State of Oregon
Department of Environmental Quality Memorandum

Date: May 22, 2009

To: Environmental Quality Commission

From: Dick Pedersen, Director

Subject: Agenda Item J, Action Item: 2008 Oregon Regional Haze Plan and new controls for PGE Boardman coal-fired power plant proposed rulemaking
June 18-19, 2009 EQC Meeting

Why this is Important

Air pollution in the form of haze can travel hundreds of miles, affecting the quality of the viewing experience in scenic areas like Crater Lake National Park. To address this problem, the Environmental Protection Agency adopted the regional haze rule in 1999 to improve and protect visibility in 156 national parks and wilderness areas across the country. This rule requires states to adopt regional haze plans. To address the problem of regional haze in Oregon, DEQ has developed the 2008 Oregon Regional Haze Plan, which includes new controls for the PGE Boardman power plant.

DEQ Recommendation and EQC Motion

The Department of Environmental Quality recommends that the Environmental Quality Commission adopt the following proposed plans and rules as revisions to the Oregon State Implementation Plan:

- Proposed new regional haze rules, Division 223, as presented in Attachment A-1;
- Oregon Smoke Management Plan, Division 629, as presented in Attachment A-2; and
- The "Oregon Regional Haze Plan for Implementing Section 308 of the Regional Haze Rule," as presented in Attachment A-3.

DEQ also recommends that the EQC adopt the following related rule amendments:

- Proposed changes to the compliance extension contingency provision in the mercury rules, Division 228, as presented in Attachment A-4.

After extensive review and consideration of over 1200 public comments, DEQ is recommending adoption of its initial Dec. 2008 rule proposal that includes new emission control requirements for the PGE Boardman power plant with one change, which would allow PGE to formally request a rule change to avoid installing SO_2 or Selective Catalytic Reduction controls, if and when PGE decides to permanently close the Boardman coal-fired power plant.[1]

[1] This proposed change can be found on pages 155 and 202 of the proposed Oregon Regional Haze Plan

Background and Need for Rulemaking

Congress designated certain national parks and wilderness areas as Class I areas, where visibility was identified as an important value. Currently there are 156 Class 1 areas in the country. Oregon has 12 Class I areas, including Crater Lake National Park and 11 wilderness areas. Under the federal regional haze rule, states must develop plans that will improve Class 1 area visibility on the haziest days, the worst 20 percent, and ensure no degradation on the clearest days, the best 20 percent, over the next 60 years. This long time frame recognizes the many challenges faced in reducing haze across the country. This includes the need for very complex technical analysis covering thousands of different emissions sources, and the need for multi-jurisdictional coordination among states, federal land managers such as the US Forest Service and National Park Service, EPA, Native American tribes, and many other stakeholders. The goal of the regional haze rule is to return visibility in Class I areas to natural background levels by the year 2064.

The purpose of this rulemaking is to adopt the first in a series of regional haze plans for Oregon's 12 Class I areas. The largest and most significant part of the regional haze rule is the requirement to evaluate best available retrofit technology, known as BART, for older industrial sources built before 1977, when federal rules were adopted to protect visibility in Class I areas from new industrial sources. Some of these older sources are still uncontrolled and have significant visibility impacts in Class I areas. In addition to the BART requirement, the regional haze rule requires states to show how reasonable progress is being made to reduce haze by a benchmark called the 2018 Milestone. Regional haze plans must include a long-term strategy to identify actions the state will take to reduce haze over the next ten years.

Thirteen western states coordinated regional haze planning efforts through an organization called the Western Regional Air Partnership[2], and through individual consultation with neighboring states. DEQ consulted with Washington, California, Nevada, and Idaho air agencies, as well as the US Forest Service and the National Park Service. At five year intervals states will develop updates to their regional haze plans, showing the latest visibility analysis, the current status for meeting reasonable progress milestones and proposed emission reduction strategies for making incremental progress in haze reduction.

Overview of the Oregon Regional Haze Plan and Requirements for PGE Boardman

The 2008 Oregon Regional Haze plan consists of the following:

1) Comprehensive review of visibility conditions in each of Oregon's 12 Class I areas, showing major pollutants and sources causing haze, and a projection of statewide emissions and visibility conditions in 2018;

[2] http://www.wrapair.org/about/0309wrapmap.pdf

2) Summary of DEQ's BART evaluation of the PGE Boardman coal-fired power plant and other sources potentially subject to BART, including new rules for emission controls for PGE Boardman;
3) Reasonable progress demonstration for the best and worst visibility days, related to the 2018 Milestone benchmark;
4) Long-term strategy that describes sources that will be evaluated in the next 10 years to make visibility improvements; and
5) Summary of the consultation and coordination process with neighboring states, Tribes, and federal land managers.

Additional information on parts two, three and four are described below. Discussions of parts one and five above can be found in Chapters 6-9 and 13 of the proposed Oregon Regional Haze Plan. See also Attachment A-5: Executive Summary from the Oregon Regional Haze Plan.

The most significant action associated with the 2008 Oregon Regional Haze Plan is DEQ's proposed rule requiring emission controls at the Boardman coal-fired power plant. This proposed action would provide the largest environmental benefit of any strategy in the plan, and have the largest fiscal impact.

Summary of DEQ's BART Evaluation

Under BART, states must evaluate pre-1977 major industrial sources to determine which have significant visibility impacts, and would therefore need to reduce emissions through changes in plant operations or by retrofitting with new pollution controls. DEQ evaluated over 100 sources and found ten to be BART-eligible by meeting certain criteria in the federal rule. One of these ten sources was the PGE Boardman coal-fired power plant. DEQ's visibility modeling analysis showed that the PGE Boardman plant caused considerably greater visibility degradation than any other BART-eligible source. Four other sources, listed on page 6, had visibility impacts just over the significant impact level, while the remaining five did not. The Boardman plant was evaluated for BART controls, while the other four sources chose to reduce their emissions by making changes to their operations and taking enforceable permit limits. The proposed rules accompanying the Oregon Regional Haze Plan apply to PGE Boardman and the four other sources taking permit limits.

DEQ's air quality assessment of PGE Boardman coal-fired power plant

The PGE Boardman plant is a 600 megawatt coal-fired electric generating plant. Originally permitted in 1977, PGE Boardman is Oregon's only coal-fired power plant, and represents approximately 20 percent of PGE's total energy generating capacity. The facility currently emits about 25,000 tons of air pollution per year.

DEQ's visibility modeling analysis shows that sulfur dioxide and nitrogen oxide emissions from this facility can travel more than 200 miles, significantly degrading visibility in 14 Class I areas in Oregon, Washington, and Idaho. The modeling analysis also shows these emissions significantly degrade visibility in the Columbia River Gorge National Scenic Area and contribute to acid deposition, which can threaten important Native American cultural resources such as ancient rock images. DEQ's modeling analysis shows that the highest visibility degradation occurs at the Mt. Hood Class I Area and in the Columbia River Gorge. DEQ's modeling analysis can be found at http://www.deq.state.or.us/aq/haze/docs/modelingAnalysis.pdf
Based on this analysis, DEQ developed its emission control proposal for the PGE Boardman facility with three environmental priorities in mind:

1) Meet federal requirements for BART;
2) Minimize Boardman's NOx and SO_2 emissions to help Oregon demonstrate that reasonable progress is being made toward the 2018 Milestone; and
3) Minimize Boardman's NOx and SO_2 emissions to improve visibility and better protect Native American cultural resources in the Columbia River Gorge.

While the first priority meets the federal requirements for BART, the other two priorities go beyond BART to provide extra environmental protection. As described below, this is expected to provide significant visibility improvements and a general benefit to public health.

DEQ's emission control proposal for PGE Boardman

Based on DEQ's assessment of visibility impacts from the PGE Boardman facility, a two-phased approach for installing controls was developed that would reduce total emissions by 81 percent, or about 21,000 tons per year, and reduce peak visibility impacts in the 14 Class I areas by an average of 83 percent. Phase one controls would cut sulfur dioxide, nitrogen oxides, and particulate matter emissions by about 17,000 tons per year, while the phase two controls would provide additional reduction of 4,000 tons per year of NOx. The total cost of these controls would be approximately $471 million. The following summarizes DEQ's proposed controls:

- **Phase one NOx controls:** New low-NOx burners with modified overfire air control system, at a cost of $32.6 million, which would cut NOx emissions by 4,800 tons per year, for a 46 percent reduction. These controls must be installed by July 2011.[3]

[3] The proposed rules would allow DEQ to grant an extension to July 2014, if it is demonstrated that the proposed emission limit cannot be achieved with these combustion controls. If an extension is granted, PGE Boardman would need additional time to install other controls (which can meet this limit), which accounts for the 2014 installation date. However, even if an extension is granted, the low NOx Burners and modified overfire air system would still be installed by July 2011.

- **SO_2 controls:** Semi-dry flue gas desulfurization, at a cost of $247 million, which would cut SO_2 emissions by 12,000 tons per year for an 80 percent reduction. These controls must be installed by July 2014. These controls are compatible with the mercury controls required by 2012. See the mercury rule amendments described on page 7.
- **Particulate matter controls:** Pulse jet fabric filter. These controls are a side benefit and part of installing the SO_2 controls and would supplement the existing electrostatic precipitator. This installation would cut particulate matter emissions by 122 tons per year for a 29 percent reduction. These controls must be installed by July 2014.

The combination of the above controls meets BART requirements.

In addition, DEQ recommends phase two NOx controls.

Phase two NOx control is selective catalytic reduction, at a cost of $191 million, which would cut NOx emissions by an additional 4,000 tons per year for an additional 38 percent reduction. These controls must be installed by July 2017.

The phase two NOx controls go beyond BART and were recommended for several reasons. The controls would reduce the magnitude of PGE Boardman's visibility impacts in 14 Class I areas, as described above, and would increase the total NOx reduction from 46 to 84 percent, which is a significant reduction and consistent with the 80 percent reduction from the proposed SO_2 controls. There is also a need for demonstrating reasonable progress and greater visibility improvement by the 2018 regional haze milestone. Additionally, these controls would reduce acid deposition and improve visibility in the Columbia River Gorge, and provide general benefits to air quality and public health.

BART-eligible sources taking federally enforceable permit limits

As mentioned above, there were four BART-eligible sources that had much smaller visibility impacts than PGE Boardman, yet were still over the significant impact level. EPA guidance allows BART-eligible sources to take a federally enforceable permit limit if they permanently lower their emissions so that the ambient concentration stays below this significant impact level. The federal regional haze rule requires enforceable limits to be in place before submitting the state regional haze plan to EPA. Sources that take these enforceable limits are not subject to further evaluation for BART controls; however, as with other emission sources, they will be re-evaluated in the future for reasonable progress purposes, as part of the long-term strategy. The air quality permits for these four sources have been modified to meet these emission limits.

- **PGE Beaver power plant** is a 558 megawatt electric generating plant located in Clatskanie, Oregon. This plant is reducing its emissions by using a cleaner

ultra-low sulfur diesel fuel blend as a backup fuel in its steam gas turbines, and by limiting the amount of ultra-low sulfur diesel fuel it can burn in any given day.

- **International Paper (formerly Weyerhaeuser)** is a containerboard plant located in Springfield, Oregon. The plant will soon begin work on repairs that will reduce its emissions, and show compliance through operational limits and monitoring. In the interim, limits on both operation and oil use will apply, especially during periods of inspection and maintenance of damaged equipment when emissions can vary.
- **Amalgamated Sugar** is a sugar beet processing plant located in Nyssa, Oregon, near the Idaho border, which is currently closed. Since its air quality permit is still active, this facility will have an emission limit added to its current permit, which becomes effective if the facility resumes operation in the future.
- **Georgia Pacific, Wauna Mill** is a pulp and paper manufacturing plant located near Clatskanie, Oregon. The mill is reducing its emissions by taking a permit limit based on permanently reducing oil usage, reconfiguring an emission control system to eliminate an incinerator later this year and applying production limits before and after the incinerator is eliminated.

The reasonable progress demonstration for regional haze

The first regional haze plan must show reasonable progress in meeting the 2018 Milestone as a benchmark towards achieving natural conditions by 2064. DEQ relied on regional modeling conducted by the Western Regional Air Partnership to estimate visibility conditions in 2018 for each Class I area in Oregon, based on estimated emission reductions from BART sources, emission reductions from known "on-the-books" regulations, emissions and population growth projections for Oregon and the region, future estimates of fire emissions and other factors. In terms of meeting the 2018 Milestone, most Oregon Class I areas show a slower rate of progress for the 20 percent worst days, but meet the objective for no degradation for the 20 percent best days. The primary contributor to the slower rate of progress for the worst days was natural fire or wildfires and windblown dust. Another large contributor to the worst days in western Oregon Class I areas was commercial offshore shipping, for which few regulations have yet been developed. DEQ suspects forestry and other outdoor burning sources may also be contributing to the worse days, and will evaluate these sources under the long-term strategy, as described below. The phase two selective catalytic reduction controls for PGE Boardman will result in greater visibility improvement and reasonable progress by the 2018 Milestone.

The long-term strategy for future visibility improvements

An important part of the Oregon Regional Haze Plan is the long-term strategy, which identifies ongoing efforts and new measures to improve visibility over the next 10 years. Examples of ongoing efforts include major new source review rules for new and expanding major industrial sources, DEQ's low emission vehicle standards for cars and trucks, federal emission standards for non-road engines and residential wood heating rules. In terms of new measures, the long-term strategy contains work commitments for DEQ to evaluate other industrial sources not covered by the BART rules, forestry prescribed burning, residential and rangeland burning, offshore commercial shipping and ammonia sources in order to determine potential visibility improvements by 2018. DEQ will work closely with EPA, federal land managers, appropriate stakeholders and tribal nations in conducting these evaluations, and preparing a report for the 2013 regional haze plan update.

Other actions proposed with this rulemaking

1. Amendments to the mercury rule compliance extension contingency for PGE Boardman

There are two changes related to this proposed rulemaking modifying existing rules that require PGE to reduce mercury emissions at the Boardman plan. These 2006 rules allowed DEQ to grant a one-year extension to the July 2012 compliance date if there are circumstances preventing compliance by that date. DEQ is proposing to change this extension contingency measure to two years, to reflect the timeframe for installing SO_2 controls for BART in 2014. Since the SO_2 and mercury controls share some of the same control equipment, it is advantageous for them to be installed at the same time. PGE Boardman may use an existing electrostatic precipitator to control mercury emissions until the SO_2 controls are installed. However, it is possible this could result in contamination of the fly ash, which is a valuable byproduct sold for making concrete. As a result, DEQ is also proposing to add fly ash contamination as a reason for granting a two-year extension to 2014.

2. Incorporates changes made to the Oregon Smoke Management Plan into the State Implementation Plan

This proposed rulemaking also incorporates changes made to the Oregon Smoke Management Plan into the State Implementation Plan. The Oregon Department of Forestry, in consultation with DEQ, revised the Oregon Smoke Management Plan in November 2007 and included new visibility protection provisions. These are referenced in the Oregon Regional Haze Plan, and include voluntary measures to protect Oregon Class I areas when burning inside or upwind of a Class I area. No changes to the updated Oregon Smoke Management Plan were made as part of this regional haze rulemaking, but any change to Oregon Smoke Management Plan requires a State Implementation Plan revision.

Effects of Rule

As described above, if this proposed rulemaking is adopted, it would have the following effects:

1. Require new controls for the PGE Boardman plant. Reduces PGE Boardman's peak visibility impacts by 83 percent among other improvements. DEQ would revise the plant's air permit after adoption of this proposed rulemaking.

2. Include enforceable permit limits for four BART-eligible sources. Reduces the emissions from these sources permanently, to below a level that would cause a significant visibility impact. These sources have already had their air permit revised in order to take this option, except for Amalgamated Sugar, which is currently shutdown.

3. Adopt the Oregon Regional Haze Plan as part of the State Implementation Plan. DEQ would submit this plan and all the associated rulemaking to EPA for approval as a State Implementation Plan revision. This plan serves as a legal commitment, similar to other rules and plans submitted to EPA, on how Oregon is going to meet this federal rule.

4. Amend the mercury rules to align the installation of mercury controls to SO_2 controls for PGE Boardman. This rule change would not be submitted to EPA, as it is not a State Implementation Plan revision and would take effect immediately. However, as described above, this is only a change to a contingency measure that is triggered if PGE requests an extension to the proposed 2012 compliance date.

5. Incorporate the Oregon Smoke Management Plan into the State Implementation Plan. This plan is an appendix in the Oregon Regional Haze Plan, and would be submitted to EPA for approval as a State Implementation Plan revision with the rest of this proposed rulemaking.

Fiscal Impact:

- Installing new pollution control technology on the facility will represent a major capital investment and cost to the owners of the Boardman power plant. Total capital costs for the full suite of NOx and SO_2 controls are estimated at approximately $471 million by 2018. It is possible that these costs would be passed on to customers served by the Boardman plant through increased electric rates which DEQ estimates will average about three to four percent by 2018. This potential rate increase will be contingent on future actions taken by the Oregon Public Utility Commission. Pending Public Utility Commission approval, these rate increases would likely phase in over time, beginning with rate increases averaging 0.2 to 0.3 percent between 2011 and 2014, two to three percent between 2014 and 2017, with a maximum of three to four percent by 2018.

- DEQ anticipates no significant fiscal impact to the four other BART-eligible industrial sources that have accepted federally enforceable permit limits or their customers from the proposed new emission limits, because these limits do not require any significant capital investment in these facilities. These sources did not identify any significant fiscal impacts during the comment period or at the time their air permits were modified.

- No other fiscal or economic impacts are expected from the rest of the proposed regional haze plan.

- DEQ's fiscal advisory committee agreed that there will be a general positive economic impact to public health and the environment resulting from the reduction of 21,000 tons per year of air pollution from PGE Boardman. Even though these benefits cannot be quantified, the committee agreed they should be acknowledged in principle.

For a more detailed summary of the fiscal and economic effects of this proposal see Attachment E: Statement of Need and Fiscal and Economic Impact.

Commission Authority

The commission has authority to take this action under ORS 468.020, 468A.025, 468A.035, 468A.310 and 477.013.

Stakeholder Involvement

A regional haze/BART workshop was held in Portland in 2007, and was attended by industry, environmental representatives and the public. During 2007 and 2008 DEQ met with environmental and industry groups to discuss various aspects of the BART requirements. DEQ also met with EPA and federal land managers during the preparation of the Oregon Regional Haze Plan, and participated in numerous Western Regional Air Partnership meetings with neighboring states preparing similar regional haze plans. DEQ met with several tribes in addition to the tribal nations in the Western Regional Air Partnership. During this time, DEQ also worked with Oregon Department of Forestry to adopt, through a public process, regional haze-related provisions into the Oregon Smoke Management Plan.

In October 2008, DEQ convened a fiscal advisory committee to review the economic impacts associated with this proposed rulemaking, with emphasis on the costs related to the proposed controls for PGE Boardman. The committee had a wide range of membership; from utility, power and energy organizations, to small business groups, environmental, health, and tribal interests. The committee met in October 2008, as described above, and again in January 2009 after DEQ received comments from PGE proposing alternatives to DEQ's proposal for BART and reasonable progress.

Public Comment

The public comment period began December 1, 2008, and ended January 30, 2009. This 60-day comment period was twice the length of most DEQ rulemakings. In response to PGE's proposal described below, which DEQ

received as a public comment, DEQ extended the public comment period by two weeks.

There were five public hearings held in Portland, Eugene-Springfield, Medford, Hermiston and The Dalles. A total of 111 persons attended the hearings, and 45 provided testimony. DEQ received over 1200 comments, mostly via email, with 61 written comments received. As a result of the extensive public comments and additional time needed for review and evaluation of these comments, this proposed rulemaking was rescheduled from the April 2009 EQC meeting to the June 2009 EQC meeting.

Summary of the public comments

The summary of comments and DEQ's responses can be found in Attachment B: Summary of Public Comments and Agency Responses, and Attachment C: Hearing Officer's Report on Public Hearings.

PGE's proposed decision points:

On December 17, 2008, PGE submitted comments on this rulemaking requesting DEQ consider adding two decision points or closure options to the proposed rules, which would allow PGE the option of decommissioning the Boardman plant rather than investing in additional air pollution controls. The first decision point in 2012 would allow PGE to decide to close the plant and operate it without additional controls until 2020, and the second in 2015 would allow PGE to decide to close the plant and operate it without additional controls until 2029. PGE cited the need for these two closure options as being primarily related to the impact and costs of upcoming carbon regulations to address global warming. PGE noted that these closure options would: (1) provide needed flexibility in making critical planning decisions about the future of the plant; (2) allow sound economic decisions to be made for PGE's customers; and (3) satisfy DEQ's regulatory needs as alternate ways of meeting the BART and reasonable progress requirements.

Summary of key comments and DEQ responses

The following represents some of the key comments DEQ received on this rulemaking. DEQ's detailed response to these comments can be found in Attachment B: Summary of Public Comments and DEQ Responses. Several of the topics raised in the comments below are also discussed in the key issues section on page 12 of this report.

- **PGE's decision point proposal.** Most of the comments in favor of PGE's decision point closure options cited the importance of giving PGE the flexibility to make sound economic decisions in the future when carbon regulations are known. PGE and others also commented that these decision

points would still allow DEQ to meet BART and reasonable progress requirements. *See DEQ responses #19-21, 23-25 in Attachment B.*

- **Overall stringency and installation timeline of DEQ's proposed controls for PGE Boardman**. Those in favor of more stringency stated that the proposed NOx and SO_2 emission limits did not reflect the lowest levels achievable using this control technology. There were also many comments advocating faster installation of controls than proposed, such as requiring SO_2 controls in 2013 instead of 2014. *See DEQ responses #1-9,11,12,16.*

- **Selective catalytic reduction requirements**. There were many comments in favor of requiring selective catalytic reduction controls as BART. In contrast, many opposed selective catalytic reduction controls as being too stringent and expensive. *See DEQ responses #6,11.*

- **Overall cost of the proposed controls for PGE Boardman is too expensive.** Many comments cited selective catalytic reduction controls as being too expensive, and that the overall estimated cost of $471 million would have major impacts on the economy, energy supply, and electricity rates, which could ultimately force the plant to shutdown. *See DEQ responses #11,13,15,18,52.*

- **Proposed compliance date extension contingency measures for phase one NOx and mercury**. There was some opposition to allowing DEQ to grant compliance date extensions for installing phase one NOx controls and mercury controls via contingency measures. *See DEQ responses #3, 14,48.*

- **Adequacy of DEQ's BART evaluation for other industrial sources.** There were a number of comments on the BART evaluation of other industrial sources besides PGE Boardman, mostly related to modeling and selection of sources to be evaluated for BART controls. *See DEQ responses #35-37.*

- **Adequacy of the reasonable progress demonstration.** Several comments noted that since most Oregon Class I areas showed a slower rate of progress than the 2018 Milestone more controls should be required. *See DEQ response #38.*

- **Comments on DEQ's proposed evaluation of fire sources under the long-term strategy**. There were several comments and questions on the proposed evaluation of forestry prescribed burning, and how DEQ would address fire sources in general. *See DEQ response #41.*

- **Failure of the plan to address other issues besides Class I visibility**. There were many comments from the general public that this rulemaking was too limited in scope, and should be addressing visibility in the Columbia River Gorge, general air quality impacts, public health and global warming. *See DEQ responses #46-50, 54.*

Key Issues

Has DEQ identified the appropriate controls for PGE Boardman?

As described in this report, DEQ's visibility modeling for PGE Boardman showed this plant to be one of the most significant single sources of haze pollution in Oregon, impacting 14 Class I areas in Oregon and Washington, within a 200 mile radius of the plant, and accounting for half of the Class I visibility impacts from the five BART sources that were modeled. Its highest impact at the Mt. Hood Class I Area is approximately nine times the significant impact level, and about seven times this level at the Columbia River Gorge. In addition, the NOx and SO_2 emissions from PGE Boardman contribute to acid deposition in these 14 Class I areas and the Columbia River Gorge.

As noted above, during the public comment period there were many comments on the stringency and overall estimated cost of $471 million for the proposed controls for PGE Boardman. Some argued the costs were too high, while others argue for greater stringency and faster implementation of these controls.

DEQ conducted an exhaustive three-year evaluation of the appropriate controls for this facility, researching numerous control technologies and recent retrofits across the country for similar power plants.DEQ also hired an independent consultant, Eastern Research Group, with extensive expertise in coal plant control technology, to assist in the control evaluation. DEQ staff reviewed over 30 different types and combinations of control technologies, evaluating the cost and control efficiencies of each, and the engineering requirements for retrofitting the Boardman plant and worked closely with PGE plant engineers during this evaluation. DEQ made additional assessments on the shortest time feasible for installation, and set emission limits that were the highest achievable, yet reflect the use of proper averaging times, and account for normal fluctuations in emissions that would ensure compliance with permit limits. The end result was a suite of emission controls for PGE Boardman that is both stringent and cost-effective, and complies with the regulatory requirements for BART and reasonable progress.

In addition to general comments on the stringency and cost, there were specific comments on the proposed phase two selective catalytic reduction controls. Some argued that selective catalytic reduction controls should be included as part of the BART controls and required by 2014, while others strongly opposed these controls as being too stringent and expensive, not providing enough visibility improvement to be justified or that DEQ was unfairly singling out PGE Boardman for additional controls.

The magnitude of PGE Boardman's visibility impacts in 14 Class I areas was a key factor in DEQ recommending selective catalytic reduction controls. Without the selective catalytic reduction controls, the NOx reduction is only 46 percent, and the combined total emission reduction only 66 percent. With selective catalytic reduction controls, the total NOx reduction increases to 84 percent, and the combined total emission reduction to 81 percent. The overall cost-effectiveness of selective catalytic reduction, combined with phase one NOx controls, is nearly the same as the SO_2 controls on a cost per ton basis. Additionally, there is more visibility improvement from reducing NOx than SO_2 due to the fact that NOx contributes slightly more to haze formation than SO_2.

DEQ did not recommend selective catalytic reduction controls as BART due to cost and implementation concerns. Although selective catalytic reduction is considered cost effective, the cost is about six times more than the phase one NOx controls, yet only provide about twice as much visibility improvement. DEQ also determined that installation of selective catalytic reduction would take longer than the five years allowed under the BART rules, due to the time needed for engineering, procurement, and construction and additional time needed for extensive modifications to the boiler to accommodate this retrofit.

Overall, DEQ believes the phase one NOx controls combined with the SO_2 controls to be the best approach to meet BART, and adding the phase two selective catalytic reduction controls are both necessary and justified. Over the next eight years the combination of these controls will reduce the plant's emissions by approximately 21,000 tons per year, reduce peak visibility impacts at the 14 Class I areas by an average of 83 percent, improve visibility by the 2018 Milestone, reduce visibility degradation in the Columbia River Gorge and provide general air quality and public health benefits. These controls will also help reduce the risk to important Native American cultural resources in the Gorge. The proposed controls are cost-effective and are realistically achievable for PGE.

Should the proposed controls for Boardman include the closure option decision points proposed by PGE?

DEQ does not support PGE's closure options proposal. The preferred approach would be for PGE to request an alternate compliance path at a future time when the full extent of carbon regulations is known, when costs and tradeoffs have been evaluated and when a decision has been made on the future of the Boardman plant.

EPA and federal land managers also questioned if PGE's proposal legally satisfies the BART and reasonable progress requirements. Their comments cited the lack of an evaluation of other BART controls that might be cost-

effective, and the visibility improvements such controls might provide, prior to the proposed closure dates. The federal BART rules require that all control technologies be evaluated with specific emphasis on the expected visibility improvements and requires full public review and comment of any BART determination. PGE also concluded no controls were needed for the 2015 decision point, prior to the 2029 closure date. DEQ agrees these factors were not fully addressed in PGE's proposal for the 2012 decision point and that the proposal does not address the required 2018 Milestone and necessary visibility improvements.

Proposed change: In response to PGE's proposal, DEQ has added provisions to the proposed Oregon Regional Haze Plan that would allow PGE to formally request a rule change to avoid installing SO_2 or selective catalytic reduction controls, if and when PGE decides to permanently close the Boardman coal-fired power plant.[4] PGE would have to make this request well in advance of the required installation dates for these controls, allowing sufficient time for a full public process. In considering a request, DEQ would initiate a public rulemaking process involving participation by a fiscal advisory committee, stakeholder interests, tribal nations and the public. An opportune time for PGE to consider this option would be as part of DEQ's 2013 regional haze plan update; although PGE could request a rule change at any time the decision has been made to close the Boardman facility. See Attachment A-6 for the proposed language.

Should DEQ allow extensions to compliance dates for phase one NOx and mercury controls?

There were many comments on the proposed compliance date extension contingency measures for phase one NOx and mercury controls. DEQ recommends retaining these measures as proposed.

DEQ has proposed a stringent phase one NOx emission limit for the boiler at Boardman. PGE must combustion controls to meet these limits by July 2011 and no extension would be granted for the installation of combustion controls. However, due to the unique design of the Boardman boiler, it is possible these combustion controls may not achieve the proposed limit. If PGE fails to meet the required limit, there is a contingency measure in the proposed rules that will require PGE to install more costly pollution controls, known as a selective non-catalytic reduction system. If selective non-catalytic reduction system is necessary, DEQ will extend the phase one NOx compliance date to 2014 to allow for the engineering, fabrication and installation of these controls. The selective non-catalytic reduction system would be temporary, and would be either replaced or used in conjunction with the selective catalytic reduction controls required in phase two.

[4] This proposed change can be found on pages 155 and 202 of the proposed Oregon Regional Haze Plan

The proposed revision to the mercury rules would extend the existing compliance extension contingency measure from one to two years. This proposal is not changing the default 2012 compliance date for installing mercury controls and existing rules allow DEQ to grant a one year extension if there are circumstances preventing compliance by that date. DEQ recommends changing this contingency measure to two years to align with the installation of SO_2 controls in 2014. SO_2 and mercury controls share some of the same control equipment and it is advantageous for them to be installed at the same time. In addition, DEQ recommends adding fly ash contamination as a reason for granting this extension. PGE Boardman may be able to use activated carbon injection with an existing electrostatic precipitator to control mercury emissions until the SO_2 controls are installed. There is a possibility that this process could contaminate the fly ash, make it unusable for concrete production and require landfill disposal. If this occurs, PGE could be granted a two-year extension rather than one.

Next Steps

- If approved, DEQ will submit the Oregon Regional Haze Plan and accompanying regional haze rules, and Oregon Smoke Management Plan, to EPA as a revision to the Oregon State Clean Air Act Implementation Plan.
- PGE Boardman's Title V Permit will be modified to reflect the new rules.

Attachments

A. Proposed Rulemaking
   1. Proposed new regional haze rules, Division 223
   2. Oregon Smoke Management Plan, Division 629
   3. 2008 Oregon Regional Haze Plan (electronic copy, see attached disc)
   4. Proposed amendments to mercury rules, Division 228
   5. Executive Summary from the Oregon Regional Haze Plan
   6. Proposed changes to Plan to address PGE decision points proposal (excerpt from the revised Plan)

B. Summary of Public Comments and Agency Responses
C. Hearing Officer's Report on Public Hearings
D. Relationship to Federal Requirements Questions
E. Statement of Need and Fiscal and Economic Impact
F. Land Use Evaluation Statement

Available Upon Request

1. DEQ's Fiscal Impact Report
2. DEQ Visibility and Acid Deposition Modeling Analysis of the PGE Boardman Power Plant
3. Proposed Rulemaking Announcement
4. Written comments received
5. December 17, 2008 "decision points" comment letter from PGE
6. DEQ's BART Report for PGE Boardman
7. Rule Implementation Plan
8. Legal Notice of Hearing

Approved:

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