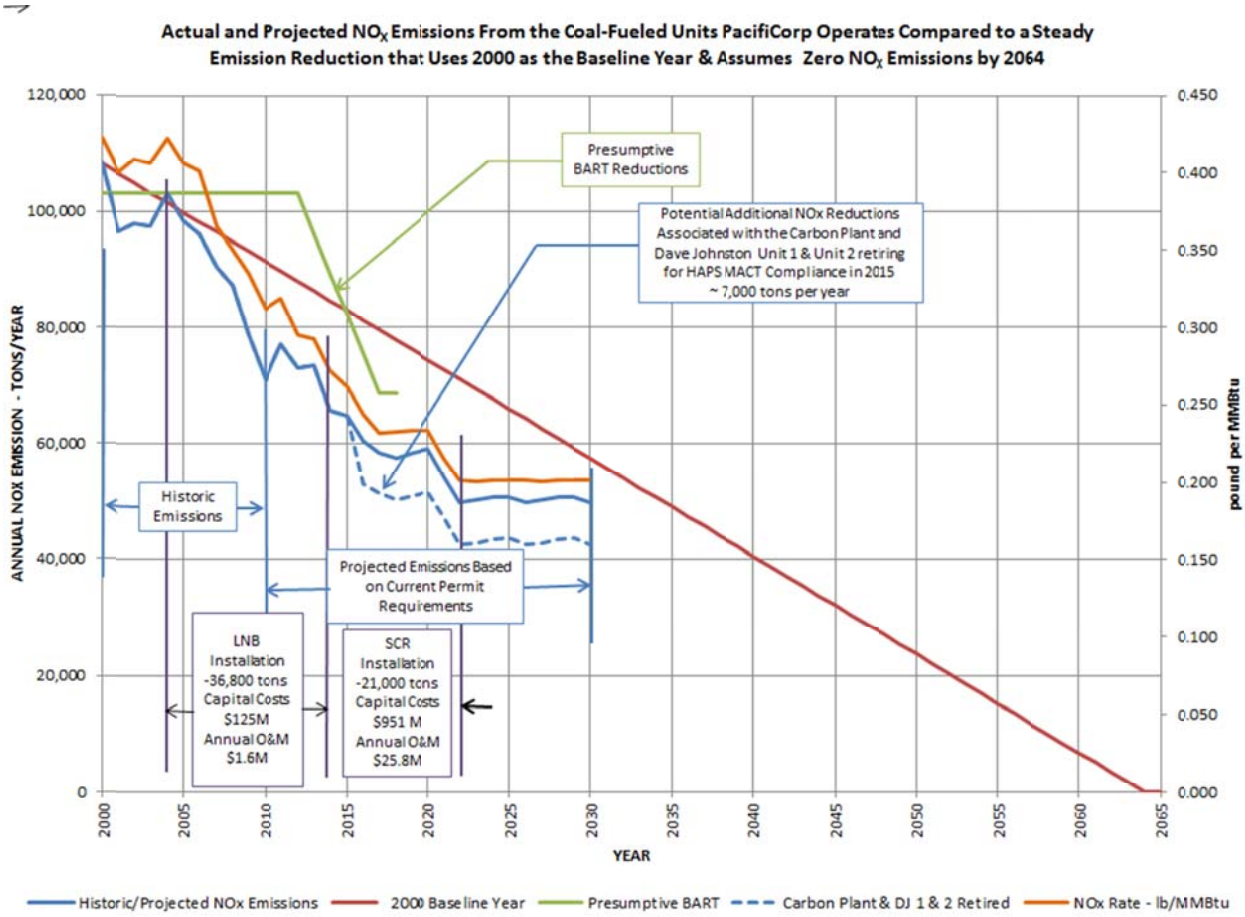
- The costs of compliance;
- The energy and non-air quality environmental impacts of compliance;
- Any existing pollution control technology in use at the source;
- The remaining useful life of the source; and
- The degree of visibility improvement which may reasonably be anticipated from the use of BART.

In considering whether the states' implementation plans are sufficient for approval, EPA appears to be focused, at best, on two criteria – the costs of compliance and the degree of visibility improvement. Effectively, EPA has indicated that any emission reductions that can be accomplished for $5,000 or less per ton at facilities that have more than a 0.50 deciview impact on a Class I area should be controlled. EPA's analysis fails to take into consideration the more robust criteria considered by the states in making their determinations, opting for more reductions sooner.

As a result of EPA's failure to take into consideration factors such as existing pollution control technology in use at the source, its cost per ton of emissions reduced is inaccurate. For example, at PacifiCorp's Jim Bridger Unit 1, low-NOx burners were installed in 2010. Rather than calculating the incremental costs associated with installation of SCR from the reduced baseline that reflects the emission reductions from low-NOx burners, EPA spreads the cost of both low-NOx burners and SCR to achieve a cost per ton removed more than $2,000 per ton lower than the incremental difference between low-NOx burners and SCR.

EPA's suggestions that it will require more emission controls in a shorter period of time is akin to jumping off a cliff, rather than achieving emission reductions in a reasonable period of time through 2064. (See Figure 2.)

**Figure 2 – PacifiCorp's Regional Haze/BART Compliance Strategy**




## 5. Hg/HAPS

In March 2005, EPA issued the Clean Air Mercury Rule ("CAMR") to permanently limit and reduce mercury emissions from coal-fired power plants under a market-based cap-and-trade program; this rule would effectively remove coal-fired power plants from the Clean Air Act list of sources of hazardous air pollutants. However, CAMR was vacated in February 2008, with the circuit court finding EPA's removal of coal-fired power plants from the list of generating sources regulated under Clean Air Act Section 112 out of statutory compliance.

On March 16, 2011, the EPA signed the proposed Utility Hazardous Air Pollutants ("HAPS") Maximum Achievable Control Technology ("MACT") rule, which sets standards for 10 non-mercury HAPS metals, mercury and acid gases. It also establishes work practices to ensure the minimization of organic HAPS such as furans and dioxins emitted by coal and oil-fueled electric generating units. The rule is standard-drive, not technology-driven and, as such, there are

multiple pathways to comply with the rule; however, it appears the EPA is encouraging utilities to: install baghouses with particulate matter continuous emission monitors for non-mercury metallic HAPS control, install sulfur dioxide scrubbers to control acid gases, and install activated carbon/reagent injection to remove mercury.

***MidAmerican's Compliance Strategy:*** In order to meet emissions projections, MidAmerican Energy Company must complete scrubber projects planned for Neal 4 in 2013, and Neal units 2 and 3 and Ottumwa Generating Station in 2014 and add sorbent injection to Neal 1, Walter Scott Energy Center unit 1, Walter Scott Energy Center unit 2, and Riverside Generating Station. Walter Scott Energy Center unit 4 already employs an activated carbon injection system to control mercury and the remaining units with existing or planned baghouses are expected to install activated carbon injection by fall 2014. The cost of most of these projects is approximately $485 million (MidAmerican Energy Company's share). Additional activated carbon injection and sorbent injection projects at the four small coal-fueled units would require an estimated $30 million (MidAmerican Energy Company's share).

MidAmerican Energy Company's smaller coal-fueled units (Walter Scott Energy Center 1, Walter Scott Energy Center 2, Neal 1, and Riverside) may not be able to comply with the proposed HAPS MACT rule without making significant investments in control technology (unless the units are converted exclusively to fire natural gas).

For PacifiCorp, in order to meet the emission reductions anticipated by the new regulations, PacifiCorp must complete scrubber, baghouse, and mercury emissions controls projects no later than fall of 2014 in order to comply with the anticipated January 1, 2015 implementation date at a cost of approximately $1.26 billion (PacifiCorp's share). This capital cost includes installation of mercury control at all PacifiCorp units, including Carbon Unit 1 and 2 and Dave Johnston Unit 1 and Unit 2 at an estimated $12 million (PacifiCorp's share).

The units most at risk from the new HAPS MACT regulations are unscrubbed units that do not have baghouses. These units (Carbon Units 1 and 2 and Dave Johnston Units 1 and 2) may need to be idled or converted to natural gas (assuming it is available onsite) if the non-mercury metallic HAPS and acid gas HAPS limits cannot be met through dry sorbent injection, or other emergent low-cost technology solutions.

Due to the non-emission-trading nature of the proposed rule, units not meeting the unit-based HAPS MACT emission standards would be required to cease operation on or about January 1, 2015, should that date become the compliance deadline. Some of those facilities are also located in key transmission grid areas that provide voltage support that cannot be addressed by the fall of 2014 in order to comply with the anticipated January 1, 2015 implementation date. As such, we urge EPA to carefully consider potential options to develop a mechanism that avoids significant impacts to the availability, reliability and cost of electricity while balancing the need to reduce emissions.

## 6. Water

**Cooling Water Intake Structure Rule:** EPA recently released it proposed cooling water intake structure ("CWIS") rule pursuant to Clean Water Act (CWA) section 316(b) for existing steam-electric power plants. In November 2010, EPA entered into a settlement agreement with the environmental community that sets a binding timetable for a proposed rule by March 2011 and a final rule by July 2012.

***MidAmerican's Compliance Strategy:*** All of MidAmerican Energy's coal-fueled generating facilities, except Louisa, Ottumwa and Walter Scott Unit 4, which have water cooling towers, are regulated facilities under 316(b) of the Clean Water Act and may be impacted by the outcome of the expected rulemaking. Neal 1-4, Walter Scott Energy Center 1-3, and Riverside Generating Station have once through cooling on the Missouri and Mississippi Rivers. At PacifiCorp, only the Dave Johnston plant withdraws enough cooling water to be covered by the 316(b) rule. Every other PacifiCorp facility that is potentially affected by this rule has a recirculating cooling system in place thereby meeting the likely technology requirements of the rule.

**Steam Electric Effluent Guidelines:** EPA announced in September 2009 that it intends to revise the existing steam electric guidelines, last updated in 1982, that set the technology-based effluent limitations for the steam electric industry. The new effluent guidelines rulemaking is likely to set strict performance standards that will force technological and operational changes at existing coal-fueled, nuclear, gas-fueled, and combined cycle facilities. The most significant impact, however, will likely be to coal-fueled facilities. The proposed rule is due in July 2012 with a final rule expected in January 2014.

***MidAmerican's Compliance Strategy:*** MidAmerican Energy Company does not have any wet scrubbers installed in its coal-fueled fleet, and none are planned. The dry scrubbing process does not produce a significant waste water stream, as the approximate 600 gallons per minute of lime slurry water is evaporated in the process and emitted out the stack as vapor. MidAmerican, however, may face a greater challenge concerning the discharge of process water from its coal ash surface impoundments.

PacifiCorp has a number of wet scrubbers in its coal-fueled fleet which produce waste water streams. In most cases, water from these waste streams is collected and evaporated in waste water ponds. The wet scrubbers are currently installed at Hunter 1-3, Huntington 1-2, Naughton 3, Bridger 1-4, Cholla 4, Craig 1-2, and Colstrip 3-4. New wet scrubbers are planned to be placed in service at Naughton 1-2 in 2012 and 2011, respectively. In addition, the PacifiCorp coal-fueled facilities have a number of coal ash surface impoundments.

Unfortunately, there is no definitive method to ascertain the potential financial impacts of new effluent guidelines on the MidAmerican and PacifiCorp coal-fueled fleets until the actual rule requirements are proposed in mid-2012; and there are no projects budgeted to specifically address these issues. However, as the effluent discharge requirements become more and more stringent, the facilities which have discharges to waterways will likely be required to either add wastewater treatment facilities or redesign their process if possible to be a zero discharge facility. The costs to comply with such a rule are expected to be high. Wastewater treatment systems

generally range from tens of millions of dollars for a small facility, to a hundred million or more for a large facility.

## 7. Ash

In June 2010, EPA proposed two primary regulatory options for coal combustion residuals ("CCR") disposed of in landfills and/or surface impoundments: (1) regulation of the materials as hazardous wastes under Subtitle C of the Resource Conservation and Recovery Act ("RCRA"); or (2) regulation of the materials as non-hazardous wastes under Subtitle D of RCRA. Under both options, the proposed regulatory requirements likely would lead to the accelerated closure of all existing unlined landfills and unlined wet surface impoundments, although the agency's "D Prime" option would allow for the continued use of existing landfills and surface impoundments through their useful life as long as certain environmental and safety standards were met. Under each option, CCRs that are beneficially used would be excluded from regulation; however, the stigma associated with a hazardous waste determination would have a devastating impact on continued beneficial uses. Under the two primary options under consideration by EPA, CCR disposal practices will be impacted significantly and result in significant compliance costs, may lead to the closure of existing disposal facilities, and may threaten continued CCR beneficial use.

***MidAmerican's Compliance Strategy:*** The regulation of CCR under either of the EPA's primary options would have a significant impact on the methods that MidAmerican Energy Company typically employs to manage its ash. With the exception of Walter Scott Unit 4 and Neal Unit 4 which handle all the coal ash dry, all of MidAmerican Energy Company's coal-fueled units sluice the boiler bottom ash to on-site surface impoundments. In addition, if CCR is ultimately designated as a hazardous waste, the beneficial use market could evaporate and eliminate the over $3 million MidAmerican Energy Company receives each year for this commodity. The loss of the beneficial use market would also increase disposal costs and dramatically increase the rate at which the monofills are filled.

Similar to MidAmerican Energy Company, the regulation of CCR under either of the EPA's primary options would have a significant impact on the methods that PacifiCorp typically employs to manage its ash. Currently, Carbon, Hunter, and Huntington do not have any wet surface impoundments at the facilities. The remaining coal-fueled units, however, sluice ash and scrubber waste to on-site surface impoundments. In addition, if CCR is ultimately designated as a hazardous waste, the beneficial use market could evaporate and eliminate the over $3.5 million PacifiCorp receives each year on average from this commodity. The loss of the beneficial use market would also increase disposal costs and dramatically increase the rate at which monofills are filled.

## 8. $CO_2$

**Best Available Control Technology ("BACT") Guidelines:** On November 10, 2010, the EPA published a set of guidance documents to assist state permitting authorities and industry permitting applicants with the Clean Air Act PSD and title V permitting for sources of greenhouse gases ("GHGs"). The guidance consists of a number of different documents. EPA provided a general guidance document entitled "PSD and Title V Permitting Guidance For

Greenhouse Gases," which includes a set of appendices with illustrative examples of BACT determinations for different types of facilities. There also remains ongoing concern about the application of New Source Review ("NSR") rules to GHGs. It is unclear whether owners of fossil power plants should proactively undertake efficiency improvements, lest those efficiency improvements be treated as a modification that triggers the application of NSR rules.

***MidAmerican's Compliance Strategy:*** With respect to the GHG BACT permitting, PacifiCorp recently completed permitting for its Utah Lake Side 2 natural gas combined-cycle power plant, where the additional resources and costs required to complete the permitting effort were estimated to be between $25,000 and $50,000 for GHG-related modeling costs, consultant costs, and internal labor.

MidAmerican Energy Company recently completed its GHG BACT permitting for its George Neal South emission control project located in Iowa, but the additional work was completed internally. However, to comply with the newly proposed GHG limit, MidAmerican Energy Company demonstrated that replacing the existing turbine with a more efficient design is technically feasible and would cost approximately $20 million. We also have to test several boiler injection chemicals to determine if they improve plant efficiency. If it is determined that the chemicals are technically and economically feasible, the unit will be required to utilize them going forward.

It should also be noted, that despite claims to the contrary, there are no post-combustion technologies commercially available to control greenhouse gas emissions. Carbon capture and sequestration is likely at least 5-10 years away from becoming commercially available, and only if certain technical, legal, and liability challenges can be overcome. Additionally, the use of biomass is generally limited to certain boiler types for potential retrofit, and only a small percentage can replace the primary boiler fuel. As a result, facilities undergoing GHG BACT permitting are only left with potential efficiency upgrades / heat rate improvement projects to pursue. Since these types of projects typically result in relatively small improvements in efficiency (i.e. less than 1%-3%), an aggressive GHG BACT permit limit may not be achievable on existing units.

**New Source Performance Standards:** On December 23, 2010, in a settlement reached with several states and environmental groups in *New York v. EPA*, the EPA agreed to promulgate emissions standards covering GHGs from both new and existing electric generating units under Section 111 of the Clean Air Act by July 26, 2011 and issue final regulations by May 26, 2012.[3] New source performance standards are established under the Clean Air Act for certain industrial sources of emissions determined to endanger public health and welfare and must be reviewed every eight years. New source performance standards apply to new and modified sources and effectively establish the floor for determining what constitutes BACT.

In addition, emission guidelines will apply to existing sources. The emissions guidelines, issued by EPA, are used by states to develop plans for reducing emissions and include targets based on demonstrated controls, emission reductions, costs and expected time frames for installation and

[3] EPA also entered into a similar settlement the same day to address greenhouse gas emissions from refineries with proposed regulations by December 15, 2011 and final regulations by November 15, 2012.

compliance and may be less stringent than the requirements imposed on new sources. States must submit their plans to EPA within nine months after the guidelines' publication unless EPA sets a different schedule. States have the ability to apply less stringent standards or longer compliance schedules if they demonstrate that following the federal guidelines is unreasonably cost-prohibitive, physically impossible, or that there are other factors that reasonably preclude meeting the guidelines. States may also impose more stringent standards or shorter compliance schedules. Lastly, under Section 111, EPA may establish standards that rely upon market mechanisms rather than technology-specific emissions rates.

***MidAmerican's Compliance Strategy:*** It is unclear what approach EPA will take when establishing new source performance standards covering GHGs from both new and existing electric generating units or what the guidelines will be for existing sources. The proposed settlement agreement indicates that EPA's initial evaluation of available GHG control strategies indicates that there are cost-effective control strategies for reducing GHGs from electric generating units and that it would be appropriate for EPA to concurrently propose performance standards from new and modified electric generating units, and emissions guidelines for GHG emissions from existing affected electric generating units. As noted above (p. 15), MidAmerican disagrees that there are cost-effective post-combustion control strategies for reducing greenhouse gas emissions, and only limited efficiency improvements are commercially available at this time. EPA indicated that the GHG standards are likely to apply to existing facilities starting in 2015 or 2016.

# Figure 3 - Overview of MidAmerican's Environmental Control Projects

| | | | | NOx Emission Controls | | | | | $SO_2$ Emission Controls | | Particulate Controls | | | Mercury (Hg) Control | CCB Compliance | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Year Installed | Regulatory Depreciation Life (non-OR) | Accredited Net MW Rating (100% Share) | Neural Network System | Low NOx Burners | Overfire Air | Selective Non-Catalytic Reduction | Selective Catalytic Reduction | Dry Scrubber | Wet Scrubber | Electrostatic Precipitator | Wet Scrubber | Baghouse | Activated Carbon Injection | (Dates shown are initial compliance projects in-service) Pond closure, wet-to-dry conversion, new facilities | Potential to Operate on Full Load Natural Gas | MEC/PAC Ownership |
| Neal 1 | 1964 | | 135 | Y | N/A | Y | Not Planned | Not Planned | Not Planned | Not Planned | Y - Hot | N/A | Not Planned | 2014 | 2015 | Y | 100.00% |
| Neal 2 | 1972 | | 295 | Y | Y | Y | 2014 | Not Planned | 2014 | Not Planned | Y - Cold | N/A | 2014 | 2014 | 2015 | N/A | 100.00% |
| Neal 3 | 1975 | | 515 | Y | Y | Y | 2014 | Not Planned | 2014 | N/A | Y - Cold | N/A | 2014 | 2014 | 2015 | N/A | 72.00% |
| Neal 4 | 1979 | | 644 | Y | Y | Y | 2013 | Not Planned | 2013 | N/A | Y - Cold | N/A | 2013 | 2014 | Not Planned | N/A | 40.57% |
| WSEC 1 | 1954 | | 45 | Not Planned | Y | Not Planned | Not Planned | Not Planned | Not Planned | Not Planned | Y - Hot | N/A | Not Planned | 2014 | 2015 | N/A | 100.00% |
| WSEC 2 | 1958 | | 88 | Not Planned | Y | Y | Not Planned | Not Planned | Not Planned | Not Planned | Y - Hot | N/A | Not Planned | 2014 | 2015 | Y | 100.00% |
| WSEC 3 | 1978 | | 690 | Y | Y | Y | Not Planned | Not Planned | Y | N/A | Y - Cold | N/A | Y | 2014 | 2015 | N/A | 79.10% |
| WSEC 4 | 2007 | | 800 | Y | Y | Y | Not Planned | Y | Y | N/A | N/A | N/A | Y | Y | Not Planned | N/A | 59.66% |
| Louisa | 1983 | | 745 | Y | Y | Y | Not Planned | Not Planned | Y | N/A | Y - Hot | N/A | Y | 2014 | 2014 | N/A | 88.00% |
| Riverside | 1925/1961 | | 130 | Y | Y | Y | Not Planned | Not Planned | Not Planned | Not Planned | Y - Cold | N/A | Not Planned | 2014 | 2015 | Y | 100.00% |
| Ottumwa | 1981 | | 710 | Y | Y | Y | Not Planned | Not Planned | 2014 | N/A | Y - Hot | N/A | 2014 | 2014 | Not Planned | N/A | 52.00% |
| | | | | | | | | | | | | | | | | | |
| Carbon 1 | 1954 | 2020 | 67 | Not Planned | Not Planned | Not Planned | Not Planned | Not Planned | Not Planned | Not Planned | Y - Cold Side | - | Not Planned | Sorb Inj + Oxidizer | 2015 | Under Review | 100.00% |
| Carbon 2 | 1957 | 2020 | 105 | Not Planned | Not Planned | Not Planned | Not Planned | Not Planned | Not Planned | Not Planned | Y - Cold Side | - | Not Planned | Sorb Inj + Oxidizer | 2015 | Under Review | 100.00% |
| Cholla 4 | 1981 | 2042 | 395 | Not Planned | Y | Y | Not Planned | Not Planned | N/A | Y | N/A | - | Y | Coal Oxidizer | 2015 | Not Planned | 100.00% |
| Colstrip 3 | 1984 | 2046 | 740 | Not Planned | Y | Y | Not Planned | Not Planned | N/A | Y | N/A | Y | N/A | Y - Installed | 2015 | Not Planned | 100.00% |
| Colstrip 4 | 1986 | 2046 | 740 | Not Planned | Y | Y | Not Planned | Not Planned | N/A | Y | N/A | Y | N/A | Y - Installed | 2015 | Not Planned | 100.00% |
| Craig 1 | 1980 | 2034 | 428 | Not Planned | Y | Y | 2014 | Not Planned | N/A | Y | N/A | - | Y | Coal Oxidizer | 2015 | Not Planned | 19.28% |
| Craig 2 | 1979 | 2034 | 428 | Not Planned | Y | Y | 2013 | Not Planned | N/A | Y | N/A | - | Y | Coal Oxidizer | 2015 | Not Planned | 19.28% |
| Dave Johnston 1 | 1958 | 2027 | 106 | Not Planned | N | N | Not Planned | Not Planned | Not Planned | Not Planned | Y - Cold Side | - | Not Planned | Sorbent Injection | 2015 | Under Review | 100.00% |
| Dave Johnston 2 | 1960 | 2027 | 106 | Not Planned | N | N | Not Planned | Not Planned | Not Planned | Not Planned | Y - Cold Side | - | Not Planned | Sorbent Injection | 2015 | Under Review | 100.00% |
| Dave Johnston 3 | 1964 | 2027 | 220 | Not Planned | Y | Y | Not Planned | Not Planned | Y | N/A | Y - Cold Side | - | Y | Sorbent Injection | 2015 | Not Planned | 100.00% |
| Dave Johnston 4 | 1972 | 2027 | 330 | Not Planned | Y | Y | Not Planned | Not Planned | 2012 | N/A | Y - Cold Side | - | 2012 | Sorbent Injection | 2015 | Not Planned | 100.00% |
| Hayden 1 | 1965 | 2030 | 184 | Not Planned | Y | Y | Not Planned | 2015 | Y | N/A | N/A | - | Y | Sorbent Injection | 2015 | Not Planned | 24.46% |
| Hayden 2 | 1976 | 2030 | 262 | Not Planned | Y | Y | Not Planned | 2016 | Y | N/A | N/A | - | Y | Sorbent Injection | 2015 | Not Planned | 12.60% |
| Hunter 1 | 1978 | 2042 | 430 | Not Planned | 2014 | 2014 | Not Planned | Not Planned | N/A | Y | Y - Cold Side | - | 2014 | Coal Oxidizer | 2015 | Not Planned | 93.75% |
| Hunter 2 | 1980 | 2042 | 430 | Not Planned | 2011 | 2011 | Not Planned | 2023 | N/A | Y | Y - Cold Side | - | 2011 | Coal Oxidizer | 2015 | Not Planned | 60.31% |
| Hunter 3 | 1983 | 2042 | 460 | Not Planned | Y | Y | Not Planned | 2024 | N/A | Y | N/A | - | Y | Coal Oxidizer | 2015 | Not Planned | 100.00% |
| Huntington 1 | 1977 | 2036 | 445 | Not Planned | Y | Y | Not Planned | 2023 | N/A | Y | Y - Cold Side | - | Y | Coal Oxidizer | 2015 | Not Planned | 100.00% |
| Huntington 2 | 1974 | 2036 | 450 | Not Planned | Y | Y | Not Planned | Not Planned | N/A | Y | N/A | - | Y | Coal Oxidizer | 2015 | Not Planned | 100.00% |
| Jim Bridger 1 | 1974 | 2037 | 530 | Not Planned | Y | Y | Not Planned | 2022 | N/A | Y | Y - Cold Side | - | Not Planned | Sorb Inj + Oxidizer | 2015 | Not Planned | 66.67% |
| Jim Bridger 2 | 1975 | 2037 | 527 | Not Planned | Y | Y | Not Planned | 2021 | N/A | Y | Y - Cold Side | - | Not Planned | Sorb Inj + Oxidizer | 2015 | Not Planned | 66.67% |
| Jim Bridger 3 | 1976 | 2037 | 530 | Not Planned | Y | Y | Not Planned | 2015 | N/A | Y | Y - Cold Side | - | Not Planned | Sorb Inj + Oxidizer | 2015 | Not Planned | 66.67% |
| Jim Bridger 4 | 1979 | 2037 | 530 | Not Planned | Y | Y | Not Planned | 2016 | N/A | Y | Y - Cold Side | - | Not Planned | Sorb Inj + Oxidizer | 2015 | Not Planned | 66.67% |
| Naughton 1 | 1963 | 2029 | 160 | Not Planned | 2012 | 2012 | Not Planned | Not Planned | N/A | 2012 | Y - Cold Side | - | Not Planned | Sorb Inj + Oxidizer | 2015 | Not Planned | 100.00% |
| Naughton 2 | 1968 | 2029 | 210 | Not Planned | 2011 | 2011 | Not Planned | Not Planned | N/A | 2011 | Y - Cold Side | - | Not Planned | Sorb Inj + Oxidizer | 2015 | Not Planned | 100.00% |
| Naughton 3 | 1971 | 2029 | 330 | Not Planned | Y | Y | Not Planned | 2014 | N/A | Y | Y - Cold Side | - | 2014 | Sorb Inj + Oxidizer | 2015 | Not Planned | 100.00% |
| Wyodak | 1978 | 2039 | 335 | Not Planned | 2011 | 2011 | Not Planned | Not Planned | Y | N/A | Y - Cold Side | - | 2011 | Sorbent Injection | 2015 | Not Planned | 80.00% |