NOTE: The redline/strikeout denotes changes proposed to the rules adopted June 19, 2009.

DEPARTMENT OF ENVIRONMENTAL QUALITY

DIVISION 223
REGIONAL HAZE RULES

340-223-0010

Purpose

OAR 340-223-0020 through 340-223-~~0050~~ 0080 establish requirements for certain sources emitting air pollutants that reduce visibility and contribute to regional haze in Class I areas, for the purpose of implementing Best Available Retrofit Technology (BART) requirements and other requirements associated with the federal Regional Haze Rules in 40~~¼~~ CFR § 51.308, as in effect on ~~June 19, 2009~~December 9, 2010.

NOTE: This rule is included in the State of Oregon Clean Air Act Implementation Plan as adopted by the Environmental Quality Commission under OAR 340-200-0040.

Stat. Auth.: ORS 468 & 468A
Stats. Implemented: ORS 468A.025
Hist.: DEQ 3-2009, f. & cert. ef. 6-30-09

340-223-0020

Definitions

The definitions in OAR 340-200-0020 and this rule apply to this division. If the same term is defined in this rule and OAR 340-200-0020, the definition in this rule applies to this division.

(1) "BART-eligible source" means any source determined by the Department to meet the criteria for a BART-eligible source established in ~~the federal BART rule in 40¼ CFR 51.308,~~ Appendix Y to 40 CFR Part 51, "Guidelines for BART Determinations Under the Regional Haze Rule", and in accordance with the federal Regional Haze Rules under 40~~¼~~ CFR § 51.308(e), as in effect on December 9, 2010~~June 19, 2009~~.

(2) "Best Available Retrofit Technology (BART)" means an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant that is emitted by an existing stationary facility. The emission limitation must be established, on a case-by-case basis, taking into consideration the technology available, the costs of compliance, the energy and nonair quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source or unit, the remaining useful life of the source or unit, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.

(3) "Deciview" means a measurement of visibility impairment. A deciview is a haze index derived from calculated light extinction, such that uniform changes in haziness correspond to uniform incremental changes in perception across the entire range of conditions, from pristine to highly impaired. The deciview haze index is calculated based on the following equation (for the purposes of calculating deciview, the atmospheric light extinction coefficient must be calculated from aerosol measurements):

Deciview haze index=$10\ln(b_{ext}/10\ Mm^{-1})$~~10 lnc (bext/10 Mm-1)~~

Where bext= the atmospheric light extinction coefficient, expressed in inverse

megameters (Mm-1).

(4) "Dry sorbent injection pollution control system" means a pollution control system that reduces sulfur dioxide emissions by combining a dry alkaline reagent directly with the boiler exhaust gas stream to enable the reagent to adsorb sulfur dioxide and be collected by the existing electrostatic precipitator.

(45) "Subject to BART" means a BART-eligible source that based on air quality dispersion modeling causes visibility impairment equal to or greater than 0.5 deciview in any Class I area, at the 98th percentile for both a three-year period and one-year period.

(6) "Ultra-low sulfur coal" means coal that contains no more than 0.25 lb sulfur/mmBtu heat input on average.

NOTE: This rule is included in the State of Oregon Clean Air Act Implementation Plan as adopted by the Environmental Quality Commission under OAR 340-200-0040.

Stat. Auth.: ORS 468 & 468A
Stats. Implemented: ORS 468A.025
Hist.: DEQ 3-2009, f. & cert. ef. 6-30-09

340-223-0030

BART and Additional Regional Haze Requirements for the Foster-Wheeler Boiler at the Boardman Coal-Fired Power Plant (Federal Acid Rain Program Facility ORISPL Code 6106)

(1) Emissions limits:

(a) Between July 1, 2011 and December 31, 2020, nitrogen oxide emissions must not exceed 0.23 lb/mmBtu heat input as a 30-day rolling average, provided that:

(A) If the source submitted a complete application for construction and/or operation of pollution control equipment to satisfy the emissions limit in subsection (1)(a) at least eight months prior to the compliance date of July 1, 2011, and the Department has not approved or denied the application by the compliance date, the compliance date is extended until the Department approves or disapproves the application, but may not be extended to a date more than five years from the date that the United States Environmental Protection Agency approves a revision to the State of Oregon Clean Air Act Implementation Plan that incorporates OAR 340-223-0030; and

(B) If it is demonstrated by December 31, 2011 that the emissions limit in subsection (1)(a) cannot be achieved with combustion controls, the Department by order may grant an extension of compliance to July 1, 2013.

(b) Except as provided in section (3) below:

(A) Between July 1, 2014 and June 30, 2018, sulfur dioxide emissions must not exceed 0.40 lb/mmBtu heat input as a 30-day rolling average; and

(B) Between July 1, 2018 and December 31, 2020, sulfur dioxide emissions must not exceed 0.30 lb/mmBtu heat input as a 30-day rolling average.

(c) Between July 1, 2014 and December 31, 2020, particulate matter emissions must not exceed 0.040 lb/mmBtu heat input as determined by compliance source testing.

(d) During periods of startup and shutdown, the following emissions limits apply instead of the limits in subsections (a) through (c):

(A) Sulfur dioxide emissions must not exceed 1.20 lb/mmBtu, as a 3-hour rolling average;

(B) Nitrogen oxide emissions must not exceed 0.70 lb/mmBtu, as a 3-hour rolling average; and

(C) Particulate matter emissions must be minimized to extent practicable pursuant to approved startup and shutdown procedures in accordance with OAR 340-214-0310.

(e) The Foster-Wheeler boiler at the source must permanently cease burning coal by no later than December 31, 2020. Notwithstanding the definition of netting basis in OAR 340-200-0020, the netting basis for the boiler is reduced to zero upon the date on which the boiler permanently ceases burning coal, and prior to that date the netting basis for the boiler applies only to physical changes or changes in the method of operation of the boiler for the purpose of complying with emission limits applicable to the boiler and in effect on December 10, 2010.

(2) Studies to evaluate compliance with the sulfur dioxide emissions limits in paragraphs (1)(b)(A)-(B), and the potential side effects of compliance with those limits, if required by section (3), must be completed as follows:

(a) A plan to evaluate the sulfur dioxide emissions limit in paragraph (1)(b)(A) must be submitted for Department approval by July 1, 2011, and the results of the evaluation must be submitted to the Department by July 1, 2013;

(b) A plan to evaluate the sulfur dioxide emissions limit in paragraph (1)(b)(B) must be submitted for Department approval by July 1, 2015, and the results of the evaluation must be submitted to the Department by July 1, 2017; and

(c) Each study pursuant to this section (2) must:

(A) Evaluate whether a dry sorbent injection pollution control system is technically infeasible, will prevent compliance with mercury emissions limits under OAR 340-228-0606, or cause a significant air quality impact (as that term is defined in OAR 340-200-0020) for PM_{10} or $PM_{2.5}$;

(B) Evaluate a range of commercially available sorbent materials that could be used in a dry sorbent injection pollution control system to reduce sulfur dioxide emissions;

(C) Evaluate the potential for significant air quality impacts for PM_{10} or $PM_{2.5}$ as follows:

(i) Perform modeling consistent with the requirements of OAR 340-225-0050(1) with screening meteorological data containing conservative meteorological assumptions; or

(ii) If modeling with screening meteorological data pursuant to subparagraph (i) demonstrates that significant air quality impacts for PM_{10} or $PM_{2.5}$ will occur, perform modeling with site specific meteorological data obtained from the installation of a meteorological monitoring station, including one year of monitoring data for each study. The meteorological monitoring station must be installed, certified, operated and maintained, and the output of the meteorological monitoring station must be recorded, in accordance with a plan approved by the Department;

(D) Evaluate the use of other sulfur dioxide pollution control systems of equal or lower cost as a dry sorbent injection pollution control system, including but not limited to the use of ultra-low sulfur coal, if the study demonstrates that the use of a dry sorbent injection pollution control system is technically infeasible, will prevent compliance with mercury emissions limits under OAR 340-228-0606, or will cause a significant air quality impact (as that term is defined in OAR 340-200-0020) for PM_{10} or $PM_{2.5}$; and

(E) If applicable, propose an emissions limit for sulfur dioxide based on a 30-day rolling average that exceeds the limits listed in paragraphs (1)(b)(A)-(B), based upon the reduction of sulfur dioxide emissions to the maximum extent feasible through the use of a dry sorbent injection pollution control system or another sulfur dioxide pollution control system of equal or lower cost, including but not limited to the use of ultra-low sulfur coal, provided that the emissions limit may not exceed 0.55 lb/mmBtu heat input as a 30-day rolling average.

(3) Between July 1, 2014 and December 31, 2020, sulfur dioxide emissions may exceed the limit listed in paragraph (1)(b)(A) or (B), or both, if:

(a) Studies have been submitted pursuant to section (2);

(b) Compliance with the applicable emissions limit or limits would:

(A) Be technically infeasible;

(B) Prevent compliance with mercury emissions limits under OAR 340-228-0606; or

(C) Cause a significant air quality impact, as that term is defined in OAR 340-200-0020, for PM_{10} or $PM_{2.5}$;

(c) Sulfur dioxide emissions are otherwise reduced to the maximum extent feasible as described in subsection (2)(c); and

(d) The source's Oregon Title V Operating Permit is modified to include a federally enforceable permit limit reflecting the requirements of subsection (2)(c), prior to the compliance date for the sulfur dioxide emissions limit in paragraph (1)(b)(A) or (B) that will be exceeded; provided that if the source's Oregon

Title V Operating Permit has not been modified prior to the applicable compliance date, sulfur dioxide emissions may exceed the emissions limit in paragraph (1)(b)(A) or (B) if the source submitted a complete application to modify its Oregon Title V Operating Permit at least eight months prior to the applicable compliance date and sulfur dioxide emissions do not exceed the emissions limit proposed in its application (which may not exceed 0.55 lb/mmBtu heat input as a 30-day rolling average).

(4) Compliance demonstration. Using the procedures specified in section (5) of this rule:

(a) Compliance with a 30-day rolling average limit must be demonstrated within 180 days of the compliance date specified in section (1) of this rule; and

(b) Compliance with any 30-day rolling average limit for sulfur dioxide that may be established pursuant to subsection (3)(c) must be demonstrated within 180 days of the compliance date for the limit in paragraph (1)(b)(A) or (B) that is superseded by the emissions limit established pursuant to subsection (3)(c).

(5) Compliance Monitoring and Testing.

(a) Compliance with the emissions limits in subsections (1)(a), (b) and (d)(A)-(B), and with any emissions limit for sulfur dioxide that may be established pursuant to subsection (3)(c), must be determined with a continuous emissions monitoring system (CEMS) installed, operated, calibrated, and maintained in accordance with the acid rain monitoring requirements in 40 CFR Part 75 as in effect on December 9, 2010.

(A) The hourly emissions rate in terms of lb/mmBtu heat input must be recorded each operating hour, including periods of startup and shutdown.

(B) The daily average emissions rate must be determined for each boiler operating day using the hourly emissions rates recorded in (A), excluding periods of startup and shutdown.

(C) 30-day rolling averages must be determined using all daily average emissions rates recorded in (B) whether or not the days are consecutive.

(D) The daily average emission rate is calculated for any calendar day in which the boiler combusts any fuel. An operating hour means a clock hour during which the boiler combusts any fuel, either for part of the hour or for the entire hour.

(b) Compliance with the particulate matter emissions limit in subsection (1)(c) must be determined by EPA Methods 5 and 19 as in effect on December 9, 2010.

(A) An initial particulate matter source test must be conducted by January 1, 2015.

(B) Subsequent tests must be conducted in accordance with a schedule specified in the source's Oregon Title V Operating Permit, but not less than once every 5 years.

(C) All testing must be performed in accordance with the Department's Source Sampling Manual as in effect on December 9, 2010.

(6) Notifications and Reports.

(a) The Department must be notified in writing within 7 days after any control equipment (including combustion controls) used to comply with emissions limits in section (1), and with any emissions limit for sulfur dioxide that may be established pursuant to subsection (3)(c), begins operation.

(b) For nitrogen oxide and sulfur dioxide emissions limits in section (1) based on a 30-day rolling average, a compliance status report, including CEMS data, must be submitted within 180 days of the compliance dates specified in section (1).

(c) For any sulfur dioxide emissions limit that may be established pursuant to subsection (3)(c), a compliance status report, including CEMS data, must be submitted within 180 days of the compliance date for the limit in paragraph (1)(b)(A) or (B) that is superseded by the emissions limit established pursuant to subsection (3)(c).

(d) For particulate matter, a compliance status report, including a source test report, must be submitted within 60 days of completing the initial compliance test and all subsequent tests as specified in subsection (5)(b).

(e) The Department must be notified in writing within 7 days of the date upon which the boiler permanently ceases burning coal.

(7) The following provisions of this rule constitute BART requirements for the Foster-Wheeler Boiler: subsection (1)(a), paragraph (1)(b)(A), subsections (1)(c)-(e), (2)(a) and (2)(c), and sections (3)-(6).

(8) The following provisions of this rule constitute additional requirements pursuant to the federal Regional Haze Rules under 40 CFR § 51.308(e) for the Foster-Wheeler Boiler: paragraph (1)(b)(B), subsections (2)(b) and (2)(c), and sections (3)-(6).

~~(1) Emissions limits:~~

~~(a) On and after July 1, 2011, nitrogen oxides emissions must not exceed 0.28 lb/mmBtu heat input as a 30-day rolling average and 0.23 lb/mmBtu heat input as a 12-month rolling average.~~

~~(A) If it is demonstrated by July 1, 2012 that the emission limits in (a) cannot be achieved with combustion controls, the Department may grant an extension of compliance to July 1, 2014.~~

~~(B) If an extension is granted, the nitrogen oxides emissions must not exceed 0.23 lb/mm Btu heat input as a 30-day rolling average on and after July 1, 2014.~~

~~(b) On and after July 1, 2014, sulfur dioxide emissions must not exceed 0.12 lb/mmBtu heat input as a 30-day rolling average.~~

~~(c) On and after July 1, 2014, particulate matter emissions must not exceed 0.012 lb/mmBtu heat input as determined by compliance source testing.~~

~~(d) The emission limits in (a) through (c) above do not apply during periods of startup or shutdown.~~

~~(2) Compliance demonstration. Using the procedures specified in section (3) of this rule:~~

~~(a) Compliance with a 30-day rolling average limit must be demonstrated within 180 days of the compliance date specified in section (1) of this rule.~~

~~(b) Compliance with a 12-month rolling average must be demonstrated within 12 months of the compliance date specified in section (1) of this rule.~~

~~(3) Compliance Monitoring and Testing~~

~~(a) Compliance with the emissions limits in (1)(a) and (b) must be determined with a continuous emissions monitoring system (CEMS) installed, operated, calibrated, and maintained in accordance with the acid rain monitoring requirements in 40 CFR Part 75 as in effect on June 19, 2009.~~

~~(A) The hourly emission rate in terms of lb/mmBtu heat input must be recorded each operating hour, including periods of startup and shutdown.~~

~~(B) The daily average emission rate must be determined for each boiler operating day using the hourly emission rates recorded in (A), excluding periods of startup and shutdown.~~

~~(C) 30-day rolling averages must be determined using all daily average emissions rates recorded in (B) whether or not the days are consecutive.~~

~~(D) 12-month rolling averages must be determined using calendar month averages based on all daily averages during the calendar month.~~

~~(b) Compliance with the particulate matter emissions limit in (1)(c) must be determined by EPA Methods 5 and 19 as in effect on June 19, 2009.~~

~~(A) An initial test must be conducted by January 1, 2015.~~

~~(B) Subsequent tests must be conducted in accordance with a schedule specified in the Oregon Title V Operating Permit, but not less than once every 5 years.~~

~~(C) All testing must be performed in accordance with the Department's Source Sampling Manual as in effect on June 19, 2009.~~

~~(4) Notifications and Reports~~

~~(a) The Department must be notified in writing within 7 days after any control equipment (including combustion controls) used to comply with emissions limits in section (1) begin operation.~~

~~(b) For NOx and SO2 limits based on a 30-day rolling average, a compliance status report, including CEMS data, must be submitted within 180 days of the compliance dates specified in section (1).~~

~~(c) If applicable, a compliance status report for the 12-month rolling average NOx limit in section (1)(a) must be submitted by August 1, 2012.~~

~~(d) For particulate matter, a compliance status report, including a source test report, must be submitted within 60 days of completing the initial compliance test specified in section (3)(b).~~

NOTE: This rule is included in the State of Oregon Clean Air Act Implementation Plan as adopted by the Environmental Quality Commission under OAR 340-200-0040.

Stat. Auth.: ORS 468 & 468A
Stats. Implemented: ORS 468A.025
Hist.: DEQ 3-2009, f. & cert. ef. 6-30-09

~~**340-223-0040**~~

~~**Additional NOx Requirements for the Foster Wheeler Boiler at the Boardman Coal Fired Power Plant (Federal Acid Rain Program Facility ORISPL Code 6106)**~~

~~On and after July 1, 2017, nitrogen oxides emissions must not exceed 0.070 lb/mmBtu heat input, excluding periods of startup and shutdown.~~

~~(1) Compliance with the NOx emissions limit must be determined with a continuous emissions monitoring system in accordance with OAR 340-223-0030(2) and (3).~~

~~(2) The Department must be notified in writing within 7 days after any control equipment used to comply with the emission limit begins operation.~~

~~(3) A compliance status report, including CEMS data, must be submitted by January 1, 2018.~~

~~**NOTE**: This rule is included in the State of Oregon Clean Air Act Implementation Plan as adopted by the Environmental Quality Commission under OAR 340-200-0040.~~

~~Stat. Auth.: ORS 468 & 468A~~
~~Stats. Implemented: ORS 468A.025~~
~~Hist.: DEQ 3-2009, f. & cert. ef. 6-30-09~~

340-223-~~0050~~ 0040

Federally Enforceable Permit Limits

~~(1) Any BART-eligible source that causes visibility impairment less than 0.5 deciview in all Class I areas, at the 98th percentile for both a three-year period and one-year period, based on a federally enforceable permit limit or limits, is not subject to BART.~~

~~(2) If a BART-eligible source's federally enforceable permit limit will be terminated, and as a result the source will be subject to BART, the source is required to submit a BART analysis and install BART as determined by the Department prior to terminating the federally enforceable permit limit.~~(1) A BART-eligible source that would be subject to BART may accept a federally enforceable permit limit or limits that reduces the source's emissions and prevents the source from being subject to BART.

(2) Any BART-eligible source that accepts a federally enforceable permit limit or limits as described in section (1) to prevent the source from being subject to BART, and that subsequently proposes to terminate its federally enforceable permit limit or limits, and that as a result will increase its emissions and become subject to BART, must submit a BART analysis to the Department and install BART as determined by the Department prior to terminating the federally enforceable permit limit or limits.

(3) The Foster-Wheeler boiler at The Amalgamated Sugar Company plant in Nyssa, Oregon (Title V permit number 23-0002) is a BART-eligible source, and air quality dispersion modeling demonstrates that it would be subject to BART while operating. However, it is not operating as of December 9, 2010~~June 19, 2009~~, and therefore is not subject to BART. Prior to resuming operation, the owner or operator of the source must either:

(a) Submit a BART analysis and install BART as determined by the Department by no later than five years from the date that the United States Environmental Protection Agency approves a revision to the State of Oregon Clean Air Act Implementation Plan that incorporates OAR chapter 340, division 223,~~July 1, 2014~~ or before resuming operation, whichever is later; or

(b) Obtain and comply with a federally enforceable permit limit or limits assuring that the source's emissions will not cause the source to be subject to BART.

NOTE: This rule is included in the State of Oregon Clean Air Act Implementation Plan as adopted by the Environmental Quality Commission under OAR 340-200-0040.

Stat. Auth.: ORS 468 & 468A
Stats. Implemented: ORS 468A.025
Hist.: DEQ 3-2009, f. & cert. ef. 6-30-09

340-223-0050

Alternative Regional Haze Requirements for the Foster-Wheeler Boiler at the Boardman Coal-Fired Power Plant (Federal Acid Rain Program Facility ORISPL Code 6106)

(1) The owner and operator of the Foster-Wheeler boiler at the Boardman coal-fired power plant may elect to comply with OAR 340-223-0060 and 340-223-0070, or with OAR 340-223-0080, in lieu of complying with OAR 340-223-0030, if the owner or operator provides written notification to the Director by no later than July 1, 2014. The written notification must identify which rule of the two alternatives the owner or operator has chosen to comply with. The owner or operator may not change its chosen method of compliance after July 1, 2014.

(2) Compliance with OAR 340-223-0080 in lieu of complying with OAR 340-223-0030 is allowed only if the Foster-Wheeler boiler at the Boardman coal-fired power plant permanently ceases to burn coal within five years of the approval by the United States Environmental Protection Agency (EPA) of the revision to the State of Oregon Clean Air Act Implementation Plan that incorporates OAR chapter 340, division 223. If the boiler has not permanently ceased burning coal by that date, the owner and operator shall be liable for violating OAR 340-223-0030 for each day beginning July 1, 2014 on which the owner or operator did not comply with OAR 340-223-0030. This liability shall include, but is not limited to, civil penalties pursuant to OAR chapter 340, division 12, which includes penalties for the economic benefit of operating the facility without the required pollution controls.

(3) If, by December 31, 2011, the EPA fails to approve a revision to the State of Oregon Clean Air Act Implementation Plan that incorporates OAR 340-223-0030 (concerning BART requirements based upon permanently ceasing the burning of coal in the Foster-Wheeler Boiler by December 31, 2020), or OAR 340-223-0060 and 340-223-0070, then the compliance date of July 1, 2014 in OAR 340-223-0060(2)(b) and (c) (sulfur dioxide and particulate matter emissions limits) is delayed until three years from the date of EPA approval.

(4) Notwithstanding sections (1) and (3), if the EPA approves a revision to the State of Oregon Clean Air Act Implementation Plan that incorporates OAR 340-223-0030 (concerning BART requirements based upon permanently ceasing the burning of coal in the Foster-Wheeler Boiler by December 31, 2020), then OAR 340-223-0060 and 340-223-0070 are repealed, compliance with OAR 340-223-0060 and 340-223-0070 in lieu of complying with OAR 340-223-0030 is no longer an alternative, and compliance with OAR 340-223-0030 or OAR 340-223-0080 is required.

340-223-0060

Alternative BART Requirements for the Foster-Wheeler Boiler at the Boardman Coal-Fired Power Plant (Federal Acid Rain Program Facility ORISPL Code 6106) Based Upon Operation Until 2040 or Beyond

(1) Subject to OAR 340-223-0050, the owner or operator of the Foster-Wheeler boiler at the Boardman coal-fired power plant may elect to comply with this rule and 340-223-0070 in lieu of compliance with OAR 340-223-0030.

(2) Emissions limits:

(a) On and after July 1, 2011, nitrogen oxide emissions must not exceed 0.28 lb/mmBtu heat input as a 30-day rolling average and 0.23 lb/mmBtu heat input as a 12-month rolling average.

(A) If it is demonstrated by July 1, 2012 that the emissions limits in (a) cannot be achieved with combustion controls, the Department may grant an extension of compliance to July 1, 2014.

(B) If an extension is granted, on and after July 1, 2014 the nitrogen oxide emissions must not exceed 0.19 lb/mm Btu heat input as a 30-day rolling average, and the emissions limits of 0.28 lb/mmBtu heat input as a 30-day rolling average and 0.23 lb/mmBtu heat input as a 12-month rolling average no longer apply.

(b) On and after July 1, 2014, sulfur dioxide emissions must not exceed 0.12 lb/mmBtu heat input as a 30-day rolling average.

(c) On and after July 1, 2014, particulate matter emissions must not exceed 0.012 lb/mmBtu heat input as determined by compliance source testing.

(d) During periods of startup and shutdown, the following emissions limits apply instead of the limits in subsections (2)(a) through (c):

(A) Sulfur dioxide emissions must not exceed 1.20 lb/mmBtu, as a 3-hour rolling average;

(B) Nitrogen oxide emissions must not exceed 0.70 lb/mmBtu, as a 3-hour rolling average; and

(C) Particulate matter emissions must be minimized to extent practicable pursuant to approved startup and shutdown procedures in accordance with OAR 340-214-0310.

(3) Compliance demonstration. Using the procedures specified in section (4) of this rule:

(a) Compliance with a 30-day rolling average limit must be demonstrated within 180 days of the compliance date specified in section (2) of this rule.

(b) Compliance with a 12-month rolling average must be demonstrated within 12 months of the compliance date specified in section (2) of this rule.

(4) Compliance Monitoring and Testing.

(a) Compliance with the emissions limits in (2)(a), (b) and (d)(A)-(B) must be determined with a continuous emissions monitoring system (CEMS) installed, operated, calibrated, and maintained in accordance with the acid rain monitoring requirements in 40 CFR Part 75 as in effect on December 9, 2010.

(A) The hourly emissions rate in terms of lb/mmBtu heat input must be recorded each operating hour, including periods of startup and shutdown.

(B) The daily average emissions rate must be determined for each boiler operating day using the hourly emissions rates recorded in (A), excluding periods of startup and shutdown.

(C) 30-day rolling averages must be determined using all daily average emissions rates recorded in (B) whether or not the days are consecutive.

(D) 12-month rolling averages must be determined using calendar month averages based on all daily averages during the calendar month.

(b) Compliance with the particulate matter emissions limit in (2)(c) must be determined by EPA Methods 5 and 19 as in effect on December 9, 2010.

(A) An initial test must be conducted by January 1, 2015.

(B) Subsequent tests must be conducted in accordance with a schedule specified in the Oregon Title V Operating Permit, but not less than once every 5 years.

(C) All testing must be performed in accordance with the Department's Source Sampling Manual as in effect on December 9, 2010.

(7) Notifications and Reports.

(a) The Department must be notified in writing within 7 days after any control equipment (including combustion controls) used to comply with emissions limits in section (2) begin operation.

(b) For nitrogen oxide and sulfur dioxide limits based on a 30-day rolling average, a compliance status report, including CEMS data, must be submitted within 180 days of the compliance dates specified in section (2).

(c) If applicable, a compliance status report for the 12-month rolling average nitrogen oxide limit in section (2)(a) must be submitted by August 1, 2012.

(d) For particulate matter, a compliance status report, including a source test report, must be submitted within 60 days of completing the initial compliance test specified in section (4)(b).

NOTE: This rule is included in the State of Oregon Clean Air Act Implementation Plan as adopted by the Environmental Quality Commission under OAR 340-200-0040.

Stat. Auth.: ORS 468 & 468A
Stats. Implemented: ORS 468A.025

340-223-0070

Additional NOx Requirements for the Foster-Wheeler Boiler at the Boardman Coal-Fired Power Plant (Federal Acid Rain Program Facility ORISPL Code 6106) Based Upon Operation Until 2040 or Beyond

(1) Subject to OAR 340-223-0050, the owner or operator of the Foster-Wheeler boiler at the Boardman coal-fired power plant may elect to comply with this rule and 340-223-0060 in lieu of compliance with OAR 340-223-0030.

(2) On and after July 1, 2017, nitrogen oxide emissions must not exceed 0.070 lb/mmBtu heat input as a 30-day rolling average, excluding periods of startup and shutdown.

(3) Compliance with the nitrogen oxide emissions limit in section (2) must be determined with a continuous emissions monitoring system in accordance with OAR 340-223-0060(3)-(4).

(4) The Department must be notified in writing within 7 days after any control equipment used to comply with the emissions limit in section (2) begins operation.

(5) A compliance status report, including CEMS data, must be submitted by January 1, 2018.

NOTE: This rule is included in the State of Oregon Clean Air Act Implementation Plan as adopted by the Environmental Quality Commission under OAR 340-200-0040.

Stat. Auth.: ORS 468 & 468A
Stats. Implemented: ORS 468A.025

340-223-0080

Alternative Requirements for the Foster-Wheeler Boiler at the Boardman Coal-Fired Power Plant (Federal Acid Rain Program Facility ORISPL Code 6106) Based Upon Permanently Ceasing the Burning of Coal Within Five Years of EPA Approval of the Revision to the Oregon Clean Air Act State Implementation Plan Incorporating OAR Chapter 340, Division 223.

(1) Subject to OAR 340-223-0050, the owner or operator of the Foster-Wheeler boiler at the Boardman coal-fired power plant may elect to comply with this rule in lieu of compliance with OAR 340-223-0030 if the boiler permanently ceases to burn coal within five years of the approval by the United States Environmental Protection Agency (EPA) of the revision to the State of Oregon Clean Air Act Implementation Plan that incorporates OAR chapter 340, division 223.

(2) Emissions limits:

(a) Between July 1, 2011 and December 31, 2020, nitrogen oxide emissions must not exceed 0.23 lb/mmBtu heat input as a 30-day rolling average, provided that:

(A) If the source submitted a complete application for construction and/or operation of pollution control equipment to satisfy the emissions limit in subsection (2)(a) at least eight months prior to the compliance date of July 1, 2011, and the Department has not approved or denied the application by the compliance date, the compliance date is extended until the Department approves or disapproves the application, but may not be extended to a date more than five years from the date that the EPA approves a revision to the State of Oregon Clean Air Act Implementation Plan that incorporates OAR 340-223-0030; and

(B) If it is demonstrated by December 31, 2011 that the emissions limit in subsection (2)(a) cannot be achieved with combustion controls, the Department by order may grant an extension of compliance to July 1, 2013.

(b) During periods of startup and shutdown, the emissions limit in subsection (2)(a) does not apply, and nitrogen oxide emissions must not exceed 0.70 lb/mmBtu, as a 3-hour rolling average.

(3) Compliance demonstration. Using the procedures specified in section (4) of this rule, compliance with a 30-day rolling average limit must be demonstrated within 180 days of the compliance date specified in section (2) of this rule.

(4) Compliance Monitoring and Testing. Compliance with the emissions limit in subsection (2)(a) must be determined with a continuous emissions monitoring system (CEMS) installed, operated, calibrated, and maintained in accordance with the acid rain monitoring requirements in 40 CFR Part 75 as in effect on December 10, 2010.

(a) The hourly emission rate in terms of lb/mmBtu heat input must be recorded each operating hour, including periods of startup and shutdown.

(b) The daily average emission rate must be determined for each boiler operating day using the hourly emission rates recorded in (a), excluding periods of startup and shutdown.

(c) 30-day rolling averages must be determined using all daily average emissions rates recorded in (b) whether or not the days are consecutive.

(d) The daily average emission rate is calculated for any calendar day in which the boiler combusts any fuel. An operating hour means a clock hour during which the boiler combusts any fuel, either for part of the hour or for the entire hour.

(5) Notifications and Reports

(a) The Department must be notified in writing within 7 days after any control equipment (including combustion controls) used to comply with emissions limit in subsection (2)(a) begin operation.

(b) A compliance status report, including CEMS data, must be submitted within 180 days of the compliance date specified in section (2).

NOTE: This rule is included in the State of Oregon Clean Air Act Implementation Plan as adopted by the Environmental Quality Commission under OAR 340-200-0040.

Stat. Auth.: ORS 468 & 468A
Stats. Implemented: ORS 468A.025

DIVISION 200
GENERAL AIR POLLUTION
PROCEDURES AND DEFINITIONS

340-200-0040

State of Oregon Clean Air Act Implementation Plan

(1) This implementation plan, consisting of Volumes 2 and 3 of the State of Oregon Air Quality Control Program, contains control strategies, rules and standards prepared by the Department of Environmental Quality and is adopted as the state implementation plan (SIP) of the State of Oregon pursuant to the federal **Clean Air Act, 42 U.S.C.A 7401** to **7671q**.

(2) Except as provided in section (3), revisions to the SIP will be made pursuant to the Commission's rulemaking procedures in division 11 of this chapter and any other requirements contained in the SIP and will be submitted to the United States Environmental Protection Agency for approval. The State Implementation Plan was last modified by the Commission on December 10~~April 29~~, 2010.

(3) Notwithstanding any other requirement contained in the SIP, the Department may:

(a) Submit to the Environmental Protection Agency any permit condition implementing a rule that is part of the federally-approved SIP as a source-specific SIP revision after the Department has complied with the public hearings provisions of 40 CFR 51.102 (July 1, 2002); and

(b) Approve the standards submitted by a regional authority if the regional authority adopts verbatim any standard that the Commission has adopted, and submit the standards to EPA for approval as a SIP revision.

NOTE: Revisions to the State of Oregon Clean Air Act Implementation Plan become federally enforceable upon approval by the United States Environmental Protection Agency. If any provision of the federally approved Implementation Plan conflicts with any provision adopted by the Commission, the Department shall enforce the more stringent provision.

Stat. Auth.: ORS 468.020
Stats. Implemented: ORS 468A.035
Hist.: DEQ 35, f. 2-3-72, ef. 2-15-72; DEQ 54, f. 6-21-73, ef. 7-1-73; DEQ 19-1979, f. & ef. 6-25-79; DEQ 21-1979, f. & ef. 7-2-79; DEQ 22-1980, f. & ef. 9-26-80; DEQ 11-1981, f. & ef. 3-26-81; DEQ 14-1982, f. & ef. 7-21-82; DEQ 21-1982, f. & ef. 10-27-82; DEQ 1-1983, f. & ef. 1-21-83; DEQ 6-1983, f. & ef. 4-18-83; DEQ 18-1984, f. & ef. 10-16-84; DEQ 25-1984, f. & ef. 11-27-84; DEQ 3-1985, f. & ef. 2-1-

85; DEQ 12-1985, f. & ef. 9-30-85; DEQ 5-1986, f. & ef. 2-21-86; DEQ 10-1986, f. & ef. 5-9-86; DEQ 20-1986, f. & ef. 11-7-86; DEQ 21-1986, f. & ef. 11-7-86; DEQ 4-1987, f. & ef. 3-2-87; DEQ 5-1987, f. & ef. 3-2-87; DEQ 8-1987, f. & ef. 4-23-87; DEQ 21-1987, f. & ef. 12-16-87; DEQ 31-1988, f. 12-20-88, cert. ef. 12-23-88; DEQ 2-1991, f. & cert. ef. 2-14-91; DEQ 19-1991, f. & cert. ef. 11-13-91; DEQ 20-1991, f. & cert. ef. 11-13-91; DEQ 21-1991, f. & cert. ef. 11-13-91; DEQ 22-1991, f. & cert. ef. 11-13-91; DEQ 23-1991, f. & cert. ef. 11-13-91; DEQ 24-1991, f. & cert. ef. 11-13-91; DEQ 25-1991, f. & cert. ef. 11-13-91; DEQ 1-1992, f. & cert. ef. 2-4-92; DEQ 3-1992, f. & cert. ef. 2-4-92; DEQ 7-1992, f. & cert. ef. 3-30-92; DEQ 19-1992, f. & cert. ef. 8-11-92; DEQ 20-1992, f. & cert. ef. 8-11-92; DEQ 25-1992, f. 10-30-92, cert. ef. 11-1-92; DEQ 26-1992, f. & cert. ef. 11-2-92; DEQ 27-1992, f. & cert. ef. 11-12-92; DEQ 4-1993, f. & cert. ef. 3-10-93; DEQ 8-1993, f. & cert. ef. 5-11-93; DEQ 12-1993, f. & cert. ef. 9-24-93; DEQ 15-1993, f. & cert. ef. 11-4-93; DEQ 16-1993, f. & cert. ef. 11-4-93; DEQ 17-1993, f. & cert. ef. 11-4-93; DEQ 19-1993, f. & cert. ef. 11-4-93; DEQ 1-1994, f. & cert. ef. 1-3-94; DEQ 5-1994, f. & cert. ef. 3-21-94; DEQ 14-1994, f. & cert. ef. 5-31-94; DEQ 15-1994, f. 6-8-94, cert. ef. 7-1-94; DEQ 25-1994, f. & cert. ef. 11-2-94; DEQ 9-1995, f. & cert. ef. 5-1-95; DEQ 10-1995, f. & cert. ef. 5-1-95; DEQ 14-1995, f. & cert. ef. 5-25-95; DEQ 17-1995, f. & cert. ef. 7-12-95; DEQ 19-1995, f. & cert. ef. 9-1-95; DEQ 20-1995 (Temp), f. & cert. ef. 9-14-95; DEQ 8-1996(Temp), f. & cert. ef. 6-3-96; DEQ 15-1996, f. & cert. ef. 8-14-96; DEQ 19-1996, f. & cert. ef. 9-24-96; DEQ 22-1996, f. & cert. ef. 10-22-96; DEQ 23-1996, f. & cert. ef. 11-4-96; DEQ 24-1996, f. & cert. ef. 11-26-96; DEQ 10-1998, f. & cert. ef. 6-22-98; DEQ 15-1998, f. & cert. ef. 9-23-98; DEQ 16-1998, f. & cert. ef. 9-23-98; DEQ 17-1998, f. & cert. ef. 9-23-98; DEQ 20-1998, f. & cert. ef. 10-12-98; DEQ 21-1998, f. & cert. ef. 10-12-98; DEQ 1-1999, f. & cert. ef. 1-25-99; DEQ 5-1999, f. & cert. ef. 3-25-99; DEQ 6-1999, f. & cert. ef. 5-21-99; DEQ 10-1999, f. & cert. ef. 7-1-99; DEQ 14-1999, f. & cert. ef. 10-14-99, Renumbered from 340-020-0047; DEQ 15-1999, f. & cert. ef. 10-22-99; DEQ 2-2000, f. 2-17-00, cert. ef. 6-1-01; DEQ 6-2000, f. & cert. ef. 5-22-00; DEQ 8-2000, f. & cert. ef. 6-6-00; DEQ 13-2000, f. & cert. ef. 7-28-00; DEQ 16-2000, f. & cert. ef. 10-25-00; DEQ 17-2000, f. & cert. ef. 10-25-00; DEQ 20-2000 f. & cert. ef. 12-15-00; DEQ 21-2000, f. & cert. ef. 12-15-00; DEQ 2-2001, f. & cert. ef. 2-5-01; DEQ 4-2001, f. & cert. ef. 3-27-01; DEQ 6-2001, f. 6-18-01, cert. ef. 7-1-01; DEQ 15-2001, f. & cert. ef. 12-26-01; DEQ 16-2001, f. & cert. ef. 12-26-01; DEQ 17-2001, f. & cert. ef. 12-28-01; DEQ 4-2002, f. & cert. ef. 3-14-02; DEQ 5-2002, f. & cert. ef. 5-3-02; DEQ 11-2002, f. & cert. ef. 10-8-02; DEQ 5-2003, f. & cert. ef. 2-6-03; DEQ 14-2003, f. & cert. ef. 10-24-03; DEQ 19-2003, f. & cert. ef. 12-12-03; DEQ 1-2004, f. & cert. ef. 4-14-04; DEQ 10-2004, f. & cert. ef. 12-15-04; DEQ 1-2005, f. & cert. ef. 1-4-05; DEQ 2-2005, f. & cert. ef. 2-10-05; DEQ 4-2005, f. 5-13-05, cert. ef. 6-1-05; DEQ 7-2005, f. & cert. ef. 7-12-05; DEQ 9-2005, f. & cert. ef. 9-9-05; DEQ 2-2006, f. & cert. ef. 3-14-06; DEQ 4-2006, f. 3-29-06, cert. ef. 3-31-06; DEQ 3-2007, f. & cert. ef. 4-12-07; DEQ 4-2007, f. & cert. ef. 6-28-07; DEQ 8-2007, f. & cert. ef. 11-8-07; DEQ 5-2008, f. & cert. ef. 3-20-08; DEQ 11-2008, f. & cert. ef. 8-29-08; DEQ 12-2008, f. & cert. ef. 9-17-08; DEQ 14-2008, f. & cert. ef. 11-10-08; DEQ 15-2008, f. & cert. ef 12-31-08; DEQ 3-2009, f. & cert. ef. 6-30-09; DEQ 8-2009, f. & cert. ef. 12-16-09; DEQ 2-2010, f. & cert. ef. 3-5-10; DEQ 5-2010, f. & cert. ef. 5-21-10

State Implementation Plan Revision
Adoption of Regional Haze Strategies in Oregon

Oregon Regional Haze Plan for Implementing Section 308 (40CFR 51.308) of the Regional Haze Rule

Adopted by the Environmental Quality Commission
June 19, 2009

Revised December 9, 2010

State of Oregon
Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204-1390

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4. EPA's BART Rule, Appendix Y - Guidelines for BART Determinations
5. Oregon BART Modeling Protocol
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Oregon Regional Haze Plan Reference Materials

Oregon DEQ Information and Documents

Available at the DEQ Regional Haze website:
http://www.deq.state.or.us/aq/haze/index.htm
See other documentation in the Appendices Section of this document

Applicable Western Regional Air Partnership (WRAP) Reports and Documents

Available at the WRAP website:
http://www.wrapair.org/
or at the WRAP TSS website:
http://vista.cira.colostate.edu/tss/

Other Reference

1. EPA's Regional Haze Regulations (64 Federal Register 35714), July 1, 1999.
2. EPA's Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations: Final Rule (70 Federal Register 39104), July 6, 2005.

ACKNOWLEDGEMENTS AND SUMMARY

Acknowledgements

Major assistance in preparing this implementation plan was provided by the Western Regional Air Partnership (WRAP) and its forums and committees, who provided Oregon and other western states with much of the policy and technical support information needed to meet the requirements of Section 308 of the Regional Haze Rule. Special thanks to the following staff:

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- Tom Moore, Air Quality Program Manager, Western Governor's Association
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- Lee Alter, IOC Staff Support
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This document comprises the State of Oregon's State Implementation Plan submittal to EPA under Section 308 of the Regional Haze Rule (40 CFR 51.308). Adoption of the Oregon Section 308 Regional Haze Plan (herein referred to as the Oregon Regional Haze Plan) amends the State of Oregon Clean Air Act Implementation Plan, OAR 340-200-0040. See Appendix H for the complete citation of this rule. Other appendices at the end of this document provide additional information related to the strategies, including Oregon administrative rules associated with this plan, reference material (technical analysis and reports) prepared by the WRAP, and other documentation.

Executive Summary

Regional haze is air pollution that travels long distances and reduces visibility in scenic areas. The haze that affects visibility in Oregon comes from motor vehicles, power plants, industrial and manufacturing processes, forestry, agricultural and other open burning, as well as natural sources such as wildfire and windblown dust. The federal Clean Air Act contains requirements to protect and improve visibility in national parks and wilderness areas in the country. In 1977

Congress designated certain national parks and wilderness areas as "Class 1 areas," where visibility was identified as an important value. Currently there are 156 Class 1 areas in the country. Oregon has 12 Class 1 areas, including Crater Lake National Park and 11 wilderness areas.

To address the problem of regional haze the Environmental Protection Agency (EPA) adopted the *Regional Haze Rule* in 1999. This rule requires states to adopt regional haze plans to incrementally improve visibility in all Class 1 areas, including Oregon, over the next 60 years. It focuses on improving Class 1 area visibility on the haziest days (the worst 20 percent) and ensuring no degradation on the clearest days (the best 20 percent). The first regional haze plan must include "Reasonable Progress Goals" (RPG) for each Class I area, for the year 2018, also known as the "2018 milestone year". RPGs are interim goals that represent incremental visibility improvements, based on a calculation of a "uniform rate of progress" (URP). The first regional haze plan describes the progress anticipated in reaching the 2018 URP milestone for each Class I area, for the 20 percent worst and best days, based on projections of emission reductions and visibility improvements from regional haze control strategies during this first planning period.

Best Available Retrofit Technology (BART) is a key part of the federal Regional Haze Rule, and the central focus of regional haze plans that states are developing. It applies to certain older industrial facilities that began operating before 1977 when federal Prevention of Significant Deterioration (PSD) rules were adopted to protect visibility in Class I areas when permitting new industrial facilities. Under BART, these older facilities must now evaluate their visibility impact in Class I areas, and if found to be significant, conduct an evaluation of new pollution controls, and install them within five years.

This document is Oregon's Regional Haze Plan to meet this federal rule. The highlights of the plan are as follows:

- History and regulatory background of the Regional Haze Rule, and geographical description of each of Oregon's 12 Class I Areas. See Chapters 1 through 5.

- A comprehensive review and technical assessment of visibility conditions in each of Oregon's 12 Class I areas, showing major pollutants and source categories in Oregon and other states causing haze, and a projection of visibility by a required "milestone" date of 2018. See Chapters 6 through 9.

- DEQ's evaluation of ten "BART-eligible" sources, and proposal to require retrofit controls on the power plant, and reduce emissions at four other facilities to below the visibility impact level considered to be significant. See Chapter 10.

- "Reasonable Progress Goals" established by DEQ for Oregon's 12 Class I area, which show improvements in visibility for the haziest or worst days (but less than the first URP milestone for 2018) and no visibility degradation for the clearest or best days. See Chapter 11.

- A "Long-Term Strategy" that describes what actions DEQ will take to address major sources of haze over the next 10 years, and commitments for future plan updates and revisions.

- Summary of the efforts by DEQ to consult and coordinate with other States, Tribes, and Federal Land Managers on the regional haze strategies contained in this plan. See Chapter 13.

The major elements of this plan are the BART evaluation, Reasonable Progress Goals, and the Long-Term Strategy.

Best Available Retrofit Technology evaluation

The primary result~~outcome~~ of the BART evaluation in Chapter 10 was the outcome of the BART~~a~~ determination for ~~that~~ the PGE Boardman coal-fired power plant ~~be required to install pollution controls~~. DEQ evaluated 10 BART-eligible sources, and found that the PGE Boardman plant had by far the greatest visibility impact in Oregon's Class I areas, and in several of Washington's Class I areas as well. As a result, DEQ adopted BART requirements for the PGE Boardman plant that contain a 2020 closure date for the plant, at the request of PGE. Prior to this date, PGE would install BART controls, and meet emission limits in 2011, 2014, and 2018, that will reduce total emissions by 48%. After 2020, all emissions from the plant, or approximately 25,500 tons per year of primarily sulfur dioxide (SO_2) and nitrogen oxide (NO_x), would be eliminated. Both the emission reductions from the interim BART controls and from plant closure would provide significant visibility benefits to 14 Class I areas impacted by the Boardman plant, including the Columbia Gorge National Scenic Area. In addition, the complete elimination of all emissions after 2020 would greatly contribute to meeting regional haze "reasonable progress" requirements (see below). For a full description of DEQ's BART determination, see Chapter 10. ~~DEQ identified a two-step process for installing controls at this facility. Phase one requires controls for sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) that would reduce these emissions by about 66 percent by 2014, at a cost of about $280 million. Phase one meets the minimum requirements for BART. Phase two requires more advanced controls for NO_x that would reduce emissions by about 81 percent by 2017, at an additional cost of $191 million. Phase two goes "beyond BART" to achieve additional visibility improvement and to meet regional haze "reasonable progress" requirements (see below). The total emissions reduced from both phases is approximately 20,800 tons per year, which will provide significant visibility benefits in 14 Class I areas in Oregon and Washington, as well as the Columbia Gorge National Scenic Area.~~

Also as part of the BART evaluation, DEQ found four other BART-eligible sources that had visibility impacts that we just over the "significance" level used for the modeling protocol for BART sources. DEQ determined these sources could take a federally enforceable permit limit to lower their emissions below the significance level. Sources that take an enforceable permit limit are not subject to further evaluation for BART controls, however as BART-eligible sources, they can be re-evaluated as part of a more comprehensive review of industrial emissions under the reasonable progress requirements for making visibility improvements. This re-evaluation of all BART-eligible sources is part of the Long-Term Strategy described below.

Reasonable Progress Goals

In establishing RPGs for each Class I area, DEQ relied upon emission projections and regional modeling work conducted by the Western Regional Air Partnership (WRAP). The WRAP *Technical Support System* or TSS website provided considerable technical information in determining the RPGs, and is referenced in the Appendices section of the plan. The RPGs described in Chapter 11 represent future visibility conditions in Oregon's Class I areas in 2018, based on the URP calculated for each Class I area (see Chapter 6) that represents a "presumptive goal" for the first regional haze plan. In cases where the RPGs do not meet the URP goal for 2018, States are required to explain the reasons for the slower progress, additional controls that were considered for this first plan, and what future actions that will be taken to ensure the 60-year objective of the Regional Haze Rule will be met.

While the RPGs for Oregon's Class I areas meet the requirement for no degradation of the clearest or best days, they do show a slower rate of progress for the haziest or worst visibility days, and do not meet the 2018 URP milestones in most areas. The reasons for this, as described in Chapter 11, are summarized below:

- DEQ's analysis of emissions data, source apportionment, and modeling results strongly supports the finding that the contribution of natural sources, such as wildfire and windblown dust, is the primary reason for slower progress in achieving the 2018 milestone in Oregon's Class I areas.

- Similar to the contribution of natural sources, DEQ believes marine vessel emissions are also affecting progress in making visibility improvements. These emissions are estimated to be currently half of the statewide SO_2 emissions and one-third the statewide NO_x emissions. This contribution to visibility impairment is significant, especially in Western Oregon Class I areas. Current DEQ authority to regulate offshore shipping emissions is limited. The plan identifies future work that is needed to address this significant source of emissions.

- DEQ's analysis of projected visibility improvements from sulfate and nitrate impacts in Oregon Class I areas shows about a 20 percent reduction in these pollutants by the 2018 milestone. Given the strong association of these pollutant species to anthropogenic sources, DEQ believes this is a more realistic indicator of reasonable progress. If natural sources are excluded, this 20 percent reduction in sulfates and nitrates corresponds to the same percent reduction that is represented by the 2018 milestone.

- Mobile sources (mostly cars and trucks) are the largest anthropogenic source of emissions in Oregon. By 2018 more than half of these emissions are projected to decrease due to numerous federal emission standards that are already "on the books", as well as programs in Oregon that will reduce these emissions. DEQ believes this major reduction supports the demonstration that RPGs are reasonable based on the considerable progress being made reducing this large source of emissions.

- DEQ conducted a "Four-Factor Analysis" as required under the Regional Haze rule to evaluate other large sources of emissions (non-BART sources) that could be reduced or controlled to improve visibility by 2018. Using this analysis DEQ did not find any controls that were reasonable to pursue at this time. However, as noted above, the BART controls ~~additional NO_x controls required under the Phase 2 requirements~~ for the PGE Boardman ~~P~~power ~~P~~plant will result in a 48% reduction in emissions prior to 2018, followed by the complete elimination all emissions after 2020. Overall, this represents a total emission reduction of approximately 25,500 tons per year. Although not a direct result of the four-factor analysis, this does represent a "greater than BART" emission reduction that is significant, and will provide noticeable visibility improvements in 14 different Class I areas.~~an additional reduction of approximately 4,000 tons NO_x, and significant visibility improvements, when installed in 2017.~~ Based on the preliminary information obtained from the four-factor analysis, DEQ has proposed in the Long-Term Strategy of the plan to further evaluate non-BART industrial sources for possible new controls in the next five years to make additional visibility improvements by 2018.

Long-Term Strategy

Chapter 12 of this plan is the Long-Term Strategy, which describes on-going rules and programs that are expected to provide visibility improvements, and identifies new measures that DEQ has committed to evaluate by the next plan update in 2013. The two primary commitments are to evaluate possible visibility improvements from non-BART industrial sources not included in the BART review, and Class I area smoke impacts from forestry burning. These represent the two greatest areas where potentially significant visibility benefits could be realized.

The evaluation of non-BART sources will include a re-evaluation of the BART-eligible sources. Starting in 2009, DEQ will develop a comprehensive guidance document through a stakeholder process for evaluating visibility impacts from non-BART industrial sources. A DEQ report will be prepared by 2013 that summarizes (1) the development of this guidance; (2) results of applying the guidance to non-BART sources and BART-eligible sources; (3) any potential new controls for sources, (4) proposed rulemaking needed and schedule for adopting new rules, (5) estimated timeline for installing any new controls; and (6) estimate of the expected visibility benefits.

The evaluation of forestry burning will consist of an analysis of smoke impacts from forestry burning on visibility, for the haziest or worst days at each Class I area in Oregon. Where this burning it is found to cause significant visibility impacts, DEQ plans to work with state forestry and federal land managers to identify new smoke management controls to protect visibility.

Other new measures in the Long-Term Strategy included an evaluation of the contribution from residential open burning and rangeland burning, and further assessment on the contribution of marine vessels and possible regulatory actions that could be taken.

Columbia River Gorge National Scenic Area Visibility

The Columbia River Gorge National Scenic Area was created by Congress in 1986. While it was not designated as a Class I area, it will receive significant visibility benefit under the Oregon Regional Haze Plan due to its' proximity to nearby Class I areas, such as Mt. Hood Wilderness in Oregon. The Gorge was included with other Class I areas in the visibility modeling analysis of BART sources, and the requirement for five-year updates to Oregon Regional Haze Plan will include similar analysis and tracking of visibility improvements for the Gorge.

The National Scenic Area Act of 1986 requires the protection and enhancement of the scenic, natural, cultural, and recreational resources of the Gorge, while at the same time supporting the local economy. The Columbia River Gorge Commission (CRGC) has responsibility to administer the National Scenic Area Act. In 2001, the CRGC determined that in order to protect air quality in the Gorge, the CRGC would rely on Oregon DEQ and the Washington Southwest Clean Air Agency to develop an air quality strategy for the Scenic Area. The state agencies studied air quality and visibility and the emission sources that contribute to haze in the Gorge. Because many of the same problems that affected haze in the Gorge are the same problems that affect haze across the western region, much of the visibility efforts under the regional haze program will ultimately benefit the Gorge. Therefore, as part of the federally mandated five-year regional haze plan update, DEQ will track visibility conditions in the area and provide a separate follow up with the CRGC to provide a progress report on conditions in the Gorge. See Section 1.6.2 of this plan for more information.

CHAPTER 8: EMISSION SOURCE INVENTORY

Regional haze in Oregon's Class I areas is caused by emission sources both inside and outside the state. Emission inventories are one part of the analysis to evaluate sources that impact visibility. This chapter identifies emission sources in Oregon, and regionally in neighboring States that could be affecting visibility in Oregon's Class I areas. This emissions information focuses on changes between the current 2002 baseline and projected 2018 emission scenarios. Chapter 9 provides a description of the significant emission sources that contribute to visibility impairment in Oregon, based on source apportionment analysis.

Section 8.1 of this chapter describes in-state emissions. Section 8.2 compares Oregon emissions to regional emissions.[1] Appendix A provides a breakdown of Oregon emissions by county. All emissions information is described by pollutant, source category, and 2002 vs. 2018 scenarios.

8.1 Oregon Statewide Emissions

EPA's Regional Haze rules (40 CFR 51.308(d)(4)(v)) requires a statewide emission inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I area. The pollutants in this chapter are sulfur dioxide (SO_2), nitrogen oxides (NO_x), volatile organic compounds (VOC), organic carbon (OC), elemental carbon (EC), fine particulate ($PM_{2.5}$), coarse particulate (PM_{10}), and ammonia (NH_3).

It is important to note that each of these pollutants have characteristics that differ in terms of ability to affect visibility. Assuming "one emission unit" of fine particulate ($PM_{2.5}$), for example, the same unit of SO_2 and NO_x (sulfate and nitrate particles) would be about 3 times more effective at impairing visibility, while OC is about 4 times more effective, and EC about 10 times. Conversely, coarse particulate (PM_{10}) is about half as effective as fine. Both VOC and NH_3 affect visibility only after certain chemical reactions occur, and therefore cannot be compared in this manner.

This emissions inventory was obtained from the WRAP Technical Support System (TSS) http://vista.cira.colostate.edu/TSS/Results/Emissions.aspx. The TSS emission scenarios used in this chapter were the "plan 02d" and the "2018 PRP". The plan 02d are emissions from an average of 2000-2004, and reflect the most recent inventory of all the pollutants in the West. This inventory provides a basis for comparison with the future year 2018 projected emissions, as well as to gauge reasonable progress with respect to future year visibility. In the following tables, these emissions are referred to as 2002 emissions. The 2018 PRP represents projected emissions in the year 2018, taking into account growth, "on-the-books" controls and regulations, and the application of regional haze strategies. The year 2018 was selected as it represents the first milestone date for demonstrating reasonable progress (see Chapter 11).

[1] The county level emissions in Appendix A has been provided for reference purposes, as a further breakdown of the in-state emissions described in Section 8.1 of this chapter. However, no analysis of the county by county trend in emissions was conducted as part of this plan.

The emission tables show the primary source categories for each visibility impairing pollutant. The source categories vary by the type of pollutant. Categories include: point, area, on-road mobile, off-road mobile, oil and gas, anthropogenic fire, natural fire, biogenic, road dust, fugitive dust and windblown dust.[2] Not included as an "in-state" emission source category is offshore marine vessel emissions, which are considered "regional" emissions and discussed in Section 8.2. It should also be noted the projected 2018 emissions for natural fire (wildfires) is based on historical rates of burning and does not take into account increased burning that may occur due to climate change or natural causes.

8.1.1 SO_2 Emissions

The following table shows Oregon SO_2 emissions for baseline and future years.

Table 8.1.1-1 Oregon SO_2 Emission Inventory – 2002 & 2018

Oregon Statewide SO_2 Emissions (tons/year)			
Source Category	**Plan02d**	**Prp18a**	**Net Change**
	2002	**2018**	
Point	18,493	7,952	-10,541 (-57%)
Area	9,932	8,422	-1,510 (-15%)
On-Road Mobile	3,446	461	-2,985 (-87%)
Off-Road Mobile	6,535	152	-6,383 (-98%)
Anthro Fire	1,586	1,322	-264 (-17%)
Natural Fire	7,328	7,329	0 (0%)
Total	**47,320**	**25,638**	**-21,683 (-46%)**

Sulfur emissions produce sulfate particles in the atmosphere. Ammonium sulfate particles have a significantly greater impact on visibility than other pollutants like dust from unpaved roads due to the physical characteristics causing greater light scattering from the particles. SO_2 emissions come primarily from coal combustion at electrical generation facilities but smaller amounts come from natural gas combustion, mobile sources and even wood combustion. There are no biogenic SO_2 emissions of significance in Oregon. A 46% statewide reduction in SO_2

[2] The number and types of sources are identified by various methods. For example, major stationary sources report actual annual emission rates to the EPA national emissions database. Oregon collects annual emission data from both major and minor sources and this information is used as input into the emissions inventory. In other cases, such as mobile sources, an EPA mobile source emissions model is used to develop emission projections. Oregon vehicle registration, vehicle miles traveled information and other vehicle data are used to tailor the mobile source data to best represent statewide and area specific emissions. Population, employment and household data are used in other parts of the emissions modeling to characterize emissions from area sources such as home heating. Thus, for each source type, emissions are calculated based on an emission rate and the amount of time the source is operating. Emission rates can be based on actual measurements from the source, or EPA emission factors based on data from tests of similar types of emission sources. In essence all sources go through the same process. The number of sources is identified, emission rates are determined by measurements of those types of sources and the time of operation is determined. By multiplying the emission rate times the hours of operation in a day, a daily emission rate can be calculated.

emissions are expected by 2018 due to planned controls on existing sources, especially on-the-books rules for mobile sources (see Section 11.4.3). ~~This includes emission reductions of approximately 12,000 tons from the PGE Boardman plant are expected in the next 5 years from the installation of controls to meet the BART requirements (see Section 10.4.2).~~ Area sources of SO_2 are linked to population growth as the activity factor, which accounts for only a 15% reduction by 2018. A typical area source for SO_2 would be home heating. Not reflected in this table is a reduction of about 7,600 tons per year expected by 2018 from BART SO_2 controls at the PGE Boardman plant (see Chapter 10).

8.1.2 NO_x Emissions

The following table shows Oregon NO_x emissions for 2002 and 2018.

Table 8.1.2-1 Oregon NO_x Emission Inventory – 2002 & 2018

Oregon Statewide NO_X Emissions (tons/year)			
Source Category	**Plan02d**	**Prp18a**	**Net Change**
	2002	**2018**	
Point	26,160	24,947	-1,213 (-5%)
Area	14,740	16,979	2,238 (15%)
On-Road Mobile	111,646	42,143	-69,502 (-62%)
Off-Road Mobile	53,896	32,418	-21,478 (-40%)
Anthro Fire	6,292	5,150	-1,142 (-18%)
Natural Fire	27,397	27,400	3 (0%)
Biogenic	16,527	16,527	0 (0%)
WRAP Area O&G	85	44	-41 (-48%)
Total	**256,744**	**165,609**	**-91,134 (-35%)**

Nitrogen oxides (NO_x) are generated during any combustion process where nitrogen and oxygen from the atmosphere combine together under high temperature to form nitric oxide, and to a lesser nitrogen dioxide and in much smaller amounts other odd oxides of nitrogen. Nitrogen oxides, like sulfur dioxide, react in the atmosphere to form nitrate particles. These particles have a slightly greater impact on visibility than do sulfate particles and are four to eight times more effective at scattering light than mineral dust particles. NO_x emissions in Oregon are expected to decline 35% by 2018, primarily due to significant improvements in mobile sources. ~~This includes emission reductions of 4,800 tons from the PGE Boardman plant are expected in the next 5 years from the installation of controls to meet the BART requirements (see Chapter 10).~~ Off-road and on-road vehicles NO_x emissions are estimated to decline by more than 90,000 tons per year from the base case emissions total of 257,000 tons per year. Increases in area sources are related to population growth, with an expected 15% increase by 2018. Not reflected in this table is a reduction of about 4,700 tons per year expected by 2018 from BART NO_x controls at the PGE Boardman plant (see Chapter 10).

8.1.3 VOC Emissions

The following table shows Oregon VOC emissions for 2002 and 2018.

Table 8.1.3-1 Oregon VOC Emission Inventory – 2002 & 2018

Oregon Statewide VOC Emissions (tons/year)			
Source Category	**Plan02d**	**Prp18a**	**Net Change**
	2002	**2018**	
Point	28,762	40,639	11,876 (41%)
Area	245,649	334,846	89,197 (36%)
On-Road Mobile	88,784	36,395	-52,389 (-59%)
Off-Road Mobile	39,516	24,963	-14,553 (-37%)
Anthro Fire	9,939	7,354	-2,586 (-26%)
Natural Fire	60,336	60,344	7 (0%)
Biogenic	1,148,266	1,148,266	0 (0%)
WRAP Area O&G	34	14	-20 (-59%)
Total	**1,621,287**	**1,652,820**	**31,533 (2%)**

The dominant source of VOC emissions is biogenic emissions. These emissions comprise 70% of total Oregon VOC emissions. These are natural emissions mostly from forests, but also agricultural crops and urban vegetation. Biogenic emissions are the largest single source of VOCs in the country. Among other sources, automobiles, industrial and commercial facilities, solvent use, and refueling automobiles all contribute to VOC loading in the atmosphere. From a regional haze perspective, there is less concern with VOCs emitted directly to the atmosphere and more with the secondary organic aerosol that VOCs form after condensation and oxidation. Of more significance is the role VOCs play in the photochemical production of ozone in the troposphere. Volatile organic compounds react with NO_x to produce nitrated organic particles that impact visibility in the same series of chemical events that lead to ozone. Thus, strategies to reduce ozone in the atmosphere often lead to visibility improvements. Note that significant VOC reductions from mobile sources are more than offset by increases in area sources, due to primarily population growth. Use of solvents such as in painting, dry cleaning fluid, charcoal lighter fuel, windshield washer fluids, and many home use products show up in the area source category, and are linked to population growth. Overall, total VOC emissions are estimated to increase by 2% in 2018.

8.1.4 Organic Carbon Emissions

The following table shows Oregon Organic Carbon (OC) emissions for 2002 and 2018.

Table 8.1.4-1 Oregon Organic Carbon Emission Inventory – 2002 & 2018

Oregon Statewide Organic Carbon Emissions (tons/year)			
Source Category	**Plan02d**	**Prp18a**	**Net Change**
	2002	**2018**	
Point	1,445	283	-1,163 (-80%)
Area	22,281	23,762	1,481 (7%)
On-Road Mobile	1,009	967	-42 (-4%)
Off-Road Mobile	1,323	844	-479 (-36%)
Anthro Fire	10,937	7,863	-3,074 (-28%)
Natural Fire	81,047	81,054	7 (0%)
Road Dust	95	132	37 (38%)
Fugitive Dust	202	341	138 (68%)
Total	**118,340**	**115,245**	**-3,094 (-3%)**

Organic carbon is primarily the end product of combustion of organic material. Most of these emissions in Oregon are from natural (nonanthropogenic) wildfire, which can fluctuate greatly from year to year. 2002 was an unusually high year for wildfires in Oregon. Another sizable source is anthropogenic fire (human-caused), such as forestry prescribed burning, agricultural field burning, and outdoor residential burning. A variety of area sources contribute, although woodstoves are a significant source. Area sources increase slightly (7%) by 2018, due mostly to population increases. Overall, OC emissions are estimated to decline by 3% by 2018.

8.1.5 Elemental Carbon Emissions

The following table shows Oregon Elemental Carbon (EC) emissions for 2002 and 2018.

Table 8.1.5-1 Oregon Elemental Carbon (EC) Emission Inventory – 2002 & 2018

Oregon Statewide Elemental Carbon Emissions (tons/year)			
Source Category	**Plan02d**	**Prp18a**	**Net Change**
	2002	**2018**	
Point	45	61	17 (38%)
Area	4,121	4,355	234 (6%)
On-Road Mobile	1,166	320	-846 (-73%)
Off-Road Mobile	3,038	1,164	-1,874 (-62%)
Anthro Fire	1,935	1,416	-519 (-27%)
Natural Fire	16,403	16,403	0 (0%)
Road Dust	7	10	3 (38%)
Fugitive Dust	14	23	9 (68%)
Total	**26,728**	**23,752**	**-2,975 (-11%)**

Elemental carbon is the carbon black, or soot, which is a byproduct of incomplete combustion. It is similar to OC, but represents more combustion of fuel producing carbon particulate matter as the end product. Like OC, the primary source is natural fire, and to a lesser degree, anthropogenic fire. Other emissions of note are area and mobile sources. Area EC emissions are estimated to increase by 6% due mostly to population growth, while mobile is estimated to decrease significantly (62-73%) by 2018, as new federal mobile source regulations are being implemented.

8.1.6 PM Fine Emissions

The following table shows Oregon PM fine emissions for 2002 and 2018.

Table 8.1.6-1 Oregon Fine Particulate Matter Emission Inventory – 2002 & 2018

Oregon Statewide Fine Particulate Matter Emissions (tons/year)			
Source Category	**Plan02d**	**Prp18a**	**Net Change**
	2002	**2018**	
Point	5,728	462	-5,266 (-92%)
Area	15,295	17,082	1,787 (12%)
Anthro Fire	1,483	1,007	-475 (-32%)
Natural Fire	6,090	6,093	3 (0%)
Road Dust	1,379	1,909	530 (38%)
Fugitive Dust	3,642	6,157	2,515 (69%)
WB Dust	11,586	11,586	0 (0%)
Total	**45,203**	**44,296**	**-906 (-2%)**

PM fine in the emissions inventory includes soil materials and other non-carbon, non-sulfate and non-nitrate particulate matter less than 2.5 microns in size. The primary sources are area sources (woodstoves), and a variety of sources of dust (agriculture, mining, construction, and

unpaved and paved roads.) Here again, like OC and EC, natural fire is a significant source of PM fine. In terms of mobile sources, direct PM tailpipe emissions are relatively small, and are accounted for in the next table under PM coarse. Overall, PM fine shows a decrease of 2% by 2018. Monitoring at all sites in Oregon indicates PM fine is relatively small part of the visibility problem compared to other pollutants.

Table 8.1.6-2 Oregon Coarse Particulate Matter Emission Inventory – 2002 & 2018

Oregon Statewide Coarse Particulate Matter Emissions (tons/year)			
Source Category	**Plan02d**	**Prp18a**	**Net Change**
	2002	**2018**	
Point	10,211	12,088	1,877 (18%)
Area	3,546	4,206	660 (19%)
On-Road Mobile	618	692	74 (12%)
Anthro Fire	1,282	737	-546 (-43%)
Natural Fire	17,036	17,036	0 (0%)
Road Dust	12,630	17,485	4,855 (38%)
Fugitive Dust	21,369	43,989	22,620 (106%)
WB Dust	104,272	104,272	0 (0%)
Total	**170,964**	**200,505**	**29,541 (17%)**

PM coarse is particulate matter larger than PM fine, generally between 2.5-10 microns in size. Emission sources are similar to PM fine, but involve activities like rock crushing and processing, material transfer, open pit mining and unpaved road emissions. Windblown dust is the dominant source of PM coarse emissions. Coarse mass particles travel shorter distances in the atmosphere than other smaller particles, but can remain in the atmosphere long enough to contribute to regional haze. PM coarse emissions are significantly greater than PM fine in Oregon. Substantial increases in PM coarse are seen in the fugitive dust category. This is due to the fact that construction and emissions from paved and unpaved roads are tied to population growth and vehicle miles traveled. Overall, PM coarse emissions are estimated to increase by 17% in 2018.

8.1.7 Ammonia Emissions

The following table shows Oregon Ammonia (NH_3) emissions for 2002 and 2018.

Table 8.1.7-1 Oregon Ammonia (NH_3) Emission Inventory – 2002 & 2018

Oregon Statewide Coarse Particulate Matter Emissions (tons/year)			
Source Category	**Plan02d**	**Prp18a**	**Net Change**
	2002	**2018**	
Point	919	832	-87 (-9%)
Area	45,591	45,614	23 (0%)
On-Road Mobile	3,263	4,725	1,463 (45%)
Off-Road Mobile	39	51	13 (33%)
Anthro Fire	1,211	849	-361 (-30%)
Natural Fire	6,132	6,133	2 (0%)
Total	**57,154**	**58,206**	**1,052 (2%)**

Emission estimates for NH_3 have a high degree of uncertainty associated with them, based on a high variability in emission factors, wide range of activities, and lack of a uniform emission methodology.[3] However, NH_3 emissions are important in that they react with SO_2 and NO_x to form ammonium sulfate and ammonium nitrate particles, which are very effective in impairing visibility. NH_3 emissions come from agricultural related activities, primarily livestock operations and farming fertilizer applications. These fall under the category of area source emissions, which dominate NH_3 emissions in Oregon. Both area source and natural fire emissions are expected to be unchanged by 2018. As a result, total NH_3 emissions in Oregon are only projected to change by 2%. However, improvements in developing ammonia inventories will be needed in the near future to develop more effective regional haze strategies. As described in Section 8.2.3, improved emission inventory and better understanding of the chemistry in forming ammonium sulfate and ammonium nitrate in areas such as Eastern Oregon is needed.

8.2 Regional Emissions

In order to better understand the relative contribution of in-state vs. out-of-state emissions to regional haze, a comparison of Oregon emissions to regional emissions is provided in the following figures. Section 8.2.1 is a comparison of Oregon to the neighboring states of Washington, Idaho, California and Nevada. Section 8.2.2 is a summary of off-shore emissions from marine vessels, which have been separated from other source categories due to the unique nature of these emissions, their magnitude, and the relatively recent effort to quantify these emissions.

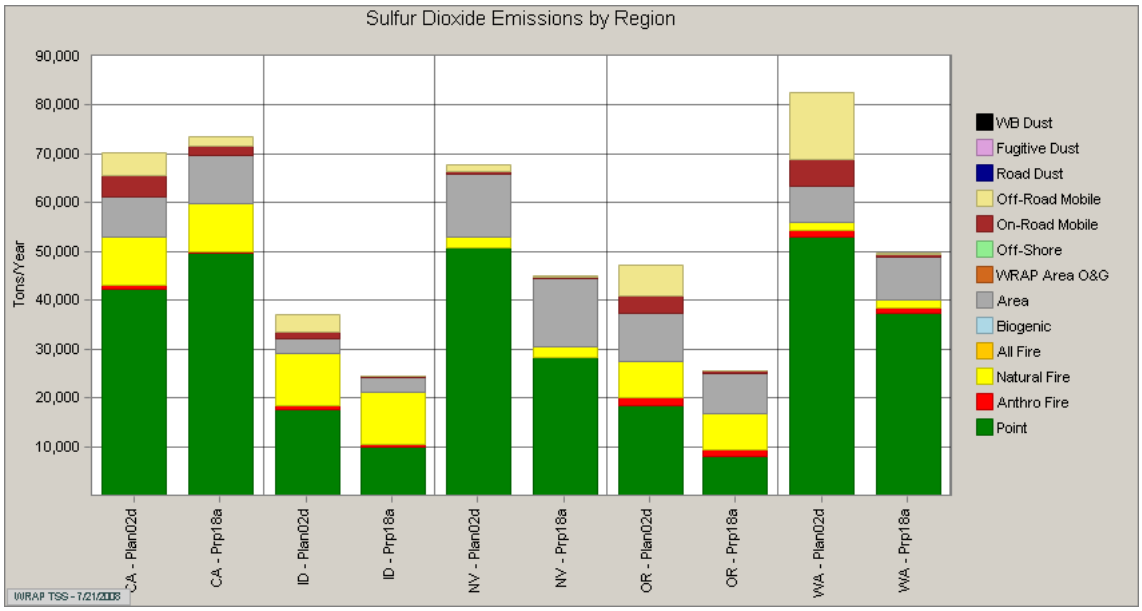
8.2.1 Regional Emissions Comparison to Neighboring States.

The following figures show Oregon emissions in comparison the states which border Oregon. The figures compare baseline to future year emissions (2002 and 2018, respectively) in tons per year. There are eight source categories for each visibility impairing pollutant: point, area, on-

[3] A separate 2005 NH_3 emission inventory prepared by the Department showed a statewide total of approximately 39,000 tons per year. This highlights the uncertainty associated with estimating NH_3 emissions.

road mobile, off-road mobile, oil and gas, anthropogenic fire, natural fire, biogenic, road dust, fugitive dust and windblown dust.[4] These regional emissions can be found on the WRAP TSS under Emissions Review Tool http://vista.cira.colostate.edu/TSS/Results/HazePlanning.aspx.

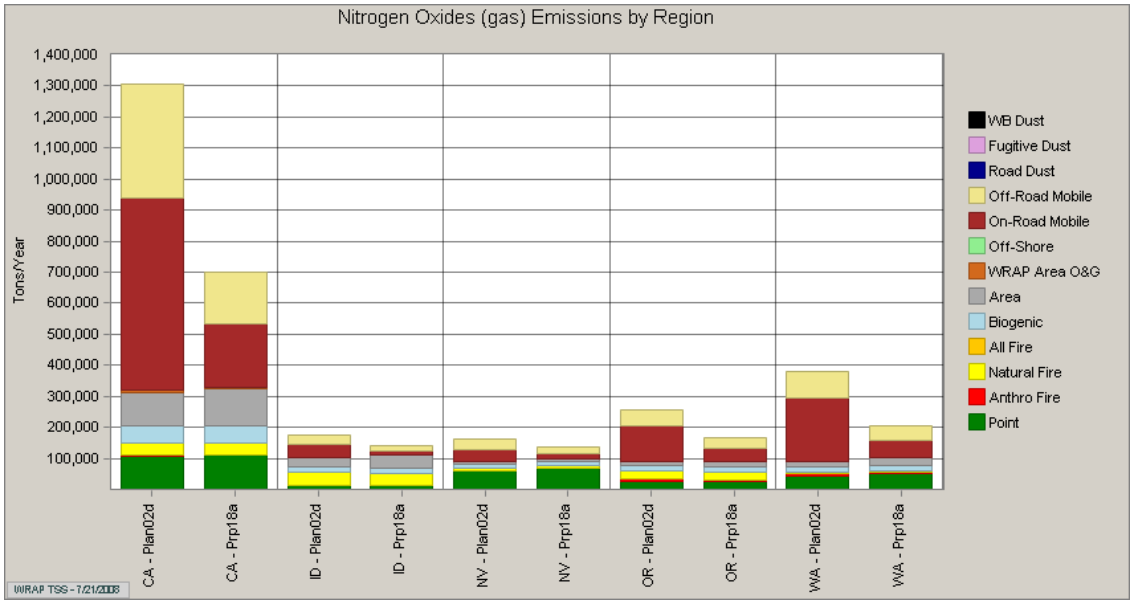
Figure 8.2.1-1 SO_2 Emissions – Oregon vs. Regional, 2002 & 2018



As indicated in Figure 8.2.1-1, Oregon SO_2 emissions are mostly from point sources, followed by area sources and natural fire. Projected emission levels for 2018 show almost a 50% reduction in Oregon, due primarily to large point source and mobile source reductions. Compared to neighboring states, Oregon total SO_2 emissions are considerably less than Washington, Nevada, and California, but more than Idaho.

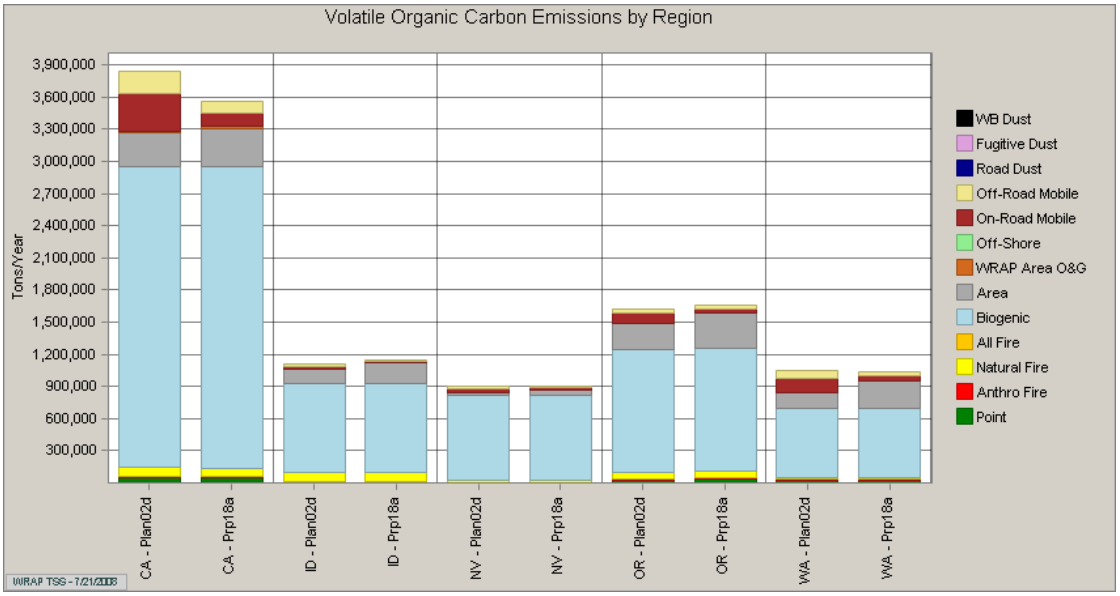
[4] The figures in this section are from the WRAP TSS, which include the source category of "Off-Shore" emissions on the right margin. These emissions are not included here, but instead are described separately in Section 8.2.2. WRAP TSS combines all of the off-shore emissions from marine vessels from the Pacific Ocean. Section 8.2.2 provides a breakdown of these off-shore emissions by State (Oregon, Washington, and California). Included is a discussion of how these emissions are estimated, and a general assessment of their potential contribution to regional haze in Oregon Class I areas.

Figure 8.2.1-2 NO_x Emissions – Oregon vs. Regional, 2002 & 2018



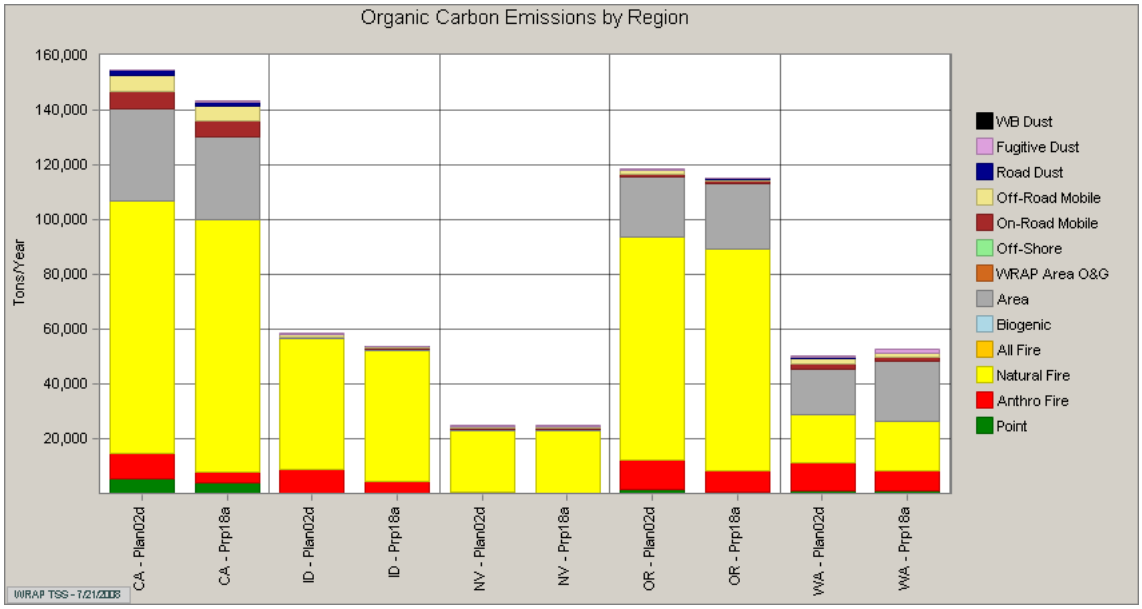
As indicated in Figure 8.2.1-2, Oregon NO_x emissions are primarily from mobile sources, which show about a 50% reduction by 2018. Compared to neighboring states, California NO_x emissions are considerably greater than Oregon and the other states.

Figure 8.2.1-3 VOC Emissions – Oregon vs. Regional, 2002 & 2018



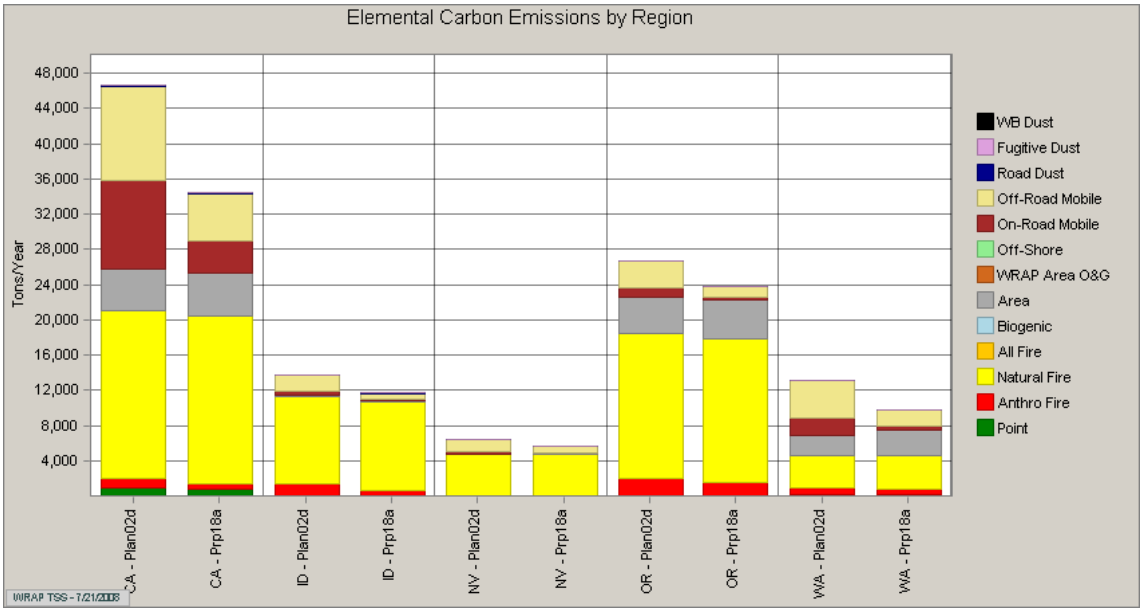
As indicated in Figure 8.2.1-3, VOC emissions are largely from biogenic sources. California's total VOC emissions are about twice that of Oregon.

Figure 8.2.1-4 OC Emissions – Oregon vs. Regional, 2002 & 2018



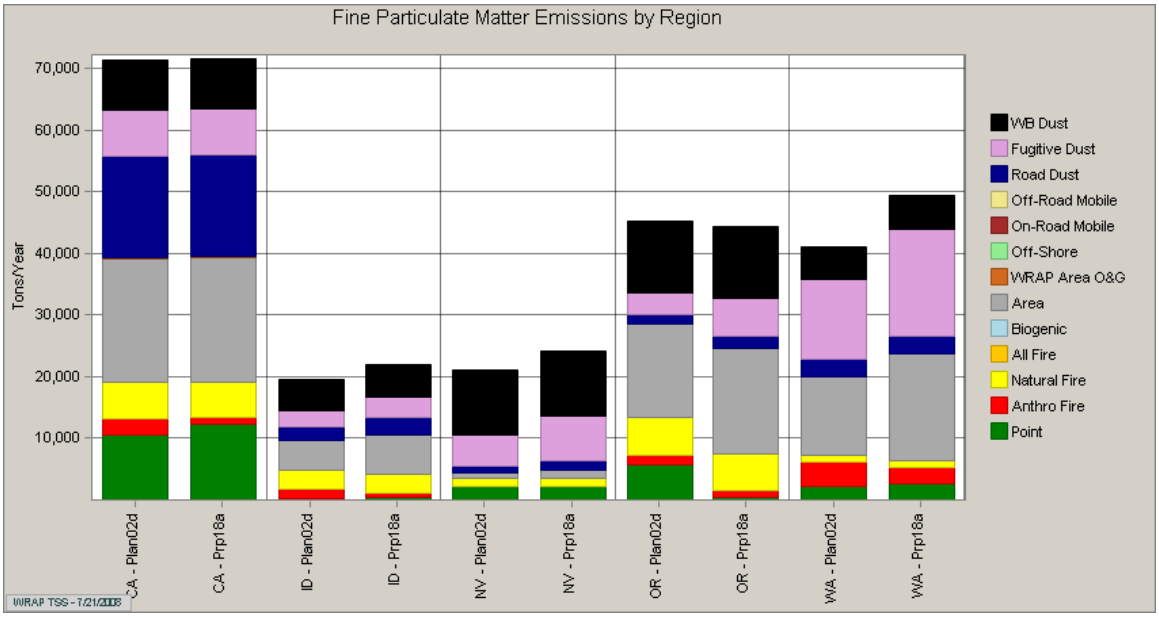
As indicated in Figure 8.2.1-4, Oregon OC emissions are primarily associated with fire sources. Oregon fire emissions are slightly lower than California's fire emissions, but considerably higher than neighboring states. 2002 was a much higher than normal year for wildfires in Oregon.

Figure 8.2.1-5 EC Emissions – Oregon vs. Regional, 2002 & 2018



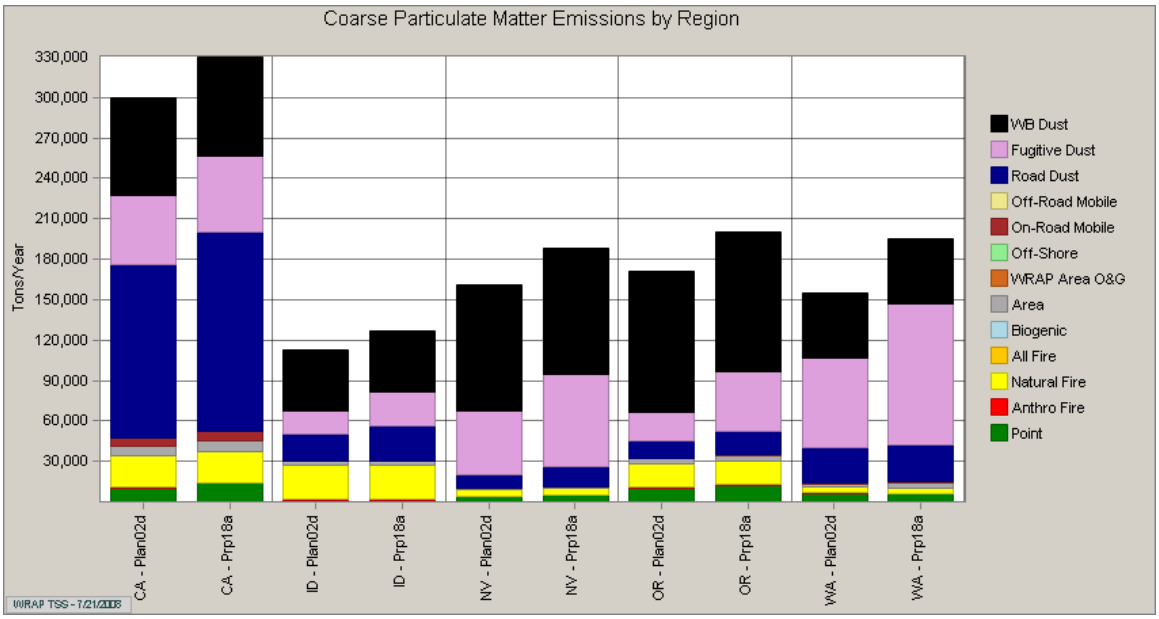
As indicated in Figure 8.2.1-5, Oregon EC emissions are mostly fire related, similar to OC.

Figure 8.2.1-6 PM Fine Emissions – Oregon vs. Regional, 2002 & 2018



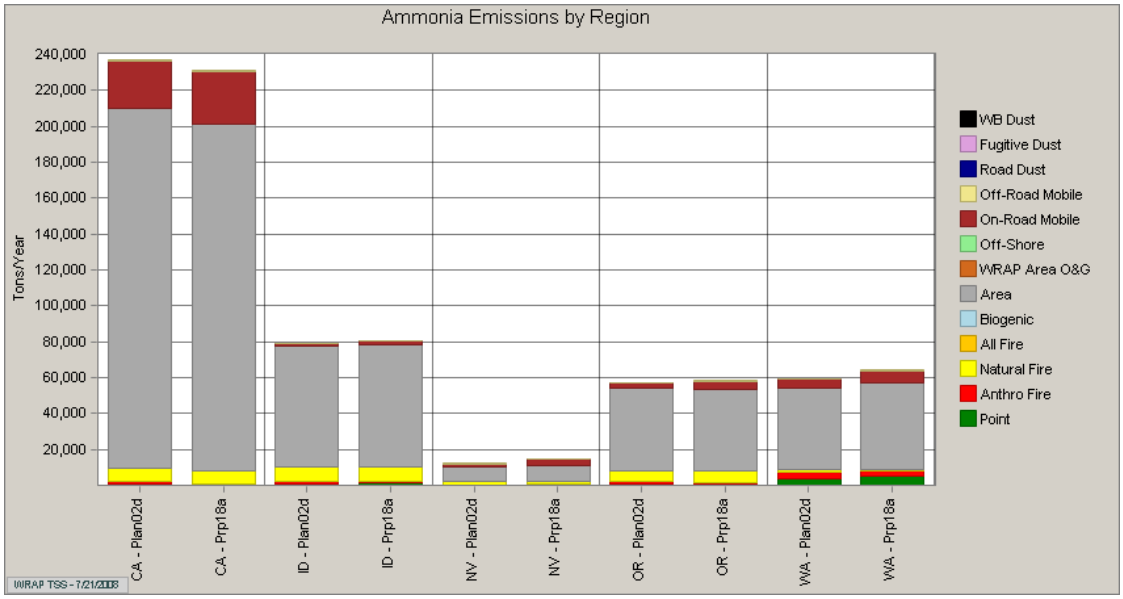
As indicated in Figure 8.2.1-6, Oregon PM Fine emissions are mostly dust and area sources, similar to Washington's. California's total Fine PM emissions are significantly higher.

Figure 8.2.1-7 Coarse PM Emissions – Oregon vs. Regional, 2002 & 2018



As indicated in Figure 8.2.1-7, Oregon PM coarse emissions are almost exclusively dust related. Again, California's emissions for this pollutant are significantly higher.

Figure 8.2.1-8 Ammonia Emissions – Oregon vs. Regional, 2002 & 2018



As indicated in Figure 8.2.1-8, Oregon ammonia emissions are almost exclusively from area sources, such as agricultural related activities involving livestock operations and farming fertilizer applications. California ammonia emissions dominate the regional total.

8.2.2 Regional Off-Shore Marine Emissions

Commercial marine shipping (tankers, container and cargo ships, bulk carriers, etc.) is a large source of emissions that is believed to have a significant contribution to regional haze in states like Oregon.[5] Until recently, emission estimates for marine vessels were limited. As part of the CMAQ regional haze modeling work conducted by the Regional Modeling Center (RMC) for the WRAP, efforts were made to update emission estimates for this source category. The RMC compiled information for this purpose through various means, including previous WRAP emission estimates, CARB estimates, EPA emission factors, and other sources.[6] 2002 emissions were estimated for vessels near shore and near ports using port call data, and offshore emissions were generated from ship location data. For purposes of identifying state emissions for marine shipping, the states were defined using latitudes where state borders meet the shore. Table 8.2.2-1 shows the different types of commercial marine vessels and uses.

[5] As stated in Section 11.4.1, the contribution of this large emissions source to visibility impairment in Oregon Class I areas, particularly those located in Western Oregon, is believed to be a significant factor in affecting the ability to meet the 2018 URP goal.

[6] See WRAP TSS website under "Resources", "Emissions", and "Offshore Emissions" for summary, or go to http://vista.cira.colostate.edu/docs/wrap/emissions/OffshoreEmissions.doc

Table 8.2.2-1 Commercial Marine Vessel Types and Uses

Type	Purpose	Activity Area
Deep draft	Ocean-going large vessels	Ocean Traffic
		Near port
Tow or Push Boats	Barge Freight	River Traffic
		Ocean Traffic
Tugs	Vessel assist and support functions	Near port
Ferries	River or lake ferrying	Regular routes
Other Commercial Vessels	Smaller support or excursion boats	Near dock
Dredges	Dredging projects	Varies
Commercial Fishing	Market fishing	Ocean
Military	Coast Guard and Navy	Ocean & Port

Emissions were estimated for each of these vessel types by the RMC, using methodology that included revising emission factors for different marine engines, updates on port activity, offshore traffic levels, and other factors. Table 8.2.2-2 shows the 2002 emissions for large ocean-going shipping by State and pollutant. Table 8.2.2-3 shows the 2002 emissions for Columbia River vessels, by port.

Table 8.2.2-2 2002 Emissions for Ocean-going Shipping Emissions by State

State	VOC (tons/year)	NO_x (tons/year)	PM10 (tons/year)	SO_2 (tons/year)
Oregon (offshore)	1,331	41,113	2,986	23,119
Oregon (near port)	22	736	72	532
Oregon (within shore)	23	1,415	42	212
Washington (offshore)	1,451	44,692	3,247	25,130
Washington (within shore)	277	10,764	763	5,352
Washington (near port)	103	3,467	335	2,483
California (offshore)	4,269	131,930	9,587	74,181
California (coastal zone)*	5,387	111,550	6,042	46,059
Total	12,863	345,667	23,074	177,068

* includes near port

Table 8.2.2-3 2002 Emissions for Columbia River Ocean-going Vessels by Port

Port	VOC (tons/year)	NO_x (tons/year)	PM10 (tons/year)	SO_2 (tons/year)
Port of Astoria, OR	3	146	7	44
Port of Kalama, WA	11	512	31	212
Port of Longview, WA	18	862	51	344
Port of Portland, OR	72	2935	209	1470
Port of Vancouver, WA	21	920	61	423

These emission estimates for both tables show that total emissions for Oregon are 79,955 tons/year, with the majority being NO_x at 48,639 tons/year (61%) and SO_2 emissions at 26,356 tons/year (33%).

Future increases in marine vessel emissions by 2018 are difficult to estimate. The RMC study estimated a possible doubling in emissions by 2018. Other estimates of future growth suggest a more modest 5-6% increase by 2020.[7]

Chapter 9 PSAT and WEP results show offshore marine vessel emissions as a major contributor to Oregon Class I areas, especially for SO_2 and NO_x, in the Kalmiopsis Class I area in the Coast Range, and the seven Class I areas located in the Cascade Mountains. The impact is less for Class I areas in eastern Oregon, based on distance from this source. If compared to emission inventory data in Chapter 8, marine vessel emissions are 56% for SO_2 and 31% for NO_x of the total 2002 statewide emission inventory for these pollutants.

The Department views these emission estimates as having a higher than average level of uncertainty, based on the description by the RMC of revisions made to emission factors, estimates of traffic and activity levels, and other aspects of methodology used for this estimation. The Department expects that further refinement of marine vessel emissions will occur in the future, through efforts by the WRAP, CARB, and other organizations.

Currently, the Department has limited authority in Oregon to regulate offshore shipping emissions. Current state regulations on shipping (340-208-0570) apply only to vessels on the Willamette River and Columbia River in three counties - Clackamas, Columbia, and Multnomah. The rules require each ship meet "visible emissions" standards for particulate matter, and must minimize soot emissions.

On July 24, 2008, the State of California adopted new strict regulations for marine vessels within 24 miles of shore. These regulations, *Adoption of a Proposed Regulation for Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels Within California Waters and 24 Nautical Miles of the California Baseline (13 CCR, section 2299.1.)*, will require the use of low sulfur marine distillate fuel in auxiliary diesel engines and diesel-electric engines, for both

[7] West coast growth rate for 2020, from "Regional Commercial Marine Vessel Inventories and Forecasts" presentation, made to California Air Resources Board, Sacramento CA, 26 July 2007, by James Corbett, University of Delaware, and Chengfeng Wang, Air Resources Board.

U.S. and foreign vessels. The regulation will be implemented in two steps. Starting in 2009 with low sulfur fuel, and then in 2012, ultra low sulfur fuel. Using the cleaner fuels required in 2009 will result in immediate emission reductions from ocean-going vessels. Reductions will increase as the fuel sulfur content is progressively lowered through the regulation's phase-in. In 2009 about a 75% percent of the diesel PM, over 80% of SO_2, and 6% of NO_x will be eliminated. In 2012, when the very low sulfur fuel requirement will result in reductions of diesel PM of 15 tons daily, an 83% reduction compared to uncontrolled emissions. SO_2 will be reduced by 140 tons daily, or a 95% reduction, and NO_x will be reduced by 11 tons per day, a 6 percent reduction.

The Department expects that implementation of California's new regulations for marine vessels will have benefits in Oregon, and will include in the next regional haze plan update in 2013 any information on possible visibility benefits in Oregon Class I areas. See Section 12.6.5 of the LTS for future efforts planned by the Department to address marine vessel emissions.

8.2.3 Role of Ammonia Emissions in Visibility Impairment

It is believed that in many areas of the country, ammonia plays a key role in the formation of haze. NH_3 reacts chemically with SO_2 and NO_x to form ammonium sulfates and nitrates, which are very effective in impairing visibility. Sources typically associated with ammonia emissions include livestock farming, application of fertilizer, and the decomposition of manure. The contribution of ammonia to regional haze in Oregon is difficult to estimate. As pointed out in Section 8.1.7, NH_3 emission estimates have a high degree of uncertainty associated with them, based on high variability in emission factors and lack of a uniform emission methodology.

A 2007 visibility study conducted on the Columbia River Gorge National Scenic Area by the Department and the Southwest Clean Air Agency (SWCAA) evaluated several haze-causing pollutants, including NH_3. This study used modeling to simulate the chemical formation and transport, and evaluated a 2004 wintertime episode with some of the highest visibility impairment days. The NH_3 emissions included in the modeling was limited to just regional estimates from dairy farms in Oregon and Washington, as other NH_3 emission information was not available. The study found that the contribution of NH_3 on some days was negligible, and on other days contributed to a 12%-30% reduction in visibility. The study was the first to provide an indication of the role NH_3 can play in contributing to haze impacts in Oregon. It also illustrated the current technical complexity and uncertainties of evaluating NH_3, due in part to limited NH_3 emission inventories. Further information on this study can be found at http://www.deq.state.or.us/aq/gorgeair/.

As mentioned above, one of the sources of NH_3 is animal feeding operations. In January 2008, an Oregon Task Force on Dairies and Air Quality was convened to study emissions from dairy operations and explore options for reducing those emissions. Currently there are 370 permitted dairy operations in Oregon. Of those, 331 of them were milking operations with 116,335 milking cows. Of the 331 permitted dairy operations, 39 were registered as large federal concentrated animal feeding operations (CAFOs), meaning that they had 700 or more dairy milking cows. The Task Force reviewed efforts in other parts of the West to improve NH_3 emission estimates, and reviewed best management practices (BMP) being used. In Idaho, for

example, some BMPs being employed include solid separation of manure, corral harrowing, low pressure irrigation, composting and rapid manure removal from outdoor lots. The Task Force concluded its work in July 2008, providing recommendations that included encouraging voluntary programs to reduce emissions from CAFO, and additional research to identify appropriate BMPs for Oregon. For additional information on the Oregon Dairy Task Force, see http://www.deq.state.or.us/aq/dairy/index.htm.

As described in Chapter 7, ammonium nitrate and ammonium sulfate are major contributors to regional haze throughout Oregon's 12 Class I areas. In addition, Eastern Oregon Class I areas (Strawberry Mountain, Eagle Cap, and Hells Canyon) there is a noticeably high contribution of ammonium nitrate to visibility impairment during the winter months. Cold temperatures and low level inversions likely intensify these impacts. See Sections 7.5 and 7.6. Much of this can be attributed to industrial sources, but primarily the PGE Boardman power plant, a large source of NO_x, and identified through BART modeling as a significant contributor to regional haze. The installation of BART controls for this plant (as described in Chapter 10) is expected to reduce NO_x emissions by about 8,000 tons per year, and SO_2 by about 11,000 tons per year. This should result in significant visibility benefits, and reduce these wintertime nitrate levels, as well as sulfate levels year-round in Eastern Oregon.

The Department recognizes that any reduction in NO_x and SO_2 also needs to include reductions in NH_3, due to the role that chemistry plays in secondary aerosol formation. Any effective strategy in Eastern Oregon, or any region of the state, will need to address the chemical formation and transport, as noted in the 2007 Columbia Gorge study summarized above, and identify measures such as the BMPs for large NH_3 sources like CAFOs, as noted in the work of the Oregon Dairy Task Force.

The Department intends to continue to explore ways to improve NH_3 emission estimates, and options for reducing these emissions in the future, as a part of Oregon's on-going participation in the WRAP, and state efforts such as the Oregon Dairy Task Force. As part of the next progress report in 2013, the Department will provide an update on any new information on NH_3 emissions, BMPs, and related programs.

CHAPTER 10: BEST AVAILABLE RETROFIT TECHNOLOGY (BART) EVALUATION

10.1 Overview of BART Process in Oregon

One of the primary requirements of the Regional Haze rule is Section 308(e) on the installation of Best Available Retrofit Technology (BART). The federal definition of BART in 40 CFR 51.301 is as follows:

> **"Best Available Retrofit Technology (BART)** means an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by an existing stationary facility. The emission limitation must be established, on a case-by-case basis, taking into consideration the technology available, the costs of compliance, the energy and nonair quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology."

The BART requirements apply to certain older industrial sources that began operating before federal Prevention of Significant Deterioration (PSD) rules were adopted in 1977 to protect visibility in Class I areas. Both the PSD and BART and rules represent the two primary regulatory tools for protecting visibility and addressing regional haze from industrial sources. The PSD rules apply to new sources and major modifications of existing sources, and require visibility in Class I areas to be protected.[8] The BART rules are essentially a retroactive version of PSD (prior to 1977) for visibility purposes. Under BART, the following sources are subject to review and potential controls if they meet the following criteria: (1) built between 1962 and 1977; (2) have the potential to emit more than 250 tons per year, and (3) fall into one of 26 specific source categories. These sources must be evaluated to see how much they contribute to regional haze and if retrofitting with controls is feasible and cost effective.

The BART process consists of three-steps: (1) determining BART-eligibility; (2) determining is a source is "subject to BART" by conducting modeling of Class I visibility impacts; and (3) conducting an analysis of BART controls (retrofitting) for those sources subject to BART that contribute to regional haze.

[8] The PSD rules are part of the New Source Review rules, which apply to major new sources and major modifications to existing sources, to protect both visibility and air quality in general. See further description in Section 12.5.1. Both PSD and BART rules require modeling to determine visibility impact, and use similar modeling techniques and a similar threshold for what constitutes is a "significant" visibility impact. Since BART addresses existing sources, the evaluation of controls considers the effectiveness and remaining life of the existing controls, and the cost of replacing them. While both rules may end up evaluating similar types of controls, the criteria and selection of controls for BART is different due to the retrofit factors and visibility improvement that would result.

10.2 Determining Oregon's BART-eligible Sources

In determining BART-eligible sources, Oregon followed Appendix Y of EPA's BART rule, Guidelines for BART Determinations Under the Regional Haze Rule, Part II, How to Identify BART-Eligible Sources (70 FR 39158 to 39161). This guidance consisted of the following criteria:

1. Does the facility contain emissions units[9] which fall into one or more of 26 source categories:
    - Fossil-fuel fired steam electric plants of more than 250 million British thermal units (BTU) per hour heat input
    - Coal cleaning plants (thermal dryers)
    - Kraft pulp mills
    - Portland cement plants
    - Primary zinc smelters
    - Iron and steel mill plants
    - Primary aluminum ore reduction plants
    - Primary copper smelters
    - Municipal incinerators capable of charging more than 250 tons of refuse per day
    - Hydrofluoric, sulfuric, and nitric acid plants
    - Petroleum refineries
    - Lime plants
    - Phosphate rock processing plants
    - Coke oven batteries
    - Sulfur recovery plants
    - Carbon black plants (furnace process)
    - Primary lead smelters
    - Fuel conversion plants
    - Sintering plants
    - Secondary metal production facilities
    - Chemical process plants
    - Fossil-fuel boilers of more than 250 million BTUs per hour heat input.
    - Petroleum storage and transfer facilities with a capacity exceeding 300,000 barrels
    - Taconite ore processing facilities
    - Glass fiber processing plants
    - Charcoal production facilities

2. Did the units "began operation" after August 7, 1962 (defined as "engaged in activity related to the primary design function of the facility").
3. Were the units "in existence" on August 7, 1977 (defined as "the owner or operator has obtained all necessary pre-construction approvals or permits required by Federal, State, or local air pollution emissions and air quality laws or regulations and either has (1) begun, or caused to begin, a continuous program of physical on-site construction of the facility or (2) entered into binding agreements or contractual obligations, which cannot be canceled or modified without substantial loss to the owner or operator, to undertake a program of construction of the facility to be completed in a reasonable time").

[9] EPA rules (40 CFR 51.166) define *emissions unit* as "any part of a stationary source that emits or has the potential to emit any pollutant".

[Note: Sources that were in operation before August 7, 1962, but were reconstructed during the August 7, 1962 to August 7, 1977 time period are also subject to BART if "the fixed capital cost of the new component exceeds 50 percent of the fixed capital cost of a comparable entirely new source".]

4. Are the potential emissions from these units 250 tons per year or more for sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulate matter (PM_{10}), volatile organic compounds (VOCs), or ammonia (NH_4).[10]

The identification of Oregon BART-eligible sources was initiated by a comprehensive study conducted by the WRAP in 2005. This study, called "Identification of BART-Eligible Sources in the WRAP Region", identified 101 Oregon sources with actual emissions over 100 tpy of any visibility-impairing pollutant, which could be potential BART sources.[11] In this study the WRAP worked with Oregon DEQ staff familiar with Oregon's sources, to review them for the three BART-eligibility criteria, by categorizing as "likely", "potentially" eligible, or "do not know." All of these sources were reviewed by each permit engineer to confirm BART-eligibility. Out of this review 26 sources were identified as needing more in-depth review to determine BART-eligibility. Out of the 26, a total of 10 were found to be eligible. These sources are listed below in Table 10.2-1. The 16 sources found not to be eligible are described in Table 10.2-2.

Table 10.2-1 List of 10 BART-eligible Sources in Oregon

BART-eligible Source	Location	BART Source Category	Nearest Class I Area
1. Amalgamated Sugar	Nyssa, eastern Oregon	SC 22 - fossil fuel boilers >250 MMBtu/hr heat input.	Eagle Cap 80 mi
2. PGE Boardman	Boardman, eastern Oregon	SC 1 - fossil fuel steam fired electric plants.	Mt. Hood 90 mi.
3. Boise Paper Solutions	St. Helens, NW Oregon	SC 3 - kraft pulp mills & 22 ff boilers >250 MMBtu/hr.	Mt. Hood 55 mi.
4. Georgia Pacific, Wauna	Clatskanie, NW Oregon	SC 3 - kraft pulp mills.	Mt. Hood 80 mi.
5. PGE Beaver	Clatskanie, NW Oregon	SC 1 - fossil fuel steam fired electric plants.	Mt. Hood 80 mi.
6. Georgia-Pacific, Toledo	Toledo, western Oregon	SC 3 - kraft pulp mills.	Three Sisters 90 mi.
7. Pope & Talbot	Halsey, western Oregon	SC 3 - kraft pulp mills.	Three Sisters 50 mi.

[10] EPA's *Guidance for Determining BART Eligibility* allows states the option of excluding VOC and NH4 emissions from the BART process, due to the inability to model these pollutants. Oregon did identify sources for these pollutants, and found one source that did exceed 250 tons for VOC. This source, SFPP Terminals in Eugene, was evaluated, as described in Table 10.3-2, #16, below.

[11] This study can be found on the WRAP website at http://www.wrapair.org/forums/ssjf/bartsources.html.

8. SP Newsprint	Newberg, NW Oregon	SC 22 - fossil fuel boilers >250 MMBtu/hr heat input.	Mt. Hood 50 mi.
9. International Paper (formally Weyerhaeuser)	Springfield, western Oregon	SC 3 - kraft pulp mills & 22 ff boilers >250 MMBtu/hr.	Three Sisters 40 mi.
10. Kingsford	Springfield, western Oregon	SC 26 - charcoal production facility	Three Sisters 40 mi.

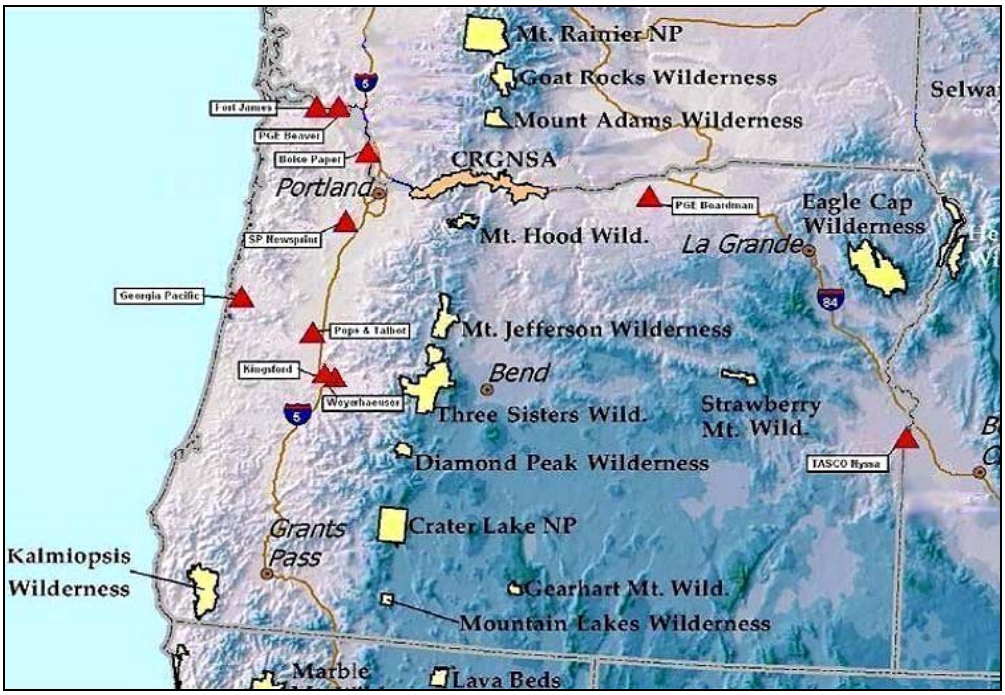
Table 10.2-2 List of Sources Determined not to be BART-eligible

Source	Reasons not BART-eligible
1. Collins Products, Klamath Falls.	Initially thought to have three fossil-fuel boilers. Upon further review found all boilers had been dismantled and scrapped.
2. Northwest Aluminum, The Dalles.	Initial analysis found applicable emission units went into operation prior to August 7, 1962. There was a reconstruction of these units, but this came after 1977, and went through PSD review. The primary aluminum production plant has been permanently shutdown.
3. ESCO, Portland.	Source did not fall under any of the 26 source categories list by EPA for BART. Additionally, no pollutant >250 tpy.
4. Chevron, Portland.	Source thought to meet two of 26 source categories. One category applies to fossil-fuel boilers >250 million BTUs/hr. The other applies to petroleum storage facilities over 300,000 barrels. Upon further review found boilers and storage facilities were far below the applicable capacity. Additionally, no pollutant >250 tpy.
5. Kinder Morgan, Portland.	This source similar to Chevron Portland. Had boilers and storage facilities far below the applicable capacity, and no pollutant >250 tpy.
6. Shore Terminals LLC (Mobil Oil), Portland. .	Upon further review found began operation before 1962, and PTE well below 250 tpy.
7. Oregon Steel Mills, Portland.	Source met source category for Iron and Steel mills. Largest emission unit in existence prior to 1977, but reconstructed after this date. Under EPA guidance on BART-eligibility, a "reconstructed source" after 1977 is not subject to BART if "the fixed capital cost of the new component exceeds 50% of the fixed capital cost of a comparable new source." DEQ review determined the reconstruction of the emission unit exceeded the 50% criteria. Other emission units at the source well under 250 tpy.
8. Wah Chang, Albany.	Primary production activity at this facility did not fall under any of the 26 source categories for BART. Other production activity under 250 tpy.
9. Weyerhaeuser, Albany Paper Mill.	Most of the emission units at this facility started up after 1977. Two emission units that started between 1962-1977 were determined to have emissions under 250 tpy.
10. Roseburg Forest Products, Roseburg.	Source met source category for fossil-fuel boilers. Two boilers had been "derated" to address other regulatory requirements, which reduced boiler capacity to under 250 million BTUs/hr through a federally enforceable permit limit. Source requested similar permit condition for a third boiler. Permit was modified August 8, 2006. Source no longer BART-eligible.
11. Bear Mountain Forest Products, Cascade Locks.	Source does not fall under any of the 26 source categories for BART. Additionally, emissions under 250 tpy.
12. City of Eugene Water Pollution Control Facility.	Boiler under 250 million BTUs/hr, and emissions under 250 tpy.
13. University of Oregon Central Power Station,	Boiler under 250 million BTUs/hr, and emissions under 250 tpy.

Eugene.	
14. International Paper, Gardiner.	This facility is shutdown and permit is no longer active.
15. Reynolds Metals, The Dalles.	This facility is shutdown and permit is no longer active.
16. SFPP Eugene Gasoline Bulk Terminal.	Source met source category for petroleum storage facilities and had emissions >250 tpy for one pollutant - VOC. Other pollutants were well under 250 tpy. EPA's guidance allows VOC emissions to be excluded from BART due to the difficulty to model visibility impacts from VOCs. DEQ used screening model that conservatively assumed that 50% of the VOC emissions were greater than six carbon atoms and equivalent to organic carbon (OC) for visibility modeling purposes. Results showed visibility impact well under 0.5 deciview. Facility removed from the BART-eligible list.

Figure 10.2-1 below is a map showing the location of the 10 BART-eligible sources in Oregon, indicated in red. The visibility impacts of Oregon's BART-eligible sources and those in neighboring States are described in Section 10.3 below.

Figure 10.2-1 Map of Oregon BART-eligible Sources



10.2.1 Extent of BART-eligible Source Emissions

The first step in the BART process was the identification of the BART-eligible sources. Table 10.2.1-1 shows the actual emissions of these sources compared to all other non-BART sources, and compared to total emissions in Oregon (for SO_2, NO_x, and $PM_{2.5}$, which are the primary haze-causing pollutants of concern). The 10 BART-eligible sources represent about 56% of the industrial emissions, and 4% of all sources in the state (2005 actual emissions). If the PGE Boardman plant is removed from this total, the remaining BART sources represent 18% of the

industry, and 1.3% of the statewide total. The significance of the comparison of BART vs. non-BART source emissions is discussed further in Chapter 12, as part of the Long-Term Strategy to evaluate non-BART sources to identify additional emission reductions from these sources in the future.

Table 10.2.1-1 Oregon BART-eligible Source Emissions (2005 actual, tons/year)

Pollutant	10 BART-eligible sources	9 BART eligible sources, w/o PGE Boardman	Total Industry (non-BART)	Total Statewide (all sources)
SO_2	16,223	4,206	3,054	47,447
NO_x	12,287	3,974	13,358	233,633
PM_{10}	2,339	1,643	7,639	455,666
PM2.5*	878	697	1,264	166,593

* PM2.5 is included in PM10

10.3 Summary of BART Modeling

The next step after determining BART eligibility was to conduct modeling of the 10 Oregon BART sources in order to evaluate Class I area visibility impacts. The results are given in Section 10.3.2, which describes source impacts on Class I areas in Oregon and neighboring States. Section 10.3.3 describes the impacts on Oregon Class I areas from BART sources located outside of Oregon.

Ideally, a full assessment of visibility impacts on Class I areas from any source would show its contribution to total impacts from all sources, and on all days, including the 20% best and worst days as described in the Regional Haze Rule. However, such modeling would be extremely complex, in terms separating out each individual source from the hundreds of emission sources affecting each Class I area at a given time. In constructing the BART program, the Rule and EPA guidance simplified the evaluation of visibility impairment from BART-eligible sources by patterning it after New Source Review, where source impacts are modeled individually relative to an estimated natural background on the 20% best days. Consequently, the BART modeling of the 20% best days is very different from, and serves a different purpose than, the use of monitoring data to determine the 20% best and worst days under the Regional Haze Rule. As a result, the BART modeling is based on individual BART source impacts in order to identify the greatest potential for making visibility improvements. This is consistent with EPA BART modeling guidance and BART modeling conducted by all other states in the country.

The BART modeling was conducted for all BART-eligible emission units, collectively, at each facility. Although EPA's BART guidance does not require the inclusion of non-BART emissions in the BART modeling, for most facilities in Oregon the BART emission units represent most of the plant emissions.

As mentioned above, the visibility impacts identified in the modeling are estimates of the highest impacts from each BART source. This is similar to the approach used for new and

major modified sources under the PSD New Source Review rules, in which the maximum impacts of new major sources are modeled for affected Class I areas. As noted in the description of the regional BART Modeling Protocol below, the Department used the highest plant-wide daily emissions from all BART emission units for each source for the modeling period of 2003-2005.

10.3.1 Description of the Modeling Protocol

The visibility impacts described in the modeling results section use the same deciview (dv) metric as used elsewhere in this plan. The deciview is a measure of visibility, and is equivalent on a logarithmic scale to light extinction. For the BART analysis, sources are evaluated on their contribution to increases in impairment at Class I areas above an estimated natural background. This increase in impairment, or delta dv, can also be expressed as a change in light extinction. For example, a delta dv of 0.5 is equivalent to a 5% increase in light extinction. For the sake of brevity, only "dv" is used here.

As stated in Chapter 5, a 1 dv change is equal to a generally perceptible change in visibility to most people. In EPA's BART modeling guidance, they note that "changes in light extinction of 5 percent [0.5 dv] will evoke a just noticeable change in most landscapes." As a result, EPA identified two thresholds for evaluating individual BART sources: (1) 0.5 dv, which is the limit of perceptible change, and what EPA suggests States can use to identify sources that "contribute" to visibility impairment; and (2) 1.0 dv, which is a perceptible change to most people, and what EPA suggests be used to identify sources that "cause" visibility impairment (see EPA's BART rule, pages 70 FR 39120-21).

For the BART modeling conducted in Oregon, the Department chose 0.5 dv as the visibility threshold. This decision was based on several factors: (1) it equates to the 5% extinction threshold for new sources under the PSD New Source Review rules, (2) it is consistent with the threshold selected by other States in the West (all selected 0.5 dv), (3) it represents the limit of perceptible change, and (4) there was no clear rationale or justification for selecting a lower level.[12]

1. Cumulative Impact Modeling

As suggested by EPA's BART guidance, if multiple BART-eligible sources impact a given Class I area on the same day, then a lower, individual, contribution threshold could be considered. Oregon, in concert with Washington and Idaho, could make an evaluation of multiple-source or cumulative impacts on Class I areas of BART-eligible sources in three states. After a multi-source evaluation, a determination would be made as to which sources, if

[12] The Department considered lower levels but concluded there was not sufficient justification for selecting a lower level than 0.5 dv. Using a similar threshold to the NSR rules was a significant factor. Also, as a participant in the WRAP, it was important that Oregon use an approach consistent with the other Western states, especially neighboring states of Washington and Idaho, with whom Oregon developed the regional three-state BART Modeling Protocol. Western states (as compared to the Midwest and East) have a similar mix of contributing pollutant species, contributing source categories, BART sources, worst-case days and natural background conditions, and other factors, which support using the same threshold level.

any, are considered to contribute to visibility impairment and subject to BART, and if a lower visibility threshold than 0.5 dv is warranted.

While consideration was given to the option of evaluating cumulative impacts from multiple BART sources, the Department decided not to pursue this path. The Department conferred with other WRAP states to determine if any were considering cumulative impacts for BART purposes, and found no state pursuing this option at the present time. This included the neighboring states of Washington, Idaho, Nevada and California. Not only was consistency with other states a major consideration for the Department, but the lack of any definitive guidance for addressing cumulative impacts from multiple BART sources was also a factor. The Department believes the WRAP regional planning process is the appropriate vehicle for developing the necessary policy and technical guidance for this type of analysis. The Department will continue its participation in the WRAP, and as part of the next Regional Haze Plan update in 2013, will report on any efforts to study and evaluate cumulative impacts, as it relates to BART-eligible sources, and the LTS commitment to evaluate non-BART sources for additional emission reductions and visibility improvements by the 2018 milestone.

2. Oregon-Washington-Idaho BART Modeling Protocol

The modeling conducted was based on the BART Modeling Protocol developed jointly by Oregon DEQ, Idaho DEQ, and Washington Department of Ecology, Federal Land Managers (National Park Service and U.S. Forest Service), and EPA Region 10. It was based on EPA Guidelines for BART Determinations under the Regional Haze Rule (Appendix Y).[13] The CALPUFF model was used to estimate daily visibility impacts above estimated natural conditions at each Class I area from the BART-eligible emission units at each source, based on actual emission over a three year period (2003-2005). This evaluation looked at both the 98th percentile of the three-year period (which is the 22nd highest day), and the 98th percentile of each individual year (which is the 8th highest day). The highest of these 98th percentile values was then compared to the visibility threshold of 0.5 deciview.

The 98th percentile is a frequently used cutoff in modeling where there are measurement limitations, and certain model assumptions and uncertainties involved. The use of the 98th percentile follows EPA's recommended approach for modeling BART sources (see EPA's BART rule, page 70 FR 39121).[14] According to EPA, the use of the 98th percentile is "a more robust approach that does not give undue weight to the extreme tail of the distribution", and that "will effectively capture the sources that contribute to visibility impairment in a Class I area, while minimizing the likelihood that the highest modeled visibility impacts might be caused by unusual meteorology or conservative assumptions in the model". EPA concludes that "if the 98th percentile value from your modeling is less than your contribution threshold, then you may conclude that the source does not contribute to visibility impairment and is not subject to BART."

[13] See Appendix D-4 for this guidance.
[14] It should also be noted that Federal Land Managers requested that the 98th percentile be used and incorporated into the three-state regional BART protocol.

The BART Modeling Protocol incorporated the use of the 98th percentile, as did the modeling protocols for other states conducting BART modeling across the country. It is important that the same metrics be used for the BART analysis over a wide area, especially for Class I impacts that cross state and regional boundaries.

The emissions used in the modeling reflected the highest emitting day for each facility within the modeling period (2003-2005). They also reflected the facility's steady-state operating conditions during periods of high capacity utilization, which did not include start-up, shutdown, or malfunction emissions.

A copy of the BART Modeling Protocol is provided in Appendix D-5.

Oregon DEQ contacted each BART-eligible source directly to obtain actual emissions and stack parameter information on each BART-eligible emission unit for the modeling. This information was obtained with the assistance of the DEQ permit engineer already assigned to the particular facility. The following is a list of information obtained:

1. Emission Unit Name
2. Geo-location of the Emissions Unit (Latitude - Longitude, or UTM with Zone and Datum)
3. Emission rate - highest 24-hour average actual emissions in the years 2003-2005 (lbs/hour)
4. Stack Base Elevation (meters)
5. Stack Height (meters)
6. Stack Inside Diameter (meters)
7. Exit Velocity (meters/second)
8. Stack Gas Temperature (degrees F, C, or K)
9. Emissions should be quantified for:
   - SO_2
   - $H2SO_4$ (sulfuric acid mist) if available
   - NO_x
   - PM_{10}
   - VOC
10. Speciated PM10 (where available):
    Filterable fraction
    - Elemental carbon (EC)
    - PM Fine ($PM_{2.5}$)
    - PM Course

    Condensable fraction
    - Secondary Organic Aerosol (OC)
    - Inorganic Aerosol (SO_4)
    - Non-SO_4 Inorganic Aerosol

Modeling was conducted for SO_2, NO_x, and PM emissions ($PM_{2.5}$ and/or PM_{10}). EPA guidance allows states the option of excluding VOC emissions from the BART process, due to the inability to easily model this pollutant.[15]

[15] The Department found a single source that met the BART eligibility criteria for VOC emissions, as indicated in Table 10.2-2. This source (#16 SFPP) was evaluated using a screening model, and found to have impacts well under the 0.5 dv threshold.

Oregon provided each source the opportunity, including the participation in two workshops, to provide feedback on the modeling protocol, participate in the modeling effort, and discuss the results. For some facilities, multiple model runs were conducted either by DEQ or by the consultant to the facility using refined emission rates and stack parameters, and other data, These refined model inputs were based on the availability of recent source test results, continuous emission monitoring (CEMs) data, and other information.

10.3.2 Summary of Oregon BART Modeling Results

Table 10.3.2-1 below shows the results of the CALPUFF modeling conducted on the 10 BART-eligible sources. The far left column of the table shows the Class I areas that were modeled.[16] These are Class I areas in Oregon, Washington, and Idaho that are within 300 kilometers of the individual 10 Oregon BART-eligible sources, in accordance with the distance criteria specified in the BART Modeling Protocol.

The table shows that out of 10 sources that were modeled, five had impacts below the 0.5 dv threshold, and five were over the threshold. The visibility impacts from PGE Boardman facility were considerably higher than any of the other four BART sources over the 0.5 dv threshold. The extent of these impacts is described further in Section 10.4.2, along with the BART control determination for PGE Boardman.

As indicated in Table 10.3.2-1, the five sources under the 0.5 dv threshold are listed as "Exempt", and are shown in the first group. In the next group are four sources listed as "Exempt with FEPL". These are sources that were over the threshold that chose the option of a federally enforceable permit condition (FEPL), as described in Section 10.4.1 below. The last column shows PGE Boardman that was far over the threshold and underwent a BART control determination. The impacts for PGE Boardman in the table reflect the BART controls that have been identified for this facility in Section 10.4.2.

Table 10.3.2-2 shows the modeled impacts for the four BART sources before and after the FEPL. A description of emissions reductions and the FEPL at each source is provided below in Section 10.4.1.

[16] Note the Columbia River Gorge National Scenic Area is listed, however it is not a Class I area. It was added to the modeling runs as a receptor point, for information purposes only, based on current interest in visibility conditions in the Gorge. Non-Class I areas are not part of BART process, as they are not addressed under EPA's Regional Haze Rule. However, it should be noted that on non-Class I areas like the Gorge that are in close proximity to Class I areas (such as Mt. Hood) receive visibility benefits from the strategies adopted for Class I areas.

Table 10.3.2-1 BART-Eligible Source Modeling Results

22 Best day per three year period (2003-2005)

	Exempt					Exempt with FEPL				Subject
Class I Area	Boise Paper	GP Toledo	Kingsford	Pope & Talbot	SP Newsprint	GP Wauna	PGE Beaver	Intern'l Paper Springfield	Amalgamated Sugar	PGE Boardman
Alpine Lakes	0.159				0.037	0.263	0.282			2.237
Columbia Gorge	0.478	0.114	0.014	0.221	0.166	0.333	0.359	0.122		3.709
Crater Lake		0.107	0.019	0.199	0.036			0.208		
Craters of the Moon									0.047	
Diamond Peak	0.115	0.125	0.030	0.247	0.061	0.154	0.123	0.278		1.025
Eagle Cap									0.437	2.225
Gearhardt Mt			0.005	0.076				0.059		
Glacier Peak	0.097					0.155	0.158			1.396
Goat Rocks	0.177	0.064	0.006	0.114	0.052	0.236	0.272	0.062		2.420
Hells Canyon									0.282	1.951
Jarbridge									0.059	
Kalmiopsis		0.190	0.023	0.304				0.218		
Lava Beds			0.006					0.076		
Marble Mt			0.012	0.172				0.143		
Mt Adams	0.192	0.083	0.009	0.133	0.062	0.240	0.258	0.085		2.684
Mt Hood	0.367	0.156	0.020	0.299	0.125	0.344	0.357	0.189		4.98~~604~~
Mt Jefferson	0.234	0.143	0.028	0.296	0.092	0.244	0.243	0.239		3.119
Mountain Lakes		0.080	0.011	0.137				0.125		
Mt Rainier	0.246	0.083	0.007	0.095	0.061	0.356	0.414	0.062		2.020
Mt Washington	0.172	0.136	0.032	0.303	0.075	0.217	0.176	0.279		2.334
North Cascades						0.121	0.136			1.056
Olympic NP	0.224				0.058	0.450	0.412			
Redwood			0.016	0.243				0.176		
Sawtooth									0.078	
Selway-Bitteroot									0.082	
Strawberry Peak									0.349	1.717
Three Sisters	0.185	0.163	0.049	0.396	0.091	0.234	0.195	0.444		2.288
Max dv	**0.367**	**0.190**	**0.049**	**0.396**	**0.125**	**0.450**	**0.414**	**0.444**	**0.437**	**4.98~~604~~**

A summary of the results of the BART-eligible source modeling is provided below.

1. Exempt Oregon BART-eligible sources based on 2003-2005 Actual Emissions:

- Boise Paper Solutions, St. Helens OR
- Georgia Pacific, Toledo Pulp & Paper Operations, Toledo OR
- Kingsford Manufacturing, Springfield OR
- Pope and Talbot, Halsey OR
- SP Newsprint, Newberg OR

For these sources, the BART modeling showed impacts at all Class I areas less than 0.5 dv, and the facilities are not subject to further BART review. However, as BART-eligible sources, they will be included in the evaluation of non-BART sources described in Section 12.6.1 of the Long-Term Strategy.

2. Exempt BART-eligible sources based on emissions reduced through an FEPL

- Portland General Electric, Beaver Power Plant, Clatskanie OR

- International Paper (formally Weyerhaeuser), Springfield OR
- Georgia Pacific, Wauna Mill, Clatskanie OR
- Amalgamated Sugar, Nyssa OR

BART modeling showed these four sources had impacts over 0.5 dv in at least one Class I area. Table 10.3.2-2 below shows the initial modeling results. By accepting a FEPL, these sources have reduced their visibility impact to below 0.5 dv. See Section 10.4.1 for more details.

Table 10.3.2-2 BART-Eligible Sources with FEPLs

22 Best day per three year period (2003-2005)								
	Visibility Change with FEPL							
	PGE Beaver		Intern'l Paper Springfld		Amalgamated Sugar		GP Wauna	
Class I Area	Actual 2003-2005	FEPL	Actual 2003-2005	FEPL	Actual 2003-2005	FEPL	Actual 2003-2005	FEPL
Alpine Lakes	0.400	0.282					0.340	0.263
Columbia Gorge	0.630	0.359	0.436	0.122			0.518	0.333
Crater Lake			0.802	0.208				
Craters of the Moon					0.049	0.047		
Diamond Peak	0.182	0.123	1.002	0.278			0.170	0.154
Eagle Cap					0.457	0.437		
Gearhardt Mt			0.224	0.059				
Glacier Peak	0.234	0.158					0.172	0.155
Goat Rocks	0.433	0.272	0.249	0.062			0.288	0.236
Hells Canyon					0.295	0.282		
Jarbridge					0.062	0.059		
Kalmiopsis			0.731	0.218				
Lava Beds			0.298	0.076				
Marble Mt			0.568	0.143				
Mt Adams	0.416	0.258	0.296	0.085			0.279	0.240
Mt Hood	0.582	0.357	0.656	0.189			0.434	0.344
Mt Jefferson	0.338	0.243	0.855	0.239			0.272	0.244
Mountain Lakes			0.455	0.125				
Mt Rainier	0.655	0.414	0.238	0.062			0.443	0.356
Mt Washington	0.265	0.176	0.981	0.279			0.244	0.217
North Cascades	0.190	0.136					0.138	0.121
Olympic NP	0.679	0.412					0.568	0.450
Redwood			0.676	0.176				
Sawtooth					0.081	0.078		
Selway-Bitteroot					0.086	0.082		
Strawberry Peak					0.365	0.349		
Three Sisters	0.263	0.195	1.457	0.444			0.267	0.234
Max dv	**0.679**	**0.414**	**1.457**	**0.444**	**0.457**	**0.437**	**0.568**	**0.450**
8th Best day per single year								
Eagle Cap					**0.514**	**0.492**		

3. BART-eligible sources subject to BART

- PGE Boardman Power Plant, Boardman OR

BART modeling showed that impacts from this facility were well above 0.5 dv, and the Boardman plant is considered Subject to BART. This source underwent a BART control determination~~,~~ in 2008 and 2010, which is described Section 10.4.2.

10.3.3 Summary of Interstate Modeling Results from BART-eligible sources

As shown in Table 10.3.2-1, PGE Boardman showed impacts in six Class I areas in Washington (Alpine, Glacier Peak, Goat Rocks, Mt. Adams, Mt. Ranier, and North Cascades), and one in the portion of the Hells Canyon Class I area in Western Idaho. Although PGE Beaver and GP Wauna did showed impacts over 0.5 dv in two Washington Class I areas (Olympic and Mt. Ranier), those impacts ended up being under 0.5 dv with the FEPL.

Table 10.3.3-1 below shows the visibility impacts over 0.5 dv in Oregon Class I areas from out-of-state BART-eligible sources. Three BART sources in Washington and one in Idaho had impacts in six Oregon Class I areas (Mt. Hood, Mt. Washington, Mt Jefferson, Three Sisters, Strawberry Mountain, Eagle Cap, and Hells Canyon). The largest impact was from the Trans Alta power plant in Centralia Washington. There were no interstate impacts from BART sources in the states of California and Nevada.

- Washington BART sources impacting Oregon:

1. Weyerhaeuser plant, Longview. This facility is a kraft pulp and paper mill located on the banks of the Columbia River in Longview, Washington. The current mill was constructed in 1948 and expanded in 1956-1957, but it has had many modernizations and upgrades since then. This facility is undergoing a BART control evaluation. As indicated in Table 10.3.3-1, this facility impacts the Mt. Hood Wilderness Area.

2. La Farge, Seattle. This is a cement plant located in the Duwamish Valley in Seattle Washington. The plant produces portland cement using the wet process. 16 of the 18 emission units at the plant are subject to BART. This facility is undergoing a BART control evaluation. As indicated in Table 10.3.3-1, this facility impacts the Mt. Hood Wilderness Area.

3. Trans Alta, Centralia. This is a 702 MW coal-fired power plant located near Centralia Washington. It has 2 tangentially fired pulverized coal units using Powder River sub-bituminous coal for fuel. Controls for SO_2 and PM were recently installed in 2003, and have been determined by EPA to represent a BART level of control. As a result, it is currently undergoing a BART control evaluation only for the NO_x emissions from the plant. As indicated in Table 10.3.3-1, this facility impacts four Oregon Class I areas – Mt. Hood, Mt. Jefferson. Mt. Washington, and Three Sisters.

- Idaho BART sources impacting Oregon:

1. Amalgamated Sugar, Nampa. This is a sugar plant located in SW Idaho. It consists of a boiler rated at 350 million BTUs per hour, classified as a fossil-fuel boiler of more than 250 million BTUs per hour heat input. It was installed in 1969, and was put into service between August 7, 1962 and August 7, 1977. As indicated in Table 10.3.3-1, this facility impacts three Oregon Class I areas – Hells Canyon, Eagle Cap, and Strawberry Mtn.

Table 10.3.3-1 BART source impacts in Oregon from other States

State	BART source impacting Oregon	Oregon Class I Area highest impacted	deciview*
Washington	Weyerhaeuser, Longview	Mt. Hood Wilderness	0.67
	La Farge	Mt. Hood Wilderness	0.62
	Trans Alta, Centralia	Mt. Hood Wilderness Mt. Jefferson Wilderness Mt Washington Wilderness Three Sisters Wilderness	2.83 1.88 1.41 1.53
Idaho	Amalgamated Sugar, Nampa	Hells Canyon Wilderness Eagle Cap Wilderness Strawberry Mtn Wilderness	0.79 1.08 0.94
California	None		
Nevada	None		

*98th percentile of 3-year baseline (2003-05)

Under BART and Regional Haze Rule, the State where the BART source is located has the responsibility for evaluating BART that source. For this section of the plan, the Department is only providing the preliminary modeling results of neighboring state BART sources. Results of the BART evaluation for the BART sources in Table 10.3.3-1 are not available at this time, but can be obtained by contacting the Washington Department of Ecology and Idaho Department of Environmental Quality.

10.3.4 BART Modeling in the Context of the Regional Haze Rule

The visibility modeling in the BART program is patterned after the type of analysis required of a new or major modified source subject to NSR rules, and following EPA modeling guidelines and FLM FLAG guidance. This analysis is prescriptive on methods, standards, and baseline data, including the definition and determination of natural background. In this context, natural background is defined as the 20% best days as described in "Guidance for Estimating Natural Visibility Conditions under the Regional Haze Rule" (EPA 2003). This natural background is a calculation based on relative humidity and presumed concentration and speciation of particulate at each Class I area. It is not a measured value of visibility impairment as used to determine Reasonable Further Progress. As a result, the BART modeling results cannot be compared directly to visibility conditions on the 20% worst days or 20% best days, as typically used when describing visibility under the Regional Haze Rule.

Also, BART modeling is carried out individually for each source. Including all other contributing sources in the modeling (i.e., non-BART permitted industrial sources, mobile sources (such as motor vehicles, rail, boat traffic), area sources (non-permitted small sources including outdoor burning, etc.) would mask the contribution to visibility impairment from a single BART source. The primary purpose of BART in its regulatory context is to assess the individual contribution, and to determine the level of emission controls that may be necessary to reduce impacts. Although the broad goal is to reduce haze, the end result of BART is a

source-specific analysis with possible source-specific permit conditions and controls to reduce emissions.

This means that the visibility improvements from the BART process, as described in Section 10.5, are based on the improvement from an individual BART source. However, the results of the CMAQ modeling undertaken by WRAP, as discussed in Chapter 9, provides a regional picture that incorporates not only the estimated emissions reductions from BART sources in Oregon, and regionally across the West, but also includes emissions from non-BART permitted sources, mobile sources, and area sources including fires.

10.4 Summary of Oregon BART Control Determination Process

10.4.1 Option to take a Federally Enforceable Permit Limit

EPA guidance allows BART-eligible sources to adopt a federally enforceable permit limit (FEPL) to permanently lower emissions to below the 0.5 dv threshold level.[17] A modeling analysis is needed to demonstrate that the permit limit will achieve this level. Sources that take a FEPL remain BART-eligible, but are no longer "subject to BART", which removes the source from having to conduct a BART control determination.

Sources that pursue this option tend to be sources which modeled just over the 0.5 dv threshold, and are willing to make a permanent reduction to lower their visibility impact to under this level. There are several advantages to the FEPL option, when compared to the BART control determination. First, this option requires making actual emission reductions to lower visibility impacts below the 0.5 dv threshold. The BART determination process does not guarantee emission reductions, as it is possible the determination could result in no controls (for technical or economic reasons). Second, by reducing visibility impairment below the 0.5 dv threshold, the impact is below the human "perceptibility" level. The BART determination process has no requirement to achieve this level (although greater reductions and more visibility improvement could be an outcome). Third, this option in most cases will result in visibility improvement in a shorter period of time than the 5 years allowed under BART.

The FEPL applies to the BART-eligible emission units, and must be quantifiable and enforceable, such that compliance can be determined by the State in the same manner as any other enforceable permit condition. BART-eligible sources that take a FEPL must have their air quality permit modified by the time the regional haze SIP is submitted to EPA.

In Oregon there were four BART-eligible sources that chose to adopt a FEPL. Table 10.3.2-2 shows the visibility impacts of these sources with and without the FEPL. As explained above, each of these sources will be undergoing a permit modification to include the conditions of the FEPL. These permit modifications go through a separate public review and adoption process, and will completed prior to submittal of the Oregon Regional Haze Plan to EPA in 2009.

The following is a summary of each source FEPL:

[17] EPA Guidance document entitled "BART Exemption Q&A" from August 24, 2006.

1. PGE Beaver Power Plant

This is a 558 megawatt electrical generating plant located in Clatskanie Oregon. The BART visibility modeling conducted for this facility showed an impact on three Class I areas over the 0.5 dv contribution threshold, with the highest impact 0.68 dv at Olympic National Park in Washington. As a result of this FEPL, the facility will reduce its emissions by using a cleaner ultra-low sulfur diesel (ULSD) fuel blend as a backup fuel in its steam gas turbines. DEQ will also impose a limit on the amount of ULSD that can be burned in any given day. The result will ensure the visibility impact remains under the 0.5 dv level.

2. Georgia Pacific Wauna Mill

This is a pulp and paper manufacturing plant located in Clatskanie Oregon. The BART visibility modeling conducted for this facility showed an impact at one Class I area over the 0.5 dv contribution threshold, Olympic National Park in Washington, at 0.57 dv. As a result of this FEPL, the mill will reduce its emissions by taking a permit limit based on (1) permanently reducing use of oil, (2) reconfiguring an emission control system to eliminate an incinerator later in 2009; and (3) production limits, that apply before (an interim limit) and after elimination of the incinerator. This permit limit will ensure the visibility impact remains under the 0.5 dv level.

3. International Paper (formally Weyerhaeuser) Plant

This is a containerboard plant located in Springfield Oregon. The BART visibility modeling conducted for this facility showed an impact on nine Class I areas over the 0.5 dv contribution threshold, with the highest impact 1.45 dv at the Three Sisters Wilderness Area. As a result of this FEPL, the plant will reduce its emissions by accepting limits on fuel usage and operation, and meeting a combined SO2 and NO_x emission limit formula. The plant is also making repairs to one of its' BART units that will result in even lower emission levels and thus ensure the visibility impact is well under the 0.5 dv level.

4. Amalgamated Sugar Plant

This is a sugar beet processing plant located in Nyssa, in eastern Oregon, near the Idaho border. This plant is currently shutdown, and has no identified date to resume operations. However, since their air quality permit is still valid, BART modeling was conducted for the plant, and an impact of 0.514 dv was identified at one Class I area, the Eagle Cap Wilderness (based on single year, 8^{th} highest day, as indicated in Table 10.3.2-2). The facility is taking an FEPL in the event it resumes operation in the future. The FEPL will consist of an emission limit on a boiler, which will ensure this visibility impact is under the 0.5 dv level.

10.4.2 Summary of BART Control Determination for PGE Boardman plant

Under EPA's BART rules and guidance, BART-eligible sources that are determined to contribute to visibility impairment, and do not take the FEPL option, must undergo a BART control determination analysis. In conducting this analysis, Oregon followed Appendix Y of EPA's BART rule, Guidelines for BART Determinations Under the Regional Haze Rule - Part IV. The BART Determination: Analysis of BART Options (70 FR 39164 to 39172). This guidance can be found in Appendix D-4. The guidance describes a five-step process for determining the appropriate control technology for BART-eligible sources. The five criteria are as follows:

- Cost of compliance;
- 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 improvement in visibility which may reasonably be anticipated to result from the use of such technology

Upon completion of this evaluation, the controls determined to represent BART must be installed and in operation as expeditiously as possible, but no later than 5 years after EPA approval of the State's regional haze plan.

The summary below is from the report DEQ's 2008 BART Report for the Boardman Power Plant, which can be found in Appendix D-1 of this plan. Additional information on the visibility improvements from BART is from the report DEQ 2008 Modeling Analysis of Visibility and Acid Deposition Impacts and Benefits – PGE Boardman~~, also provided~~ in Appendix D-2. A second BART report and visibility analysis were prepared in 2010 for PGE Boardman, and can also be found in Appendix D-7 and D-8 of this plan. See the discussion in Section 5 below.

1. PGE Boardman BART Background

As a result of the BART process conducted by Oregon, one BART-eligible source was found to be subject to the BART control determination process. This facility is the PGE Boardman electric generating plant located in northeastern Oregon, about 150 miles east of Portland. Table 10.4.2-1 provides an overview of this facility. This facility is Oregon's largest electrical generating facility that serves approximately 814,000 industrial, commercial and residential customers in 52 Oregon cities.

Table 10.4.2-1 Overview of the PGE Boardman Plant

Item	Description
Plant description	Permitted in 1977, began operation 1980, 617 Megawatt electric steam plant, coal burning, Foster-Wheeler dry bottom, opposed-wall firing boiler
Emissions (tons per year)	Permitted - SO_2: 30,450, NO_x: 12,687, PM: 1,056

	Actual (2007) - SO_2: 14,902~~037~~, NO_x: 10,349~~656~~, PM: 417~~853~~
BART-eligibility	SC1 fossil fuel steam electric plant >250 MMBtu/hr, went into operation 1962-1977, emissions over 250 tpy,
Existing Emission Controls	SO_2: low-sulfur, sub-bituminous coal (~0.3% by weight) NO_x: Low NO_x burner, overfire air (1st generation) PM: cold-side electrostatic precipitator.
BART Modeling summary	Highest impact 4.60 dv (22nd highest day). A total of 14 Class I areas impacted over 0.5 dv threshold.

2. PGE Boardman BART Modeling Summary

As shown in Table 10.3.2-1 on page 143, the PGE Boardman power plant had considerably higher visibility impacts than any other BART-eligible source, impacting 14 Class I areas over the 0.5 dv threshold, with the highest impact of ~~4.6~~5.0 dv at the Mt. Hood Wilderness Area. Compared to the other four sources that initially modeled over the threshold, PGE Boardman accounted for 52% of the Class I impacts over 0.5 dv, with an average impact of 2.2 dv, compared to the combined average of the other four sources of 0.78 dv.

Figure 10.4.2-1 shows a map of the 14 Class I areas impacted by PGE Boardman, within the 300 km radius used in the modeling, in accordance with the BART Modeling Protocol described in 10.3.1.

Figure 10.4.2-1 Map of 14 Class I Areas Impacted by PGE Boardman

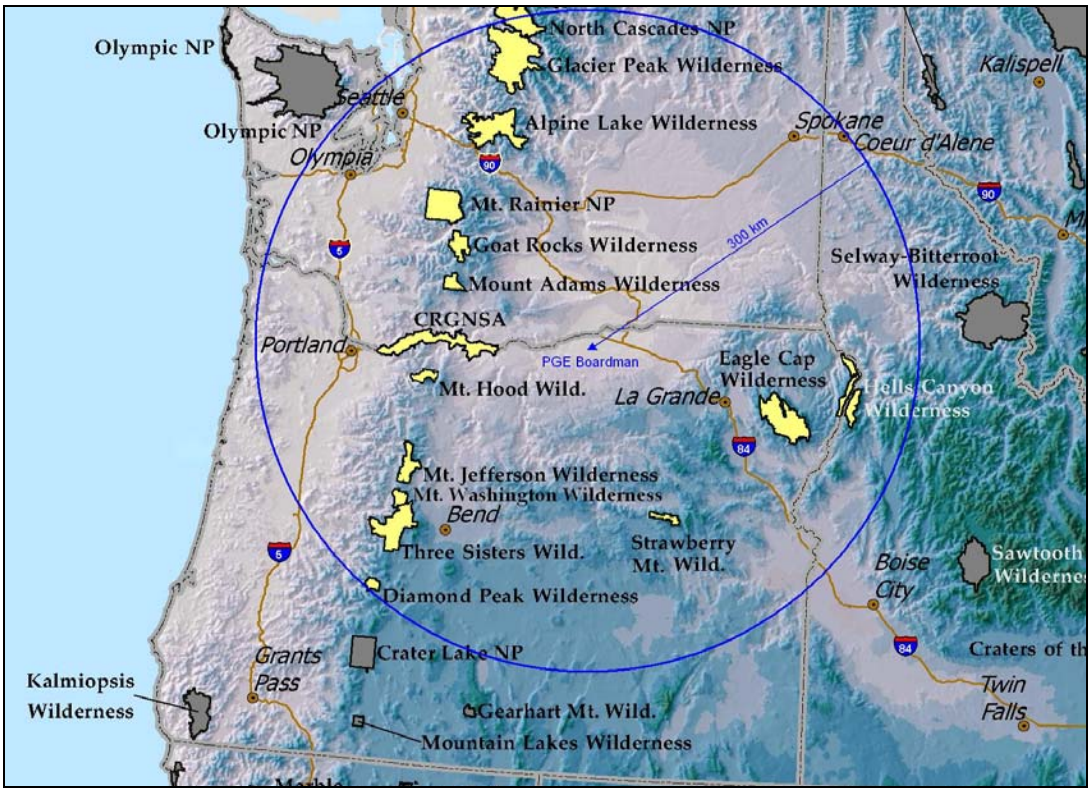


Table 10.4.2-2 identifies each of the 14 Class I areas impacted in Oregon, Washington, and Idaho, and the highest impact (in deciview) based on the 98th percentile during the 2003-05 baseline. Included in the modeling was the Columbia River Gorge National Scenic Area and Crater Lake National Park. The Columbia Gorge was added to the modeling as a receptor point, for information purposes only, based on current interest in visibility conditions in the Gorge. Crater Lake National Park was outside the 300 km radius identified in the modeling protocol, but was also included for information purposes.

Table 10.4.2-2 Summary of Class I Area Visibility Impacts from PGE Boardman Plant

Class I Areas Affected	Highest Impact (dv)*
Oregon Class I Area	
Mt. Hood Wilderness	4.~~60~~98
Mt. Jefferson Wilderness	3.12
Three Sisters Wilderness	2.29
Mt. Washington Wilderness	2.33
Eagle Cap Wilderness	2.23
Hells Canyon Wilderness	1.95
Strawberry Mountain Wilderness	1.72
Diamond Peak Wilderness	1.03
Washington Class I Area	
Mt. Adams Wilderness	2.68
Goat Rocks Wilderness	2.42
Alpine Lakes Wilderness	2.24
Mt. Rainer National Park	2.02
Glacier Peak Wilderness	1.40
North Cascades National Park	1.06
Idaho Class I Area	
Hells Canyon (Idaho portion)	1.95
National Scenic Areas (non-Class I)	
Columbia River Gorge (NSA)	3.71
Beyond 300 km (outside blue circle)	
Crater Lake National Park	1.06

*in deciview, 98th percentile of 3-year baseline (2003-05)

3. PGE Boardman's 2007 BART Analysis Report

After completion of the modeling results, DEQ informed PGE Boardman that the facility was "subject to BART". As required under the BART rule, PGE Boardman prepared a BART control analysis report which was submitted to DEQ on November 2, 2007, and identified the controls in Table 10.4.2-3 below as BART.[18]

[18] "Portland General Electric Boardman Plant, Best Available Retrofit Technology (BART) Analysis, November 2, 2007". ~~See DEQ Regional Haze website at: http://www.deq.state.or.us/aq/haze/docs/pgeAnalysisReport.pdf~~

Table 10.4.2-3 BART Proposal by PGE

Pollutant	Control Technology	Emission Rate
Sulfur dioxide	Semi-dry flue gas desulfurization	0.12 lb/mmBtu
Nitrogen oxides	New low-NO_x burners with modified overfire air system and selective non-catalytic reduction	0.23 lb/mmBtu
Particulate matter	Pulse jet fabric filter	0.012 lb/mmBtu

4. DEQ's 2008 BART Control Determination for PGE Boardman

DEQ followed EPA's *Appendix Y guidance for BART control determinations*, in selecting BART on a pollutant by pollutant basis, taking into consideration the cost, the energy and non-air environmental impacts, the remaining useful life, and the modeled visibility impacts. Table 10.4.2-4 shows the range of controls that were evaluated for the PGE Boardman plant.

Table 10.4.2-4 Summary of Control Options Evaluated for PGE Boardman

Pollutant	Controls Evaluated
SO_2	• Semi-dry flue gas desulfurization (SDFGD) • Wet flue gas desulfurization (WFGD)
NO_x	• Overfire air system operation • Upgraded low NO_x burners • Selective Non-Catalytic Reduction (SNCR) • Upgraded Low NO_x Burners (LNB) with Overfire Air (OFA) • Upgraded LNB with OFA and SNCR • New LNB with Modified OFA • SNCR/SCR hybrid (cascade) • Selective Catalytic Reduction (SCR)
PM	(co-benefit of SO_2 controls): • Pulse jet fabric filter (PJFF) • Wet ESP

~~To assist in the review of these control options, the Department engaged an independent contractor, Eastern Research Group, Inc. (ERG). ERG conducted an independent feasibility and cost assessment of select options, primarily focusing on NO_x controls. ERG evaluated control options and performance information from power plants like PGE Boardman from around the country. ERG employed several methods to estimate the likely costs of different control options, including using industry-standard cost estimation models, literature searches of costs incurred in similar projects across the country, and discussions with PGE's contractor (Black & Veatch) to explore "real-world" costs for these types of projects. ERG prepared a report for the Department, which is included as Appendix D-3 of this plan.~~

DEQ identified a two-step process for installing controls at the PGE Boardman plant. Phase 1 required the installation of new low NO_x burners with modified over fire air system for NO_x controls, semi-dry gas flue gas desulfurization for SO_2 controls, and pulse jet fabric filter for

PM controls. Phase 1 would reduce these emissions by about 66 percent by 2014, at a cost of about $280 million, and meet the minimum requirements for BART. Phase 2 added more stringent controls for NO_x by requiring Selective Catalytic Reduction (SCR), that would reduce emissions by about 81 percent by 2017, at an additional cost of $191 million. Phase 2 was in addition to BART, to achieve greater visibility improvements and address reasonable progress in Oregon's Class I areas, and address visibility and acid deposition concerns in the Columbia River Gorge National Scenic Area (not a Class I area).

This two-phased approach was adopted into DEQ rules in 2009, but subsequently revised in 2010, as described below in Section 6.

DEQ conducted a second BART determination in 2010, based on a proposal from PGE to close the Boardman plant in 2020. This necessitated re-evaluating BART controls for this facility, based on a shorter remaining useful life of the plant. Further information on DEQ's 2008 BART control determination and emissions limits that were identified can be found in Appendix D-1. DEQ's 2010 BART determination is described below.

~~Based on a review of the above costs and control options, the Department decided to require a two-phased approach to reduce haze pollution from PGE Boardman. Phase 1 would require the installation of new low NO_x burners with modified over fire air system for NO_x controls, semi-dry gas flue gas desulfurization for SO_2 controls, and pulse jet fabric filter for PM controls. Phase 2 would add more stringent controls for NO_x by requiring Selective Catalytic Reduction (SCR). Table 10.4.2-4 summarizes the Phase 1 and Phase 2 controls. Phase 1 is the Department's case-by-case determination of BART for the Boardman Power Plant; whereas, Phase 2 is in addition to BART, to provide greater visibility improvements and address reasonable progress in Oregon's Class I areas, and address visibility and acid deposition concerns in the Columbia River Gorge National Scenic Area (not a Class I area). Table 10.4.2-4 and the following summary describe the Phase 1 and Phase 2 control requirements for PGE Boardman.~~

~~Table 10.4.2-4 DEQ BART Control Determination for PGE Boardman~~

~~Pollutant~~	~~Control Technology~~	~~Emission Limit~~	~~Averaging Time~~	~~Installation Date~~	~~Compliance Date~~
~~Phase 1 Controls~~					
~~Nitrogen oxides (NO_x)~~	~~New low NO_x burners with modified overfire air system (NLNB/MOFA)~~	~~0.28 lb/mmBtu heat input~~	~~30-day rolling average~~	~~7/1/11~~	~~1/1/12~~
		~~0.23 lb/mmBtu heat input~~	~~12-month rolling average~~	~~7/1/11~~	~~7/1/12~~
	~~Selective Non-Catalytic Reduction (SNCR) contingency*~~	~~0.23 lb/mmBtu heat input~~	~~30-day rolling average~~	~~7/1/14~~	~~1/1/15~~

Sulfur dioxide (SO_2)	Semi-dry flue gas desulfurization (SDFGD)	0.12 lb/mmBtu heat input	30-day rolling average	7/1/14	1/1/15
Particulate Matter (PM)	Pulse jet fabric filter (PJFF) as part of the SDFGD system and in addition to the existing electrostatic precipitator	0.012 lb/mmBtu heat input	3-hour average based on the results of compliance source testing	7/1/14	1/1/15
Phase 2 Controls					
Nitrogen oxides (NO_x)	Selective Catalytic Reduction (SCR)	0.07 lb/mmBtu heat input	30-day rolling average	7/1/17	1/1/18

* SNCR is included as a contingency, in the event that new low NO_x burners with modified overfire air cannot achieve 0.23 lb/mmBtu heat input.

Phase 1 Controls (2011-2014):

- **NO_x Control**: New Low NO_x Burners, with modified over fire air control system. This level of control meets minimum federal requirements for Best Available Retrofit Technology (BART) for NO_x. This level of control would reduce NO_x emissions about 46%.

- **SO_2 Control**: Semi-dry flue gas desulfurization (SDFGD). This level of control meets federal requirements for Best Available Retrofit Technology (BART). This control technology is also most compatible with mercury reduction controls previously required by DEQ, and would reduce SO_2 emissions by about 80%. SDFGD was selected as BART because it provides slightly more visibility improvement than wet flue gas desulfurization, and the cost is $135 million dollars less.

- **Particulate Matter (PM) Control**. Particulate emissions from the Boardman Plant do not have a significant impact on visibility in Class I areas[19]. Therefore, a rigorous analysis of BART for particulate matter was not conducted. However, particulate matter emissions will be reduced about 29% as a side benefit of installing BART emission controls for SO_2 that include a pulse jet fabric filter. In addition, no other controls were identified that would achieve a lower emission rate than the fabric filter.

Phase 2 Additional NO_x Controls (2017):

- Phase1 NO_x controls would only reduce NO_x emissions from the Boardman facility by about 46%, as compared to about 80% for SO_2. Therefore, DEQ has proposed a second tier of NO_x controls in order to minimize the Boardman facility's air quality impacts in

[19] Or in the Columbia River Gorge National Scenic Area.

~~the affected wilderness areas as well as in the Columbia River Gorge. The Phase 2 NO_x controls would reduce NO_x emissions from the Boardman power plant by about 84%.~~

~~The Department believes Phase 2 SCR is necessary for the following reasons:~~

- ~~Nitrates contribute significantly to haze in the Class I areas, especially at Strawberry Mountain, Eagle Cap, and Hells Canyon. Under Phase 1, the Boardman plant would still be a significant source of NO_x. The modeling conducted for BART shows that further reductions of NO_x will reduce the impacts of the Boardman plant below 1.0 dv for all Class I areas, and less than 0.5 dv for the majority of them. This improvement will help demonstrate reasonable progress by 2018 and beyond.~~

- ~~In addition to providing more visibility improvement and addressing reasonable progress for Oregon Class I areas, Phase 2 will help improve the air quality in the Columbia River Gorge National Scenic Area, and reduce risks to ecosystems and Native American cultural resources. Modeling results show that controls put in place by 2014 will reduce the visibility impacts from 3.7 to 2.8 dv and the addition of SCR by 2017 will reduce the impacts from the Boardman Plant to 0.8 dv.~~
- ~~SCR will reduce or eliminate the yellow or brown plume that is currently present during some meteorological conditions. This plume is caused when nitrogen oxide (NO) is converted to nitrogen dioxide (NO_2) in the presence of free oxygen.~~

~~The Department established an installation date of 2017 for Phase 2 SCR for the following reasons:~~

- ~~Significant modifications to the boiler will be required to reduce the exhaust temperature to the level required for an SCR system. As a result, more time is required for project engineering and planning.~~

- ~~A longer than normal outage will be necessary to complete the boiler modifications. The extended schedule will allow more time to plan the project to ensure that the modifications are completed as quickly as possible and that electricity will be available from other sources during the outage.~~

- ~~An extended schedule will also allow PGE to evaluate innovative control technologies that may be superior to SCR in that they don't require ammonia or generate hazardous waste.~~

- ~~It typically takes 3 to 5 years to design and install an SCR system. The Department believes that it will take twice as long for the Boardman plant due the complexity of the project and competition with current projects throughout the country.~~

~~It is estimated that the capital cost of Phase 1 will be 280 million dollars with an annualized cost of 40.3 million dollars per year (2007 dollars). Phase 2 for NO_x will add an additional capital cost of 191 million dollars with an annualized cost of 23.1 million dollars (2007 dollars).~~

~~The Phase 1 controls are timed to align with the installation of mercury controls previously required by the Department for the Boardman power plant in 2007.~~

5. DEQ's 2010 BART Control Determination for PGE Boardman

In 2010 DEQ conducted a second BART determination for the PGE Boardman plant, in response to an early closure of the plant proposed by PGE. This was followed by DEQ adopting rule changes to reflect this early shutdown, consisted with the BART regulations. See Section 6 for further information on the 2010 rulemaking.

PGE submitted a revised BART analysis based on a proposal to close the plant by December 2020.[20] PGE proposed an alternative to BART that consisted of installing the same Phase 1 NO_x controls (i.e., low- NO_x burners with overfire air system) and reducing SO_2 emissions by burning low-sulfur coal, in combination with the 2020 closure. The proposal rejected the Phase 1 SDFGD SO_2 controls and the Phase 2 SCR NO_x controls as no longer cost effective under a 2020 shutdown, based on a much shorter life of the plant (10 years). However, this proposal was not supported by DEQ, and instead DEQ conducted another BART determination for the plant, examining a much wider range of pollution control options that would meet BART, under an early closure.

In DEQ's 2010 BART determination, three different emission reduction options were identified that each met BART, and contained separate early closure date options. This approach was taken to allow PGE to choose the most cost-effective closure option, or choose not to close and continue to be subject to the Phase 1 and 2 controls described above. Each option reflected different combinations of pollution control requirements and costs, and would be federally enforceable.

The following summarizes the three emission reduction options:

Option 1- 2020 shutdown. Required the same Phase 1 controls for NO_x in 2011 and SO_2 in 2014, but not the Phase 2 SCR controls in 2017. Installing the SDFGD controls for SO_2 in 2014 was determined by DEQ to be cost-effective with a 2020 shutdown date. DEQ determined installing the SCR controls in 2017 would not be cost effective if the plant were to close in three years (2020). The estimated cost of Option 1 was approximately $320 million.

Option 2 - 2018 shutdown. Required the same NO_x controls in 2011, but would use dry sorbent injection (DSI) controls in lieu of SDFGD controls in 2014. Similar to Option 1, no Phase 2 SCR controls would be required for NO_x. The DSI controls cost considerably less than the SDFGD controls, and provide half of the SO_2 emission reduction. DEQ's rationale for pairing DSI with a 2018 closure date was as follows:

- In the period 2019-2020, SDFGD controls for SO_2 are cost effective and would be required as BART. 2018 is the first year where these controls are no longer cost

[20] See PGE's BART Report, Revision 3: Boardman 2020 Alternative, in Appendix D-9

effective, and under the BART evaluation process, can be replaced by a less stringent BART technology (in this case, DSI).

- An earlier closure date than 2018 may also be cost effective for DSI, but DEQ believes a 2018 closure date, in combination with DSI controls meets BART and would provide a reasonable timeframe for PGE to develop replacement power options. In their proposal, PGE indicated 2020 is necessary to develop replacement power to serve their customers.

- While the DSI controls are less effective in reducing emissions than SDFGD, a 2018 closure date would result in all emissions being eliminated two years sooner than SDFGD with a 2020 closure date. This makes Option 2 very comparable to Option 1 from an overall emission reduction and visibility improvement standpoint.

- The estimated cost of this option is approximately $103 million.

Option 3 - 2015/2016 shutdown. Required the same NO_x controls in 2011, but no substantive new pollution controls for SO_2. The Clean Air Act requires BART controls to be installed no later than 5 years from the time EPA approves the regional haze plan. This option would allow PGE to close the Boardman plant by the BART deadline in lieu of installing BART controls for SO_2. This option established a shutdown date by 2015 or 2016, or five years from the date EPA approves the Oregon's 2009 Regional Haze Plan, at an estimated cost of approximately $36 million.

Further information on DEQ's 2010 BART control determination and the three options above, including more description of the selection of DSI as BART, see DEQ's 2020 BART Report for the PGE Boardman Plant in Appendix D-7.

PGE's BART III 2020 plan. In response to DEQ's three options, PGE proposed an alternative to Options 1 and 2. This proposal included the same controls and costs as Option 2, but would allow the plant to run until 2020, instead of 2018. PGE also proposed a "pilot study" for the DSI controls to confirm they could meet the required emission limit without negatively impacting mercury controls or increasing particulate emissions, to the point where expensive additional particulate controls would be required.

New PGE proposal for 2020 closure and rule adoption. After completing the 2010 BART evaluation, DEQ received another closure proposal from PGE that contained a commitment to permanently close the Boardman plant in 2020, and thereby eliminate the need for the Phase 1 and Phase 2 controls adopted in 2009. Similar to PGE's BART III plan and DEQ's Option 2, this new proposal included DSI controls, but would establish a lower SO_2 emission limit for the last two years, or from 2018 to 2020. There would also be the same pilot study for DSI as under PGE's previous proposal. The 2020 closure date would be a federally enforceable requirement in the rules.

As a result of this new proposal for an early closure, DEQ conducted additional analysis of BART controls under this approach. This analysis can be found in Appendix D-8 DEQ's addendum to the 2010 BART Report for the PGE Boardman Plant.

Table 10.4.2-5 below summarizes this new proposal and the BART controls and costs associated with it. These BART controls associated with a firm 2020 closure date were adopted as DEQ's BART rules in late 2010. These rules also included an optional earlier closure date of 2015-16, as proposed in DEQ's Option 3, to provide PGE with an earlier closure date if they should want it. Table 10.4.2-5 shows the 2010 rules with 2020 closure date in comparison to the 2009 Phase 1 and Phase 2 controls, and DEQ's Option 2 and Option 3.

Table 10.4.2-5 DEQ BART Controls Comparison for PGE Boardman

Option	Controls/Installation Date			Capital Cost (million $)	Emission reduction tons/year (+percent)
	2011 (NO_x)	2014 (SO_2)	2018 (NO_x)		
2009 Rules (no closure)	LNB/MOFA	Semi-dry Scrubber	SCR	$497.6	20,800 (81%)
Option 2 (2018)	LNB/MOFA	DSI 0.40 lb/mmBtu	-	$102.6	9,900 (39%)
Option 3 (2015-16)	LNB/MOFA	-	-	$35.7	4,800 (19%)
2010 Rules w/2020 closure	LNB/MOFA	DSI-1* 0.40 lb/mmBtu	DSI-2* 0.30 lb/mmBtu	$102.6	12,400 (48%)

* Subject to pilot study evaluation

Notes:
LNB/MOFA = Low NO_x burners with modified overfire air system.
SNCR = Selective Non-Catalytic Reduction system.
Semi-dry Scrubber, also known as semi-dry flue gas desulfurization system.
DSI = Dry Sorbent Injection
SCR = Selective Catalytic Reduction.

As noted in this table, the 2009 rules would achieve an 81% emission reduction by 2018, but would continue to allow the plant to emit about 4,700 tons of air pollution per year. The 2010 rules achieve a 48% reduction by 2020, and then eliminate all emissions after this date. For additional information on emission reductions and visibility improvements under the 2010 rules, see Section 10.5 below.

The DSI pilot study. The 2010 rules contain two dates where a pilot study would be conducted to confirm the feasibility of DSI controls, prior to the compliance dates in 2014 and 2018. PGE raised concerns about possibility that DSI could negatively impact the mercury controls scheduled to be installed in 2011 as required by other DEQ rules. PGE was also concerned that due to the sorbent injection process, the resulting particulate emissions may trigger DEQ's Prevention of Significant Deterioration (PSD) rules by causing an increase in $PM_{2.5}$ emissions greater than the significant emission rate (10 tons/yr). If that occurred, PGE would be required

to install best available control technology and conduct an air quality impact analysis to ensure the increase does not exceed the PSD increment or ambient air quality standards for $PM_{2.5}$. DEQ cannot determine what will be required until accurate emission estimates are available. However, it is possible that the existing electrostatic precipitator at the Boardman plant may satisfy the best available control technology requirement. The pilot studies will evaluate commercially available sorbents, injection zones, and ESP collection efficiency. If it is determined that the DSI system would negatively impact the mercury controls or require a fabric filter, PGE may propose an alternative limit that will be established in the permit. The alternative limit must be the lowest achievable emissions limit without negatively impacting the mercury controls or requiring a fabric filter, but may not exceed 0.55 lb/mmBtu in order to achieve at least 0.5 dv improvement in the Mt. Hood wilderness area.

Repowering the PGE Boardman plant. The 2010 rules will require the PGE Boardman Foster-Wheeler boiler to cease burning coal in 2020. The rules do not prevent the plant owners from applying for a new permit to construct a new power plant at the Boardman site, or from repowering the existing Boardman boiler using an alternative fuel. Any new facility, or the repowering of the existing coal-boiler, would need to be permitted by DEQ as a new facility without relying on the emission reductions from the existing plant and in compliance with all applicable state and federal rules, such as Prevention of Significant Deterioration requirements, and therefore subject to modern air pollution controls and air quality impact analysis.

6. 2010 BART Rule Changes subject to EPA approval

As noted above, the rules changes adopted in 2010 would replace the 2009 rules, which allowed the continued operation of the Boardman plant, under the Phase 1 and 2 control requirements. The 2020 rule changes are subject to approval by EPA. The 2009 rules would remain in force if these rule changes are not approved, however this is not expected.

~~**5. Upcoming Carbon Regulations and Requesting a Rule Change**~~

~~The Department expects that state and federal regulations to reduce greenhouse gas emissions from power plants, and many other sources, will be developed in the next several years. Although it is uncertain how future greenhouse gas regulations will affect PGE Boardman, the two-phased approach to reduce haze pollution at PGE Boardman will allow some time for PGE to evaluate the cost of greenhouse gas regulation in context with costs associated with the regional haze SO_2 and NO_x controls for the Boardman facility. The Department acknowledges the combination of these costs could be significant and may require PGE to evaluate cost-benefit factors affecting the future of the Boardman facility, as part of the Oregon Public Utility Commission Integrated Resource Plan process.~~

~~Recognizing these future uncertainties, the Department has included in the Long-Term Strategy in Chapter 12 a process by which PGE could submit a written request for a rule change to the regional haze control requirements for that facility, if PGE determines that the additional impact and cost of greenhouse gas regulations will require the closure of the PGE Boardman plant and formally proposes a closure date. Although this request could be made at any time, the Department believes it would be particularly appropriate if submitted as part of Department's 2013 regional haze plan update, where it could be considered along with the~~

~~Evaluation of Non-BART Sources and BART-eligible sources pursuant to Section 12.6.1. The Department recognizes that such a request could change the need for significant capital investment in regional haze pollution control equipment at Boardman and that a decision from the EQC would be needed as quickly as possible. The Department would evaluate the merits of PGE's request in consultation with EPA, and take action as appropriate upon that request as quickly as possible. The Department would also seek input from the public, stakeholders, tribal nations, and a fiscal advisory committee in making its determination. The Department would expect PGE to include an analysis of the estimated emission reductions and visibility benefits from an early closure, other controls that might be feasible and cost-effective during the interim, and further analysis comparing the emission reductions and other control options to the visibility benefits from the BART and Reasonable Progress controls required for the Boardman facility by rule. For further details, see Section 12.6.1 of the Long-Term Strategy.~~

10.5 Emission Reductions and Visibility Improvements Achieved from BART Process

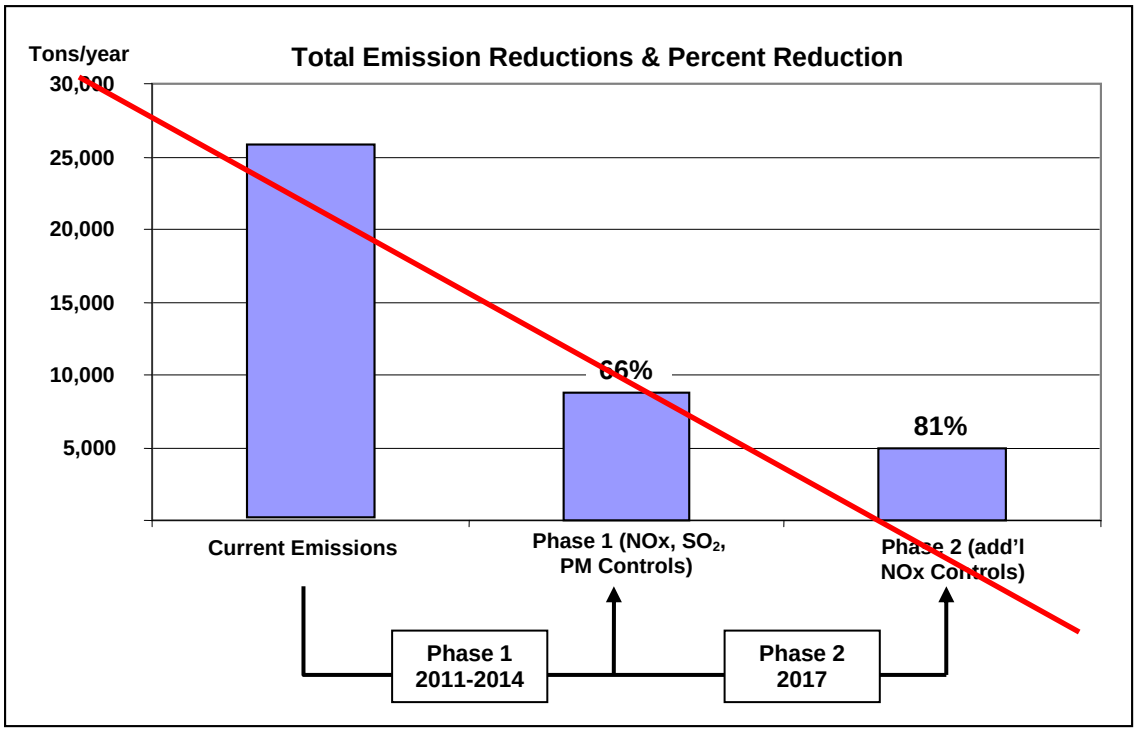
As described in Section 10.3.4, the modeling conducted for BART sources cannot be compared directly to visibility conditions on the 20% worst days or 20% best days, as contained in this regional haze plan. The visibility improvements from the BART process can only be shown by each individual source. The CMAQ modeling, described in Section 9.3.1, is a large regional scale model for showing visibility improvements expected under this regional haze plan. This modeling included assumptions of BART reductions for known BART sources across the West. However, it does not contain the results of the BART process, due to this modeling work being conducted prior to the completion of Oregon's and other states' BART reviews.

The visibility improvements described below reflect the controls identified for PGE Boardman in Section 10.4.2. For further information, see DEQ's 2010 BART report and addendum for the PGE Boardman Plant, in Appendix D-7 and D-8.~~the report DEQ Modeling Analysis of Visibility and Acid Deposition Impacts and Benefits – PGE Boardman, provided in Appendix D-2.~~

10.5.1 PGE Boardman 2020 Closure and ~~Phase 1 and 2~~ Visibility Improvement~~s~~

~~Figure 10.5.1-1 shows the emission reductions from Phase 1 and Phase 2 controls at PGE Boardman, described in the previous section. Overall, the total emission reductions of SO_2, NO_x, and PM will be about 17,000 tons/year under Phase 1, and result in an overall total of 21,000 tons/year under Phase 2. This represents a 66 percent reduction in Boardman's emissions by 2011-2014, and an 81 percent by 2017.~~

~~**Figure 10.5.1-1 Phase 1 and Phase 2 Emission Reductions for PGE Boardman**~~



~~Table 10.5.1-1 Emission Reductions and Visibility Benefits from Phase 1 and Phase 2 Controls for PGE Boardman~~

~~Reduction/Improvement Measure~~	~~Phase 1~~ ~~7/1/2014~~	~~Phase 2~~ ~~1/1/2017~~
~~Total emission reductions (NO_x, SO_2, PM tons/yr)[21]~~	~~16,900 (66% reduction)~~	~~20,800 (81% reduction)~~
~~Mt. Hood visibility impact[22] [23]~~	~~2.5 dv (45% improvement)~~	~~1.0 dv (78% improvement)~~
~~Number Class I Areas >1.0 dv[24]~~	~~6~~	~~0~~
~~Average Class I Area visibility impact~~	~~1.1 dv~~	~~0.4 dv~~
~~Total visibility impacts (sum of 98th percentile for all Class I areas)~~	~~56% improvement~~	~~82% improvement~~
~~Columbia River Gorge visibility impact~~	~~2.1 dv (44% improvement)~~	~~0.8 dv (78% improvement)~~
~~Columbia River Gorge days/year >1.0 dv impact[25]~~	~~34 (41% improvement)~~	~~3 (94% improvement)~~

[21] ~~Rounded to the nearest 100 tons. Current PGE Boardman total emissions 25,700 tons/yr~~
[22] ~~98th percentile, which is the 22nd highest daily value for the 2003-05 modeling period.~~
[23] ~~Current impact equals 4.6 dv~~
[24] ~~Current Class I areas >1 dv is 14 (within 300 km modeling distance).~~
[25] ~~Current impact is 63 days/year over 1 dv.~~

~~Table 10.5.1-1 summarizes both the emission reductions and visibility benefits from Phase 1 and 2 controls. The highest impacted Class I area (Mt. Hood) would see a 45% and 78% improvement under Phase 1 and Phase 2 controls, respectively. This table shows that there is a significant decrease in the number of days of visibility impact and the magnitude of those impacts, in all 14 Class I wilderness affected by the Boardman power plant, as well as the Columbia River Gorge National Scenic Area. Of note is the reduction in the number of Class I areas with impacts over 1 dv. Of the 14 Class I areas with impacts over 1 dv, only five would be over this level under Phase 1 and none would be over under Phase 2. Other visibility benefits would be achieved in the Columbia River Gorge, as noted in the table.~~

Table 10.5.1-1 below summarizes the emission reductions and visibility benefits from the BART controls associated with the 2020 closure for PGE Boardman. Overall, this would eliminate a total of approximately 25,500 tons of air pollution per year and provide significant visibility benefits, and additionally reduce acid deposition, toxic air contaminants, and mercury emissions, including about four million tons of greenhouse gas emissions. Prior to closure, PGE Boardman emissions would be reduced by about 19 percent in 2011, 39 percent in 2014, and up to 48 percent in 2018. The corresponding improvement in visibility at the highest impacted Class I area – the Mt. Hood Wilderness Area, would be 1.45 dv in 2011, 2.41 dv in 2014, and 2.75 dv in 2018. Upon closure in 2020, the total visibility improvement would be 4.98 dv, which is the baseline impact from the Boardman plant.

Table 10.5.1-1 Emission Reductions and Visibility Benefits from BART and 2020 Closure for PGE Boardman

BART control technology	Compliance Date	Emission reduction in tons/year and percent	Mt. Hood Visibility Impacts (dv*)	Visibility Improvement (dv*)
Baseline	----	---	4.98	---
LNB/MOFA	7/1/11	4,800 (19%)	3.54	1.44
+ DSI-1 *	7/1/14	9,950 (39%)	2.57	2.41
+ DSI-2 *	7/1/18	12,400 (48%)	2.23	2.75
+ Plant Closure	12/31/20	25,500 (100%)	none	4.98

* Subject to pilot study evaluation

Notes:
Baseline = visibility impact with no controls
LNB/MOFA = Low NO_x burners with modified overfire air system.
adds DSI 1 = Dry Sorbent Injection @ 0.40 lb/mmBTU SO_2 emission limit
adds DSI 2 = Dry Sorbent Injection @ 0.30 lb/mmBTU SO_2 emission limit.

~~Table 10.5.1-2 shows the individual visibility improvement at each of the 14 Class I areas under Phase 1 and Phase 2 controls. As noted in the previous table on the Class I area impacts over 1 dv, there are only 4 Class I areas with impacts over 0.5 dv under Phase 2 controls. This is significant in terms of 0.5 dv being the visibility impact threshold, and the level that BART-eligible sources taking a FEPL need to be under (see Section 10.4.1).~~

~~**Table 10.5.1-2 Summary of Class I Area Visibility Improvements from Phase 1 and Phase 2 Controls for PGE Boardman**~~

~~Class I Areas Affected~~	~~Highest Impact (dv)*~~	~~Phase 1 NO_x, SO_2, PM (dv)*~~	~~Phase 2 NO_x (dv)*~~
~~**Oregon Class I Area**~~			
~~Mt. Hood Wilderness~~	~~4.60~~	~~2.51~~	~~0.99~~
~~Mt. Jefferson Wilderness~~	~~3.12~~	~~1.50~~	~~0.59~~
~~Three Sisters Wilderness~~	~~2.29~~	~~0.96~~	~~0.40~~
~~Mt. Washington Wilderness~~	~~2.33~~	~~1.01~~	~~0.40~~
~~Eagle Cap Wilderness~~	~~2.23~~	~~0.95~~	~~0.36~~
~~Hells Canyon Wilderness~~	~~1.95~~	~~0.80~~	~~0.33~~
~~Strawberry Mountain Wilderness~~	~~1.72~~	~~0.66~~	~~0.28~~
~~Diamond Peak Wilderness~~	~~1.03~~	~~0.38~~	~~0.15~~
~~**Washington Class I Area**~~			
~~Mt. Adams Wilderness~~	~~2.68~~	~~1.29~~	~~0.52~~
~~Goat Rocks Wilderness~~	~~2.42~~	~~1.00~~	~~0.44~~
~~Alpine Lakes Wilderness~~	~~2.24~~	~~0.91~~	~~0.36~~
~~Mt. Rainer National Park~~	~~2.02~~	~~0.88~~	~~0.35~~
~~Glacier Peak Wilderness~~	~~1.40~~	~~0.57~~	~~0.21~~
~~North Cascades National Park~~	~~1.06~~	~~0.42~~	~~0.16~~
~~**Idaho Class I Area**~~			
~~Hells Canyon (Idaho portion)~~	~~1.95~~	~~0.80~~	~~0.33~~
~~**National Scenic Areas (non-Class I)**~~			
~~Columbia River Gorge (NSA)~~	~~3.71~~	~~2.09~~	~~0.81~~
~~**Beyond 300 km (outside blue circle)**~~			
~~Crater Lake National Park~~	~~1.06~~	~~0.30~~	~~n/a~~

~~*in deciview, 98th percentile of 3-year baseline (2003-05)~~

Table 10.5.1-2 shows the visibility improvement at each of the 14 Class I areas from the BART controls associated with the 2020 closure for PGE Boardman. Reflected in this table is the installation of Low- NO_x burners in 2011 and DSI controls in 2014. DSI-1 is the visibility improvement in 2014, followed by DSI-2 which is the visibility improvement in 2018 under a lower SO_2 emission limit. Option 3 is the visibility improvement by 2015/16 with Low-NO_x burners, and is provided for informational purposes, if PGE chooses this option. It should be noted that after closure, the highest visibility impact shown in the first column would be zero.

Table 10.5.1-2 Summary of Class I Area Visibility Improvements from BART and 2020 Closure, including DEQ Option 3, for PGE Boardman

Class I Areas Affected	Highest Impact (dv*)	+ DSI-1 2014* (dv)	+ DSI-2 2018* (dv)	DEQ Option 3 (dv)
Oregon Class I Area				

Class I Areas Affected	Highest Impact (dv*)	+ DSI-1 2014* (dv)	+ DSI-2 2018* (dv)	DEQ Option 3 (dv)
Mt. Hood Wilderness	4.98	2.41	2.75	1.45
Mt. Jefferson Wilderness	3.12	1.59	1.76	0.76
Three Sisters Wilderness	2.29	1.17	1.29	0.67
Mt. Washington Wilderness	2.33	1.23	1.36	0.62
Eagle Cap Wilderness	2.23	1.13	1.80	0.61
Hells Canyon Wilderness	1.95	1.02	1.12	0.52
Strawberry Mountain Wilderness	1.72	0.90	1.03	0.44
Diamond Peak Wilderness	1.03	0.56	0.60	0.27
Washington Class I Area				
Mt. Adams Wilderness	2.68	1.38	1.51	0.79
Goat Rocks Wilderness	2.42	1.26	1.39	0.72
Alpine Lakes Wilderness	2.24	1.17	1.30	0.67
Mt. Rainer National Park	2.02	1.05	1.14	0.54
Glacier Peak Wilderness	1.40	0.74	0.82	0.39
North Cascades National Park	1.06	0.57	0.63	0.31
Idaho Class I Area				
Hells Canyon (Idaho portion)	1.95	1.02	1.12	0.52

* Subject to pilot study evaluation

Notes:

- Both DSI controls include Low-NO_x burner with modified overfire air.
- + DSI 1 = Dry Sorbent Injection @ 0.40 lb/mmBTU SO_2 emission limit.
- + DSI 2 = Dry Sorbent Injection @ 0.30 lb/mmBTU SO_2 emission limit.
- DEQ Option 3 is 2015/16 closure with just LNB/MOFA controls.

Not reflected in Table 10.5.1-2 is the visibility improvement in the number of days where impacts from PGE Boardman would be over 0.5 or 1 deciview. Comparing the highest impact to the DSI-2 emission limit in 2018, the total number of visibility impact days in all 14 Class I areas from PGE Boardman would be 58% less on days over 0.5 dv, and 76% less on days over 1 dv.

10.5.2 FEPL Source Visibility Improvements

The four BART-eligible sources described in Section 10.4.1 are taking a federally enforceable permit limit to reduce their visibility impact to below the 0.5 dv level that represents a significant visibility impact. Most of the FEPL sources had modeled impacts just over the 0.5 dv contribution threshold, and therefore needed relatively small reductions to get under that threshold. While modeling was used to determine the emission level needed to get under the threshold, no additional modeling was conducted to estimate the total visibility improvement from the FEPL sources. Overall, it is believed to be very small.

10.6 Oregon's BART rule

Included in the adoption of this Regional Haze Plan is Oregon's BART rule, OAR 340-223-0010 through 340-223-00~~5~~90. This rule is based largely on EPA's BART rule and related Appendix Y, which includes requirements for BART-eligible sources in the state, including PGE Boardman, and FEPL sources. The Oregon BART rules were adopted in 2009, and then revised in 2010 to reflect an early 2020 closure date, and an optional 2015-16 closure date if chosen by PGE. These rules can be found in Appendix E.

CHAPTER 11: REASONABLE PROGRESS GOAL DEMONSTRATION

11.1 Overview

The Regional Haze Rule sets a 60 year timeline for states to improve visibility within Class I areas from the baseline (2000-2004) conditions to natural conditions (2064). Additionally, States are required to show "reasonable progress" over this time period in making incremental improvements, with 2018 as the first benchmark or milestone year.

The rule requires the State establish a Reasonable Progress Goal (RPG) for each Class I area that identifies the visibility improvement for the most-impaired (20% worst) days, and ensures no degradation in visibility for the least-impaired (20% best) days. The State has flexibility in establishing different RPGs for each Class I area.

As described in Chapter 5, in order to set the RPG, the State first calculates the Uniform Rate of Progress (URP) for each Class I area. The URP is simply a straight line (also known as the "glide slope") between current (baseline) conditions and natural conditions over the 60-year period. Along the glide slope, the URP for 2018 needs to be identified, as this is the first planning period (2018 milestone year) that needs to be met when establishing the RPG. The URP for each Oregon Class I area is shown in Chapter 6.

In selecting RPGs, the State must consider the 2018 URP and the emission reductions projected from all regional haze control strategies. The 2018 URP is not a presumptive target. When establishing RPGs, the State may determine RPGs at greater, lesser or equivalent visibility improvement than the URP. In cases where the RPG results in less improvement in 2018 than the URP, the State must demonstrate why the URP is not achievable, and why the RPGs are "reasonable".

A key step in establishing the RPGs is the four-factor analysis: the costs of compliance; the time necessary for compliance; the energy and non-air quality environmental impacts of compliance; and the remaining useful life of any potentially affected sources. States must demonstrate how these factors were taken into consideration in selecting the goal for each Class I area.[26] In cases where the RPGs show a slower rate of visibility improvement than the 2018 URP milestone, the State can still demonstrate reasonable progress, by showing it evaluated additional measures using the four-factor analysis, and other justification and documentation.

11.2 Steps in Demonstrating Reasonable Progress

The following steps were followed in setting the RPGs for each of Oregon's Class I areas:

[26] In addition to these four factors, other factors can be used, as appropriate, to evaluate the need to control source categories which are not well characterized by the four factors.

1. Compare Baseline to Natural conditions

For each Class I area, identify baseline (2000-2004) visibility and natural conditions in 2064, for the 20% worst and best days. See Chapter 6.

2. Identify the Uniform Rate of Progress (URP)

For each Class I area, calculate the URP glide path from baseline to 2064, including the 2018 planning milestone, for the 20% worst days. Show the URP glide path in both total deciview and by pollutant in deciview. Next, identify the improvement needed by 2018 and 2064, respectively. See Chapter 6.

3. Identify contributing pollutant species

For each Class I area, identify the pollutant species that are contributing to visibility impairment on the current (baseline) 20% worst and 20% best days. See Chapter 7.

4. Identify major emission sources within the State and trends

Using the WRAP Emission Inventory for 2002 and 2018, describe statewide emissions by source category and pollutant, and identify projected emission trends from current (2002) to the 2018 planning milestone. See Chapter 8.

5. Analyze the larger source categories contributing to impairment

For each Class I area, determine the relative contribution of anthropogenic and nonanthropogenic sources in Oregon and neighboring states to the 20% worst and best days, using monitoring data, source apportionment and modeling results, comparing baseline (2000-04) to 2018 “on-the-books” emissions reductions expected. Review these results by pollutant. See Chapter 9.

6. Document the emission reductions from BART

Describe the results of the BART process, and identify the emission reductions that will be achieved from BART and other mechanisms. See Chapter 10, Section 10.5.

7. Identify projected visibility change in 2018 from “on-the-books” controls and BART

For each Class I area, determine the visibility improvement expected in 2018 from on-the-books controls and BART, using the WRAP CMAQ modeling results, for the 20% worst and best days. Identify the extent of visibility improvement related to the 2018 URP milestone, in total deciview and in extinction by pollutant. See Chapter 9.

8. Identify sources or source categories that are major contributors and apply the 4-statutory factor analysis

As a result of the analysis under step 5 above, for each Class I area, determine key pollutant species and source categories that have the greatest impact on visibility in Oregon Class I areas, to be analyzed using the 4-factor analysis. See Section 11.3 below.

9. Describe the results of the 4-factor analysis.

Section 11.3 below describes the results of the 4-factor analysis.

10. Set the Reasonable Progress Goals (RPG) based on steps 7, 8, and 9

Set the RPG for each Class I area in deciview, based on the improvement in 2018 for the 20% worst and best days, from on-the-books controls, BART, and the results of the 4-factor analysis on major source categories. See Section 11.4 below.

11. Compare RPG to the 2018 URP milestone. Provide an affirmative demonstration that reasonable progress is being made based on pollutant trends, emission reductions, and improvements expected under the Long-Term Strategy.

For each Class I area, compare the RPG developed in step 10 to the 2018 URP milestone. Provide an affirmative demonstration that reasonable progress is being made based on pollutant trends, emission reductions from major anthropogenic source categories, and on-the-books controls. Describe the results of the 4-factor analysis in step 9 above, and how future actions identified in the Long-Term Strategy are expected to improve visibility in the next 10 years to the 2018 milestone, and beyond.

11.3 Summary of Four-Factor Analysis

Section 308(d)(1)(i)(A) of the Regional Haze Rule requires that states consider the following factors and demonstrate how they were taken into consideration in selecting the reasonable progress goals:

- costs of compliance
- time necessary for compliance
- energy and non-air quality environmental impacts of compliance, and
- remaining useful life of any potentially affected sources.

In conducting this four-factor analysis, EPA guidance indicates that States have "considerable flexibility" in how these factors are taken into consideration, in terms of what sources or source categories should be included in the analysis, and what additional control measures are reasonable.[27]

[27] EPA "Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program", June 2007.

11.3.1 Rationale and Scope of the Four-Factor Analysis

The Department looked at key pollutants and certain source categories and the magnitude of their emissions in applying the four factors. Based on the flexibility in how to apply the statutory factors, the following rationale was used in defining the scope of this analysis:

1. Focus on 20% worst days

Since the Regional Haze rule primarily focuses on demonstrating reasonable progress for the 20% worst days, the four-factor analysis in this section addresses only the worst days. It is a reasonable assumption that emission reductions benefiting the worst days also benefits the best days. Moreover, the CMAQ modeling projections in Chapter 9 and reasonable progress demonstration in this chapter both indicate that the 20% best days are maintained for all Oregon Class I areas, and in most cases are under the 2018 URP (see Table 9.3-1 and 11.4-1).

2. Focus on anthropogenic sources

Since the purpose of this analysis is to evaluate certain sources or source categories for potential controls, the four-factor analysis in this section addresses only anthropogenic sources, on the assumption that the focus should be on sources that are "controllable". Although nonanthropogenic sources such as wildfire and dust are major contributors to regional haze, the Department does not believe this analysis is applicable to these sources.[28] In considering which anthropogenic sources or source categories to apply the statutory factors, Department considered point, area, mobile, and fire (controlled burning).

For mobile sources, there are major emissions reductions projected by 2018, based on numerous "on-the-books" federal and state regulations, as described in detail in Section 11.4.3, and in Section 12.5.1 as part of on-going implementation under the LTS. There are also significant visibility improvements projected by 2018 due to these reductions, as Chapter 9 PSAT results indicate. Based on the above findings, the Department did not believe applying the four-factor analysis to mobile sources was needed.[29]

For fire sources, forestry and agricultural burning are large anthropogenic sources. As described in detail in Section 12.5.5, both of these activities are controlled under state-run smoke management programs which meet most of the Enhanced Smoke Management Program (ESMP) requirements, and as such represent an advanced level of smoke management. Both of these activities are also addressed under the Oregon Phase I Visibility program. In Section 12.6.2 of the LTS, the Department has identified future efforts to evaluate new methods of protecting Class I areas from forestry burning. Based on current controls and future efforts, the

[28] This reference to dust is to "natural" sources of dust, and not road dust, agricultural farming practices, and other anthropogenic activities.

[29] As noted in Section 12.5.1, Oregon has adopted state programs to reduce mobile source emissions, in addition to the federal regulations, and will be implementing these programs in upcoming years. It is possible new programs may be adopted as well. Given this state level effort, the Department did not believe applying the four statutory factors would be productive or necessary.

Department did not believe applying the four-factor analysis to forestry and agricultural burning was needed.[30]

As a result of the above consideration, the Department elected to focus the four-factor analysis on point and area sources only. Further refinement of this approach is provided below.

3. Focus on SO_2 and NO_x pollutants

Although there are six visibility-impairing pollutants, SO_2 and NO_x (i.e., sulfate and nitrate) are typically associated with anthropogenic sources. As noted in Chapter 8, sulfates and nitrates are about three times more effective at impairing visibility than $PM_{2.5}$. Since a large component of particulate (both fine and course) is associated with nonanthropogenic sources, such as wildfire and natural windblown dust, this pollutant was not included in the analysis.[31]

11.3.2 Identification of Point and Area Sources for the Four-Factor Analysis

The Department believes the focus on point and area sources of SO_2 and NO_x for applying the four-factor analysis is consistent with EPA guidance, in terms of flexibility to consider which major source categories are "reasonable" to evaluate for the first planning period of the regional haze plan.

As described in Chapter 8 and 9, it is important to note that there are significant reductions projected in 2018 in SO_2 and NO_x emissions and impacts from point and area sources. This trend was a consideration in the four-factor analysis, in terms of what source categories the Department considered for this analysis. Large reductions in SO_2 and NO_x emissions were also used as supporting evidence in the demonstration that the reasonable progress goals selected for Oregon were "reasonable", as described in Section 11.4.2.

The first step in the four-factor analysis is to identify the sulfate and nitrate contribution within Oregon. Table 11.3.2-1 below shows the modeled sulfate and nitrate impacts on the 20% worst days in 2018, based on PSAT modeling results, at each Oregon Class I area. This table shows that the range of the Oregon portion on the worst days is from 4-20% for sulfate, and 10-30% for nitrate, which is relatively small compared to sources outside the state. The year 2018 is used here to show projected contribution, in order to assess what further emission reductions would be beneficial in achieving reasonable progress.

[30] The Department also questioned the appropriateness or usefulness of applying the four-factor analysis to sources such as prescribed burning, as the factors do not lend themselves well to this type of source.

[31] The Department recognizes that by focusing on source categories of SO_2 and NOx, this is excluding some point and area sources of PM. The Department does not intend to evaluate all pollutants and all anthropogenic sources in this first Regional Haze Plan. However, it should be noted that under the evaluation of non-BART sources in the LTS of this plan, PM point sources will be included, along with SO_2 and NOx.

Table 11.3.2-1 Oregon Share of Modeled Sulfate and Nitrate in 2018 - 20% Worst Days

Region	Oregon Class I Area	Sulfate			Nitrate		
		2018 Total Sulfate (µg/m3)	2018 Oregon Sulfate (µg/m3)	2018 Oregon Sulfate Share (%)	2018 Total Nitrate (µg/m3)	2018 Oregon Nitrate (µg/m3)	2018 Oregon Nitrate Share (%)
Northern Cascades	Mt. Hood Wilderness Area	1.02	0.16	16%	0.83	0.30	30%
Central Cascades	Mt. Jefferson, Mt. Washington, and Three Sisters Wilderness Areas	0.75	0.12	12%	0.66	0.25	25%
Southern Cascades	Diamond Peak, Mountain Lakes, and Gearhart Mountain Wilderness Areas and Crater Lake National Park	0.53	0.07	7%	0.51	0.13	13%
Coast Range	Kalmiospis Wilderness Area	0.84	0.20	20%	0.81	0.22	22%
Eastern Oregon	Strawberry Mountain and Eagle Cap Wilderness Areas	0.68	0.06	6%	0.88	0.21	21%
Eastern Oregon/ Western Idaho	Hells Canyon Wilderness Area	0.53	0.04	4%	0.88	0.10	10%

The next step in the analysis is to identify the larger point and area source categories in Oregon. Table 11.3.2-2 below identifies SO_2 and NO_x point and area source categories in Oregon, based on their projected emissions in 2018, as identified in Chapter 8 (the PRP18a emission inventory). These categories are External Combustion Boilers, Industrial Processes, Internal Combustion Engines, Stationary Fuel Combustion, and Waste Disposal. The table shows the tons per year of each, as the extent of the contribution. Excluded from these sources categories are Oregon sources already evaluated under BART (see Chapter 10).

Table 11.3.2-2 Oregon Largest Source Categories

Pollutant	Type	Source Category	Extent of Contribution
SO_2	Point	External Combustion Boilers	858 tons/year
	Point	Industrial Processes	377 tons/year
	Area	Stationary Source Fuel Combustion	5,699 tons/year
	Area	Misc. (Agriculture Orchard Heaters)	2,243 tons/year
NO_x	Point	External Combustion Boilers	4,995 tons/year
	Point	Industrial Processes	3,639 tons/year
	Point	Internal Combustion Engines	3,688 tons/year
	Area	Stationary Source Fuel Combustion	13,454 tons/year
	Area	Waste Disposal, Treatment, and Recovery	2,881 tons/year

11.3.3 The Four-Factor Analysis

Starting with the larger source categories (SSC1), the Department identified the applicable subcategories (SCC3 and SCC6), and the list of individual sources (SCC8) that fall under these categories. The Department included all sources over 50 tons per year. BART-eligible sources were not included. The individual sources listed are only for illustrative purposes, and do not represent sources determined to be "significant" contributors to Class I visibility impairment. Only the source categories (SCC1) are being evaluated here.[32]

In conducting the four-factor analysis, the Department relied on information from EPA's AirControlNET website, which is a control technology analysis tool EPA developed to support its analyses of air pollution policies and regulations. The tool provides data on emission sources, potential pollution control measures and emission reductions, and the costs of implementing those controls. AirControlNET is a relational database system in which control technologies are linked to sources in EPA's emissions inventories.[33] The system contains a database of control measure applicability, efficiency, and cost information for reducing the emissions contributing to ambient concentrations of ozone, PM_{10}, $PM_{2.5}$, SO_2, NO_x, as well as visibility impairment (regional haze) from point, area, and mobile sources.

Following the discussion below are conclusions from the four-factor analysis in Section 11.3.4.

1. External Combustion Boilers

This source category consists of point sources with emissions totaling 858 tpy of SO_2 and 4,995 of NO_x. Included here are mostly industrial boilers that burn wood waste, oil, and natural gas. The largest subcategory of sources is industrial boilers burning wood/bark waste (SCC6). The

[32] It should also be noted that the individual sources listed do not necessary represent those which will be part of the non-BART source evaluation described in the LTS section. The official list of non-BART sources will be identified at a future time, after a review and updated inventory of these sources and their emissions is completed.

[33] For the purpose of this four-factor analysis, the Department relied upon the accuracy of EPA's emission inventory in AirControlNET, and did not compare it to our own emissions inventory.

two tables below list the individual SO_2 and NO_x sources that comprise this category, and are provided for illustrative purposes, and is not intended to identify sources subject to additional controls.

2018b SO2 Point Sources				
SCC1	SCC3	SCC6	SCC8	TPY
External Combustion Boilers	Industrial	Wood/Bark Waste	Smurfit Newsprint Corporation	516
		Residual Oil	West Linn Paper Company	270
		Process Gas	Chevron Products Company	72
			Total External Combustion Boilers	858

2018b NOx Point Sources				
SCC1	SCC3	SCC6	SCC8	TPY
External Combustion Boilers	Industrial	Wood/Bark Waste	Biomass One, L.P.	205
			Co-Gen Co. LLC	162
			Co-Gen II	177
			Columbia Forest Products, Inc.	61
			Crown Pacific Limited Partnership	106
			Jeld-Wen, Inc.	61
			Kinzua Resources, Pilot Rock Sawmill	63
			McKenzie Forest Products, LLC	176
			Pacific Wood Laminates, Inc.	53
			Roseburg Forest Products Co.	1,059
			SierraPine, A California Limited Partner	210
			Smurfit Newsprint Corporation	802
			Stimson Lumber Company	104
			Tillamook Lumber Company	69
			Willamette Industries, Vaughn	72
			Blue Heron Paper Company	291
			Smurfit Newsprint Corporation	108
		Natural Gas	Tillamook Lumber	58
			West Linn Paper Company	362
	Electric Generation	Wood/Bark Waste	Covanta Marion, Inc.	391
		Solid Waste	Northwest Pipeline Corp.	404
	Commercial/Institutional	Natural Gas	Total External Combustion Boilers	4,995

Based on the review of the above SO_2 and NO_x subcategories, the Department is focusing the four-factor analysis on the NO_x industrial boilers of wood waste, as this represents the majority of sources (16), and a total 3,672 tpy, or 63% of the External Combustion Boiler source category for both pollutants.

Cost of Compliance

NO_x controls for industrial boilers of wood or bark waste consist of the following. *Over-fire Air Systems* involve air that is introduced high in the boiler in order to achieve staged combustion. *Selective Non-Catalytic Reduction* is an add-on control technology that allows ammonia to react with NO_x without the need for a catalyst to form water and molecular hydrogen. *Selective Catalytic Reduction* is similar an add-on control technology that allows ammonia to react with NO_x and form N2 and water. The SCR catalyst enables this reaction to occur at lower temperatures than SNCR. However, SCR controls for wood burning can be problematic, as trace elements such as Na and K in the wood has been shown to foul catalysts. So this option is likely infeasible. The cost and other information on these control options are listed below.

Table 11.3.3-1 Summary of NO_x Control Options for External Combustion Boilers (Industrial Wood/Bark Waste)

Control Option	Control Efficiency	Cost Effectiveness ($/ton)
Overfire Air (OFA) Systems	30% or more	$500-$1,500
Selective Non-catalytic reduction (SNCR)	20-30%	$1,500-$10,000
Selective Catalytic Reduction (SCR)	80-90%	not cost effective*

* based on information above of catalyst failure from wood combustion

Time Necessary for Compliance

Overall time for compliance is expected to be 4-5 years. Up to 2 years would be required to develop and adopt rules necessary to require these controls. Typical timeframe for installing these NO_x controls would be 2-3 years after rule adoption.

Energy and Non-Air Quality Environmental Impacts of Compliance

These controls do not have significant energy impacts. There are environmental impacts associated with SNCR and SCR in terms of ammonia emissions, also known as "ammonia slip". Ammonia slip can be greater with SNCR than SCR, due to the former being less efficient in removing NO_x. With SCR there is the need for disposal of spent catalyst. The catalysts used in SCR must be replaced every 2-5 years. Catalysts contain heavy metals that are hazardous wastes.

Remaining Useful Life of Affected Sources

It is difficult to estimate the remaining life of any potentially affected sources. Remaining useful life is specific to the facility for which controls are considered.

2. Stationary Source Fuel Combustion

This source category consists of area sources, with emissions totaling 5,699 tpy of SO_2 and 13,354 tpy of NO_x. Included here are industrial, commercial, and residential sources that burn distillate and residual oil, natural gas, and other fuels. The two tables below list the SO_2 and NO_x emissions.

2018b SO2 Area Sources				
SCC1	SCC3	SCC6	SCC8	TPY
Stationary Source Fuel Combustion	Industrial	Distillate Oil		1,800
		Residual Oil		449
		Kerosene		60
	Commercial/Institutional	Distillate Oil		1,376
		Residual Oil		398
		Kerosene		63
	Residential	Distillate Oil		753
		Wood		642
		Kerosene		160
			Total Stationary Source Fuel Combustion	5,699

2018b NOx Area Sources				
SCC1	SCC3	SCC6	SCC8	TPY
Stationary Source Fuel Combustion	Residential	Wood		4,470
		Natural Gas		2,172
		Distillate Oil		318
		Liquified Petroleum Gas		206
		Kerosene		68
	Industrial	Natural Gas		2,654
		Liquified Petroleum Gas		674
		Distillate Oil		445
		Residual Oil		90
	Commercial/Institutional	Natural Gas		1,536
		Distillate Oil		642
		Residual Oil		80
			Total Stationary Source Fuel Combustion	13,354

The largest subcategory listed above is residential wood and natural gas combustion (6,642 tpy of NO_x, combined). These represent the woodstoves and home heating devices found throughout Oregon. The Department's residential woodheating rules in OAR 340, Division 262, require that only certified woodstoves can be sold in the state. Certified woodstoves can reduce emissions by 70%. These rules also authorize woodstove curtailment programs in any city that is designated in nonattainment with the PM national ambient air quality standard. The woodstove curtailment programs in these communities have been very effective in reducing pollution levels during the winter months. As a result of current state requirements and programs for residential wood heating, the Department is not including this subcategory in the four-factor analysis. Similarly, the low emissions generated by natural gas home heating devices do not warrant this analysis either.

The remaining sizeable subcategories above are industrial and commercial/institutional combustion, involving mostly natural gas and distillate oil. These emissions are believed to come from smaller generators and engines. As such, these emission estimates are somewhat uncertain. The control options available for those burning natural gas are very limited, since this fuel already produces very low emissions, and any post-combustion controls are not realistic from a cost standpoint. For those burning distillate oil, fuel switching to lower sulfur fuel (<1%) is an option, but not likely to produce any significant reduction in emissions, and any post-combustion controls are not cost realistic.

As a result of close review of this source category, the Department does not believe the four-factor analysis is appropriate, and would not yield any useful results.

3. Industrial Processes

This source category consists of SO_2 and NO_x point sources, with emissions totaling 377 tpy of SO_2 and 3,639 tpy of NO_x. Included here are kraft pulping, glass and cement plants, and steel manufacturing sources. The two tables below list the individual SO_2 and NO_x sources that comprise this category, and are provided for illustrative purposes, and is not intended to identify sources subject to additional controls.

2018b SO2 Point Sources				
SCC1	SCC3	SCC6	SCC8	TPY
Industrial Processes	Mineral Products	Glass Manufacture	Owens-Brockway Glass Container Inc	180
		Cement Manufacturing (Dry)	Ash Grove Cement Company	63
	Secondary Metal Production	Steel Foundries	Cascade Steel Rolling Mills, Inc.	72
	Primary Metal Production	Steel Manufacturing	Oregon Steel Mills, Inc.	63
			Total Industrial Processes	377

2018b NOx Point Sources				
SCC1	SCC3	SCC6	SCC8	TPY
Industrial Processes	Pulp/Paper and Wood Products	Plywood Operations	Timber Products Co.	68
	Mineral Products	Cement Manufacturing (Dry)	Ash Grove Cement Company	2,290
		Glass Manufacture	Owens-Brockway Glass Container Inc.	605
	Secondary Metal Production	Steel Foundries	Cascade Steel Rolling Mills, Inc.	373
	Primary Metal Production	Steel Manufacturing	Oregon Steel Mills, Inc.	303
			Total Industrial Processes	3,639

The only sizable subcategory above is SCC6 for cement manufacturing, which represents 2,290 tpy of NO_x, or 57% of the Industrial Processes category. These emissions will be focus of the four-factor analysis for this source category. The SO_2 emissions from cement manufacturing are low (63 tpy) and therefore not included in the analysis.

Cost of Compliance

There are several options for NO_x controls for dry process cement manufacturing plants. *Low* NO_x *Burners* reduce the amount of NO_x formed in the flame. *Mid-Kiln Firing* is a form of secondary combustion where a portion of the fuel is fired in a location other than the burning zone. This reduces thermal NO_x generation because the temperature in the secondary combustion zone is lower. *Selective Non-Catalytic Reduction* is an add-on control technology that allows ammonia to react with NO_x without the need for a catalyst to form water and molecular hydrogen. *Selective Catalytic Reduction* is an add-on control technology that allows ammonia to react with NO_x and form N2 and water. The SCR catalyst enables this reaction to occur at lower temperatures than SNCR. Cost and other information on these control options are listed below.

Table 11.3.3-2 Summary of NO_x Control Options for Cement Manufacturing

Control Option	Control Efficiency	Cost Effectiveness ($/ton)
Mid-Kiln Firing	25%	$500-$750
Low NO_x Burners	25%	$300-$600
Selective Non-Catalytic Reduction (SNCR)	50%	$700-$1,000
Selective Catalytic Reduction (SCR)	80%	$2,000-$5,000

Time Necessary for Compliance

Overall time for compliance is expected to be 4-5 years. Up to 2 years would be required to develop and adopt rules necessary to require these controls. Typical timeframe for installing these NO_x controls would be 2-3 years after the rule was adopted.

Energy and Non-Air Quality Environmental Impacts of Compliance

These controls do not have significant energy impacts. There are environmental impacts associated with SNCR and SCR in terms of ammonia emissions, also known as "ammonia slip". Ammonia slip can be greater with SNCR than SCR, due to the former being less efficient in removing NO_x. With SCR there is the need for disposal of spent catalyst. The catalysts used in SCR must be replaced every 2-5 years. Catalysts contain heavy metals that are hazardous wastes.

Remaining Useful Life of the Source

It is difficult to estimate the remaining life of any potentially affected sources. Remaining useful life is specific to the facility for which controls are considered.

4. Waste Disposal, Treatment, and Recovery

This source category consists of NO_x area sources with emissions totaling 2,881 tpy. Included here are residential open burning, municipal landfills, and on-site incineration at commercial and industrial facilities.

2018b NOx Area Sources				
SCC1	SCC3	SCC6	SCC8	TPY
Waste Disposal, Treatment & Recovery	Open Burning	Residential	Household Waste	1,498
		All Categories	Land Clearing Debris	731
	Landfills	Municipal		419
	On-site Incineration	Commercial/Institutional		159
		Industrial		73
			Total Industrial Processes	2,881

The largest source within this category is residential open burning, which like agricultural and forestry burning, is not suitable for applying the four-factor analysis. Instead, as described in Chapter 12, Section 12.6.3, the Department will conduct an evaluation of residential open burning to determine the extent of the contribution to visibility impairment, and the need for emission reductions, as part of the LTS of this plan. For the remainder of the emissions in this source category, the Department does not consider them to be sizeable enough to warrant the four-factor analysis.

5. Misc. (Agriculture Orchard Heaters)

This source category consists of SO_2 area sources with emissions totaling 2,243 tpy. This category represents agricultural orchard heaters, burning diesel fuel.

2018b SO2 Area Sources				
SCC1	SCC3	SCC6	SCC8	TPY
Miscellaneous Area Sources	Agriculture Production - Crops	Orchard Heaters	Diesel	2,243
			Total Industrial Processes	2,243

While the emissions in this source category (2,243 of SO_2) are not insignificant, the Department does not believe this type of source – orchard heaters – is appropriate for a four-factor analysis for several reasons. First, the Department's confidence in the emissions estimate

from orchard heaters is very low. Second, these heaters are used intermittently, during period of cold temperatures, to prevent frost damage, and for selected crops in diverse regions of the state. The probability that the intermittent use and spatial distribution of this source is a sizeable contributor to Class I area impairment is extremely low. Third, few control options are available. The Department was unable to find any information from EPA's AirControlNET nor other sources that could provide relevant information for completing a four-factor analysis.

6. Internal Combustion Engines

This source category consists of NO_x point sources with emissions totaling 3,688 tpy. Included here are electric generation and industrial engines burning natural gas. The table below lists the individual NO_x sources that comprise this category, and is provided for illustrative purposes, and is not intended to identify sources subject to additional controls.

2018b NOx Point Sources				
SCC1	SCC3	SCC6	SCC8	TPY
Internal Combustion Engines	Electric Generation	Natural Gas	Future Natural Gas EGU (Klamath Gene	887
			Future Natural Gas EGU (PGE Port We	1,153
			Hermiston Generating Company, L.P. ar	143
			Hermiston Power Plant	314
			Klamath Cogeneration Project	141
			Klamath Energy LLC	136
			Northwest Pipeline Corporation	245
	Industrial	Natural Gas	Gas Transmission Northwest Corporatio	669
			Total Industrial Processes	3,688

This source category consists of two types of engines: 1) natural gas fired reciprocating internal combustion engines, and 2) natural gas fires turbines that are either compressor, combustor, or power turbine. Emissions vary from engine to engine, model to model, and mode of operation. EPA's AirControlNET had no information on controls for this source category. Other information on this source category could not be found that would allow a four-factor analysis without a major investment of resources, and an exhaustive facility by facility review to evaluate each unit, which is beyond the scope and effort required in this first Regional Haze SIP. Given the relative low emissions represented by this source category, and the unknown level of contribution to visibility impairment, no further analysis was conducted.

11.3.4 Conclusions from the Four-Factor Analysis

Based on the four-factor analysis above, the Department concluded it is not reasonable to require controls for these source categories at this time. This analysis did provide useful information on possible control options and general costs, which will be included in a more in-depth analysis of additional control measures as described in Section 12.6.1 for the LTS. The Department will be developing guidance for conducting a comprehensive review of individual non-BART stationary sources over the next five years, to identify any additional emission reductions that could improve Class I area visibility by the 2018 milestone. Included in this review will be possible controls identified for non-BART sources, and schedule for implementation.

11.3.5 Identification of Additional Emission Reductions

Although the Department is not requiring any additional emission reductions based on the four-factor analysis, it should be noted that the BART requirements adopted for the PGE Boardman plant contain a 2020 closure date. Prior to this date, PGE would install BART controls and reduce total emissions by 48%. After 2020, all emissions from the plant, or approximately 25,500 tons per year of primarily SO_2 and NO_x would be eliminated. This will provide significant visibility benefits to the 14 Class I areas impacted by the Boardman plant (see description of visibility improvements in Section 10.5.1). In addition, the complete elimination of all emissions after 2020 greatly contribute to meeting the regional haze reasonable progress goals described below.~~additional NO_x controls required under the Phase 2 requirements for the PGE Boardman Power Plant, as described in Section 10.4.2, will result in an additional reduction of approximately 4,000 tons NO_x, and significant visibility improvements, when installed in 2017. The extent of the visibility improvements from Phase 2 controls in Oregon Class I areas impacted by PGE Boardman are described in Section 10.5.1.~~

11.4 Determination of Reasonable Progress Goals for Oregon's Class I Areas.

Under Section 308(d)(1) of the Regional Haze Rule, States must "establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions" for each Class I area of the State. These RPGs are interim goals that must provide for incremental visibility improvement for the most impaired visibility days, and ensure no degradation for the least impaired visibility days. The RPGs for the first planning period are goals for the year 2018. Based on the steps outlined in Section 11.2, the Department has established RPGs for each of Oregon's 12 Class I areas, as described below.

The RPGs identified in Table 11.4-1 are based on the Department's evaluation and consideration of: (1) the results of the CMAQ modeling described in Section 9.3, which includes on-the-books controls and other emission inputs (see Appendix C for list of CMAQ model emission inputs), (2) the results of the 4-factor analysis described in Section 11.3.3, (3) the BART review described in Chapter 10.[34] Information on~~, and (4)~~ the additional emission reductions from the BART controls associated with the 2020 closure for PGE Boardman were not available at the time of this determination of RPGs, but will be evaluated as part of the next plan update in 2013. See Section 12.7.~~"beyond BART" Phase 2 NO_x controls for PGE Boardman.~~

As shown in Table 11.4-1, the RPGs for the 20% best days not only show no degradation of visibility, but in all cases show a slight improvement over baseline conditions by 2018. The Department attributes this to ~~a combination of factors: (1)~~ the numerous "on-the-books" controls accounted for in the CMAQ modeling, and~~(2)~~ significant reductions in mobile sources emissions, as described in Section 11.4.3.~~, and (3) the "beyond BART" Phase 2 controls for~~

[34] As noted in Chapter 9, the CMAQ modeling conducted by the WRAP was prior to the completion of Oregon's and other state BART reviews, and was therefore based on "presumptive BART" for SO_2 controls on EGUs and other known BART sources in the West. See Appendix C for more information.

~~PGE Boardman.~~ The Department believes the list of measures it has included in the Long-Term Strategy of this plan will continue to ensure no degradation is achieved in the future.

For the 20% worst days, Table 11.4-1 shows that the RPGs are short of the 2018 URP goal for each Class I area (grouped according to region). Section 11.4.1 provides an affirmative demonstration why the RPGs for the 20% worst days is justified.

Table 11.4-1 Reasonable Progress Goals for 20% Worst Days and 20% Best Days for Oregon Class I Areas

Region	Oregon Class I Area	20% Worst Days			20% Best Days	
		Baseline Condition (dv)	2018 Uniform Progress Goal (dv)	2018 Reasonable Progress Goal (dv)	Baseline Condition (dv)	2018 Reasonable Progress Goal (dv)
Northern Cascades	Mt. Hood Wilderness Area	14.9	13.4	13.8	2.2	2.0
Central Cascades	Mt. Jefferson, Mt. Washington, and Three Sisters Wilderness Areas	15.3	13.8	14.3	3.0	2.9
Southern Cascades	Diamond Peak, Mountain Lakes, and Gearhart Mountain Wilderness Areas and Crater Lake National Park	13.7	12.3	13.4	1.8	1.5
Coast Range	Kalmiospis Wilderness Area	15.5	14.1	15.1	6.3	6.1
Eastern Oregon	Strawberry Mountain and Eagle Cap Wilderness Areas	18.6	16.3	17.5	4.5	4.1
Eastern Oregon/ Western Idaho	Hells Canyon Wilderness Area	18.6	16.2	16.6	5.5	4.7

11.4.1 Affirmative Demonstration the RPGs for 20% Worst Days

EPA guidance indicates that "States may establish a RPG that provides for greater, lesser, or equivalent visibility improvement as that described by the glidepath".[35] The 2018 RPGs identified in Table 11.4-1 for 20% worst days show an improvement in visibility, although less than the 2018 URP goal. However, under the Regional Haze Rule, a State can still demonstrate reasonable progress, using the four-factor analysis in Section 11.3, and other evidence and

[35] EPA "Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program", June 2007.

documentation. As a result, the Department believes the RPGs are justified and "reasonable", based on the following factors that support of this demonstration:

1. Findings from the four-factor analysis. This analysis was conducted as required under Section 308 (d)(1)(i)(A). Based on the general level of this review of major source categories, the Department determined it was not reasonable to control additional source categories and has identified a schedule for a more in-depth evaluation of individual sources and additional control measures as part of the LTS of this plan. This evaluation will be completed by the next SIP submittal in 2013, and will contain a timetable for installation of controls for subject sources. See Chapter 12.

2. Additional significant emissions reductions from the 2020 closure of ~~Phase 2 controls for~~ PGE Boardman. While the four-factor analysis did not identify any additional emission reductions for this first plan, the BART requirements adopted for the PGE Boardman plant contain a 2020 closure date that will eliminate approximately 25,500 tons of primarily SO_2 and NO_x per year. ~~DEQ is requiring additional NO_x controls under the Phase 2 "beyond BART" requirements for the PGE Boardman Power Plant, which will result in an additional 4,000 ton reduction of NO_x.~~ There are significant visibility benefits expected from this reduction, as described in Section 10.5.1.

3. Evidence that natural sources affect ability to meet the 2018 URP goal. The analysis in Chapters 8 and 9 of this plan of emissions data, source apportionment, and modeling results strongly supports the finding that the contribution of natural or nonanthropogenic sources, such as natural wildfire and windblown dust, and the pollutants associated with these sources (OC, EC, $PM_{2.5}$, Coarse PM and Soil) is the primary reason for not achieving the 2018 URP for Oregon's Class I areas. The CMAQ modeling results in Chapter 9 show considerably less reduction by 2018 in these pollutants, in contrast to significant reductions in SO_2 and NO_x, commonly associated with anthropogenic sources.

4. Evidence that offshore marine shipping emissions affect ability to meet the 2018 URP goal. Similar to natural sources of wildfire and dust mentioned above, marine vessel emissions are likely a significant factor affecting the ability to meet the 2018 URP goal. Chapter 9 PSAT and WEP results show this source category (offshore emissions) as a major contributor to Oregon Class I areas, especially for SO_2 and NO_x, in the Kalmiopsis Class I area in the Coast Range, and the seven Class I areas located in the Cascade Mountains. If compared to emission inventory data in Chapter 8, marine vessel emissions are 56% for SO_2 and 31% for NO_x of the total 2002 statewide emission inventory for these pollutants. (It should be noted that in Tables 11.4.2-2 and 11.4.2-3 below, this contribution of SO_2 and NO_x from marine vessels was included in the CMAQ modeling projections for 2018. The higher contribution of SO_2 from marine vessels is what likely accounts for the smaller improvement in SO_2 than in NO_x by 2018, as indicated in these tables. Otherwise, both SO_2 and NO_x improvements would be even greater.) See Section 12.6.5 of the LTS for future efforts planned by the Department to address marine vessel emissions.

5. Reductions in anthropogenic sources equal to or greater than 2018 URP goals as a means of showing "reasonable progress". Given the strong correlation of SO_2 and NO_x emissions to anthropogenic sources, trends in these pollutants by 2018 can be factored into the determination of reasonable progress, in contrast to the contribution of nonanthropogenic sources. The analysis in Section 11.4-2 below shows the significant reductions in SO_2 and NO_x by 2018. As shown in Chapter 6 related 2018 URP "glideslope" for each Class I area, the total reduction in deciview from baseline to the 2018 URP is approximately 20%. The tables in Section 11.4.2 show that 2018 WEP emission projections for NO_x and SO_2 far exceed a 20% reduction, while projected CMAQ modeling far exceeds 20% for NO_x, and up to 16% for SO_2 by 2018. The combination of these improvements due to emission reductions from anthropogenic sources adds to the demonstration of reasonable progress. See Section 11.4-2 below.

6. Major reductions in mobile source emissions. As the largest anthropogenic source category for SO_2 and NO_x, mobile sources show a considerable reduction in emissions by 2018. Although these reductions are primarily achieved through federal regulations already "on the books", the Department believes this further supports the demonstration of reasonable progress. See Section 11.4.3 below.

The Department expects that there will be additional visibility improvements by 2018 based on new strategies identified in the Long-Term Strategy. As described in Chapter 12, the LTS will evaluate emission reductions from non-BART sources, possible new smoke management controls for prescribed burning, and other measures. See Section 11.4.4 below.

11.4.2 20% Reduction in Emissions from Anthropogenic Sources

Chapter 6 shows the URP glideslope for each Oregon Class I area. In general, the improvement needed from the 2000-04 baseline to the 2018 URP for the worst case days is approximately 20 percent in total deciview. Although Oregon's Class I areas are not projected to meet the 2018 URP, most of this can be attributed to nonanthropogenic sources, such as natural wildfire and windblown dust. The Department believes that in determining "reasonable" progress, it is important to distinguish between anthropogenic (controllable) versus nonanthropogenic (uncontrollable) emission sources. The results of the WEP apportionment and the CMAQ regional modeling in Chapter 9 show that in looking at individual pollutants, there are significant projected reductions in SO_2 and NO_x by 2018, which represent mostly anthropogenic sources.

Table 11.4.2-1 below summarizes the projected emission reductions in SO_2 and NO_x, in comparison to the other pollutants, based on the WEP results described in Chapter 9.[36] This table shows the projected reductions in 2018 for SO_2 and NO_x average 39% and 40%, respectively. This is considerably greater than the 20% reduction represented by the 2018 URP. This is one factor that supports the demonstration that the 2018 RPGs are "reasonable".

[36] The WEP results were used instead of PSAT in order to compare the results of all pollutants. While WEP does not take into account chemical reactions of SO_2 and NOx, it is still a valuable screening tool for identifying the potential contribution of pollutant species to haze formation in Class I areas.

Most of these reductions can be attributed to considerable mobile source reductions described in Section 11.4.3, emissions reduction from BART in Oregon and neighboring states in the next five years, and the SO_2 regional milestones and backstop trading program under Section 309 of the Regional Haze Rule.[37] The numerous ongoing Oregon air pollution control programs and regulations listed in the LTS in Chapter are expected to contribute to this reduction, although this cannot be quantified at this time.

Table 11.4.2-1 WEP Projected Emission Contributions of Individual Pollutants by 2018 URP as an Indicator of "Reasonable" Progress.

Region	Oregon Class I Area	20% Worst Days Baseline to 2018 Change in Anthropogenic* Upwind Weighted Emission (WEP Analysis)					
		SO_2	NO_x	OC	EC	PM Fine	PM Coarse
Northern Cascades	Mt. Hood Wilderness Area	-46%	-48%	4%	-26%	11%	91%
Central Cascades	Mt. Jefferson, Mt. Washington, and Three Sisters Wilderness Areas	-44%	-46%	1%	-28%	24%	88%
Southern Cascades	Diamond Peak, Mountain Lakes, and Gearhart Mountain Wilderness Areas and Crater Lake National Park	-33%	-41%	-2%	-24%	15%	46%
Coast Range	Kalmiopsis Wilderness Area	-33%	-40%	-6%	-24%	14%	38%
Eastern Oregon	Strawberry Mountain and Eagle Cap Wilderness Areas	-39%	-38%	-19%	-37%	2%	19%
Eastern Oregon/ Western Idaho	Hells Canyon Wilderness Area	-37%	-28%	-30%	-42%	16%	27%

*Anthropogenic emissions exclude natural fires, biogenic emissions and windblown dust.

Table 11.4.2-2 shows sulfate and Table 11.4.2-3 shows nitrate projected reductions for the 20% worst days based on CMAQ modeling. These tables were taken from Section 9.3.1 CMAQ projections for 2018 and discussion of the breakdown by pollutant for each Class I area, as identified in Tables 9.3.1-1 to 9.3.1-6.

[37] This program involves four Western States (Arizona, New Mexico, Utah and Wyoming) and requires SO_2 regional milestones be met out to the year 2018. These milestones require significant reductions in SO_2 be achieved by 2018 that are "better than BART". Meeting the milestones is determined by annual emissions reporting by major industrial SO_2 sources in the four states. If the milestones are exceeded, a backstop trading program would then require emission allocations for these sources in the four states involved.

The visibility improvement (i.e., reduction in extinction) for SO_2 ranges from 4% to 16%, while for NO_x ranges from 28% to 58%.[38] If this reduction in SO_2 and NO_x were combined, the overall improvement would exceed 20%.

Table 11.4.2-2 CMAQ Projected Reduction in Ammonium Sulfate by 2018 URP as an Indicator of "Reasonable" Progress.

Oregon Class I Area	20% Worst Days 2018 Reduction in Ammonium Sulfate Extinction				
	2000-04 Baseline (Mm-1)	2018 URP Goal (Mm-1)	2018 Projected Visibility (Mm-1)	% of URP Goal	Total % Change by 2018
Mt. Hood Wilderness Area	11.3	8.6	9.3	74%	-18%
Mt. Jefferson, Mt. Washington, and Three Sisters Wilderness Areas	11.8	9.0	10.1	60%	-14%
Diamond Peak, Mountain Lakes, and Gearhart Mountain Wilderness Areas and Crater Lake National Park	7.3	5.9	7.0	20%	-4%
Kalmiospis Wilderness Area	10.3	7.9	9.7	25%	-6%
Strawberry Mountain and Eagle Cap Wilderness Areas	7.8	6.0	7.0	40%	-9%
Hells Canyon Wilderness Area	8.4	6.4	7.4	48%	-11%

[38] The Department believes the lower reduction in SO_2 is likely the result of the contribution of offshore marine vessel emissions, which is slightly greater for SO_2 than NOx, as discussed above in Section 11.4.1.

Table 11.4.2-3 CMAQ Projected Reduction in Ammonium Nitrate by 2018 URP as an Indicator of "Reasonable" Progress.

Oregon Class I Area	20% Worst Days 2018 Reduction in Ammonium Nitrate Extinction				
	2000-04 Baseline (Mm-1)	2018 URP Goal (Mm-1)	2018 Projected Visibility (Mm-1)	% of URP Goal	Total % Change by 2018
Mt. Hood Wilderness Area	5.5	4.7	3.6	>100%	-34%
Mt. Jefferson, Mt. Washington, and Three Sisters Wilderness Areas	2.7	2.6	1.6	>100%	-40%
Diamond Peak, Mountain Lakes, and Gearhart Mountain Wilderness Areas and Crater Lake National Park	2.6	2.5	1.1	>100%	-58%
Kalmiospis Wilderness Area	3.2	2.9	2.1	>100%	-33%
Strawberry Mountain and Eagle Cap Wilderness Areas	15.8	12.0	11.5	>100%	-27%
Hells Canyon Wilderness Area	28.5	19.7	20.6	90%	-28%

11.4.3 Major Reductions in Mobile Source Emissions by 2018

As the largest anthropogenic source category, the Department believes that the trend in mobile source emission reductions from 2002 to 2018 is another factor in support the demonstration of reasonable progress. As shown by the emission inventory information in Chapter 8, mobile source annual emissions show a considerable decrease in Oregon from 2002 (plan02d) to 2018 (prp18a), and represent the greatest emission reductions of any single source category. This can be seen in the statewide emissions in Section 8.1, and the regional level emissions in Section 8.2. The greatest reduction is in NO_x emissions, followed by VOC, and to a lesser extent SO_2. Table 11.4.3-1 shows this reduction in tons per year and percent reduction at the statewide level, from the baseline of 2002 to projected level in 2018.

Table 11.4.3-1 Mobile Source Emission Reductions in Oregon from 2002 to 2018

Source Category	SO_2	NO_x	VOC
On-Road Mobile	- 2985 tons (87%)	- 69,502 tons (62%)	- 52,389 tons (59%)
Non-Road Mobile	- 6383 tons (98%)	- 21,478 tons (40%)	- 14,553 tons (37%)

The mobile source emission inventory was based on the WRAP Mobile Source Emission Inventories Update. This report estimated all on-road and off-road mobile source emissions for the WRAP region for the 2002 base year, and projections to 2008, 2013, and 2018. It also included emissions from aircraft, locomotives, marine shipping, and road dust. The contractor who conducted the project surveyed state and local air quality planning agencies to obtain the most up-to-date mobile source activity data and control program information. On-road mobile source emissions were estimated with EPA's MOBILE6.2 model. Emissions for most off-road mobile sources were estimated with EPA's Draft NONROAD2004 model. Locomotive emissions were estimated based on locomotive fuel consumption; aircraft emissions were based on aircraft landing and takeoffs and FAA EDMS emission factors; and commercial marine emissions were estimated using a variety of activity data sources and EPA emission factors. For further information, see http://www.wrapair.org/forums/ef/UMSI/index.html

The mobile source emission reductions are based on numerous "on the books" federal mobile source regulations that include the following:

For on-road mobile sources:
- Tier 1 light-duty vehicle standards
- National Low Emission Vehicle (NLEV) standards
- Tier 2 light-duty vehicle standards, with low sulfur gasoline
- Heavy-duty vehicle standards, with low sulfur diesel

For non-road mobile sources and equipment:
- Emission standards for new nonroad spark-ignition engine below 25 hp
- Phase 2 emission standards for new spark-ignition hand-held engine below 25 hp
- Phase 2 emission standards for new spark-ignition nonhand-held engine below 25 hp
- Emission standards for new gasoline spark-ignition marine engines
- Tier 1 and 2 emission standards for new nonroad compression-ignition engines below 50 hp including recreational marine engines
- Tier 2 and Tier 3 standards for new nonroad compression-ignition engines of 50 hp and greater not including recreational marine engines greater than 50 hp
- Tier 4 emission standards for new nonroad compression-ignition engines above 50 hp and reduced nonroad diesel fuel sulfur levels

For example, in 2004 EPA adopted rules the Tier 4 rules for Nonroad Diesel Engines and Fuel, which took effect in 2008. These rules alone are expected to have major visibility benefits in Oregon. Nationally, these rules are estimated to reduce emissions in 3030 from nonroad engines, locomotive engines, and marine engines by 95% for PM2.5, 90% for NO_x, and 99% for SO_2.

The visibility benefits that are projected by 2018 from these reductions can be seen in Chapter 9, in Sections 9.2.1 and 9.2.2, under the PSAT source apportionment results for sulfate and nitrate, on the 20% worst days.

The extent of the mobile source emissions reductions and the visibility improvements that are projected are significant factors in determining that the RPGs identified in this section represent

reasonable progress. It should also be noted that this trend in emission reductions will likely be even greater than expected, due to increasing gasoline prices that are already having the effect of reducing annual vehicle miles traveled across the West, and beyond what was estimated for the emissions inventory cited in this report.

11.4.4 Additional Emission Reductions Expected by 2018 due to the Long-Term Strategy

Under the Long-Term Strategy (LTS) described in Chapter 12, additional emission reductions are expected by 2018 that will result in visibility improvements. Although these new strategies have yet to be implemented, it is reasonable to expect that these visibility improvements will occur and provide greater progress toward the 2018 milestone than the RPGs estimated in this first plan submittal. The key elements of the LTS include an evaluation and possible controls for non-BART sources, new smoke management improvements for prescribed burning, review and possible revision of state open burning regulations, and expected benefits associated with the revised $PM_{2.5}$ National Ambient Air Quality Standard.

11.4.5 Long-Term Strategy "Next Steps" in Analyzing Major Source Categories

As described in the Long-Term Strategy in Chapter 12, the Department will take the results of this four-factor analyses for source categories, and beginning in 2011~~09~~, conduct further evaluation of these source categories to determine what additional controls are appropriate to achieve further reasonable progress. It is expected this evaluation will be incorporated into the work described in Section 12.6.1 of the LTS that will develop criteria and guidance for evaluating all non-BART sources. Results from this evaluation will be reported in the required 2013 plan update.

CHAPTER 12: LONG-TERM STRATEGY

12.1 Overview of the LTS

The Regional Haze Rule requires States to submit a 10-15 year long-term strategy (LTS) to address regional haze visibility impairment in each Class I areas in the State, and for each Class I area outside the State which may be affected by emissions from the State. The LTS must include enforceable measures necessary to achieve reasonable progress goals, and identify all anthropogenic sources of visibility impairment considered by the State in developing the long-term strategy. Where the State contributes to Class I visibility impairment in other States it must consult with those States and develop coordinated emission management strategies, and demonstrate it has included all measures necessary to obtain its share of the emission reductions. If the State has participated in a regional planning process, the State must include measures needed to achieve its obligations agreed upon through that process.

As required in Section 51.308(d)(3)(v) of the Regional Haze Rule, the State must consider, at a minimum, the following factors: (1) emission reductions due to ongoing air pollution control programs; (2) measures to mitigate the impacts of construction activities; (3) emission limitations and schedules for compliance; (4) source retirement and replacement schedules; (5) smoke management techniques for agricultural and forestry burning; (6) the enforceability of emission limitations and control measures; and (7) the anticipated net effect on visibility over the period of the long-term strategy.

12.2 Overview of the LTS Development Process

As described in Chapter 4, Section 4.1, Oregon is a participant in the WRAP, which was a major source of technical and policy assistance for western States in developing regional strategies for reducing haze. The following is a partial list of the primary WRAP products relied upon by Oregon and other western States in developing the LTS. For a complete list, see the WRAP website at http://www.wrapair.org/:

- **Technical Support System (TSS)** - http://vista.cira.colostate.edu/wraptss/ - this is a project that provides a single, one-stop shop for access, visualization, analysis, and retrieval of the technical data and regional analytical results prepared by WRAP Forums and Workgroups in support of regional haze planning in the West. The TSS specifically summarizes results and consolidates information about air quality monitoring, meteorological and receptor modeling data analyses, emissions inventories and models, and gridded air quality/visibility regional modeling simulations. For more information on the WRAP TSS, see Appendix C.

- **Regional Modeling Center (RMC)** - http://pah.cert.ucr.edu/aqm/308/ - this modeling project conducted by the RMC provides regional scale, three-dimensional regulatory air quality models that simulate the emissions, chemical transformations, and transport of criteria pollutants and fine PM and consequent effects on visibility in Class I areas in the WRAP region and across North America.

- **Visibility Information Exchange Web System (VIEWS)** - http://vista.cira.colostate.edu/views/ - this system provides ongoing access to IMPROVE and other visibility monitoring data, research results, and special studies related to the Regional Haze Rule. Downloads of the IMPROVE data, custom displays of spatial, chemical, and temporal patterns, as well as information about applying monitoring data for regional haze planning are available.

- **Causes of Haze Assessment project (CoHA)** - http://coha.dri.edu/index.html - this project provides detailed analyses of IMPROVE and meteorological monitoring data in the WRAP region. Includes multi-year back trajectory wind plots for each monitored Class I area, trajectory regression analyses' results used in the Phase I AoH project, and extensive descriptive information about the monitoring data and each Class I area.

- **Emissions Data Management System (EDMS)** - http://wrapedms.org/default_login.asp - this project entails an emission inventory and web-based GIS application that provides a consistent, complete, and regional approach to emissions data tracking to meet the requirements for SIP and TIP development, periodic progress reviews, and data updates. The EDMS serves as a central regional emissions inventory database for all types of emissions, and uses associated software to facilitate the data collection efforts for regional modeling, emissions tracking and associated data analyses.

12.3 Summary of all Anthropogenic Sources of Visibility Impairment Considered in Developing the LTS.

Section 51.308(d)(3)(iv) of the Regional Haze Rule requires the identification of "all anthropogenic sources of visibility impairment considered by the State when developing its long-term strategy." Chapter 8 of this Plan describes state and regional emissions, including projections of emission reductions from anthropogenic sources from 2002 to 2018. Chapter 9 of this Plan provides source apportionment results, including projected reductions from anthropogenic sources during the same period. Together, these two chapters show the major anthropogenic sources affecting regional haze in Oregon and in the West. Section 11.3 in Chapter 11 describes the major anthropogenic source categories evaluated through the four-factor analysis.

Based on the analysis in these previous chapters, the anthropogenic sources considered by the Department in developing the LTS are identified in Section 12.5 and Section 12.6 below. Section 12.5 reflects the requirements in Section 308(d)(3)(v) of the Regional Haze Rule that lists specific factors the State must consider. Section 12.6 are major anthropogenic sources that the Department identified in Chapter 11, and will be evaluated by 2013 as possible additional new control measures, as part of the LTS in meeting the reasonable progress goals for Oregon's Class I areas. The "new" sources included in the LTS are as follows:

1. Evaluation of contribution and controls for non-BART sources, and BART update, as described below in Section 12.6.1
2. Evaluation of new smoke management controls for forestry prescribed burning, as described below in Section 12.6.2.

3. Evaluation of emission reductions from residential open burning, as described below in Section 12.6.3.
4. Evaluation of the extent and contribution from Rangeland Burning in SE Oregon, as described in 12.6.4.

12.3 Summary of Interstate Transport and Contribution

Sections 51.308(d)(3)(i) and (ii) of the Regional Haze Rule requires that the LTS address the contribution of interstate transport of haze pollutants between States. Chapter 8 of this plan showed regional emissions by State, while Chapter 9 identified interstate transport of pollutants and larger source categories based on source apportionment results. The Department has analyzed the PSAT and WEP source apportionment findings, focusing on the 20% worst days for primarily impacts from SO_2 and NO_x, typically associated with point, area, and mobile anthropogenic sources. Other pollutants such as OC, EC, PM fine and coarse, were reviewed as well, however, these were assumed to be associated with natural fire and dust sources, and not evaluated any further.[39]

The Department consulted with neighboring States as part of this review, and discussed the need for coordinated strategies to address interstate transport. Based on this consultation, no significant contributions were identified that supported developing new interstate strategies. Both Oregon and neighboring states agreed that the implementation of BART and other existing measures in state regional haze plans were sufficient to address the relatively minor contributions discussed below. This interstate consultation is an on-going process and commitment between States. See Chapter 13 for further information.

12.3.1 Other State Class I Areas Affected by Oregon emissions

The Department reviewed PSAT and WEP source apportionment information on the WRAP TSS website, focusing on the 20% worst day impacts in Class I areas in neighboring States that were the closest to Oregon. The closest Class I areas were as follows: 1) Mt. Ranier National Park and Goat Rocks Wilderness in Washington; 2) Sawtooth Wilderness in Idaho, 3) Jarbridge Wilderness in Nevada, and 4) Lava Beds National Monument and Redwood National Park in California. In none of these examples did the Department find a sizable contribution from Oregon sources. The following summarizes the Department's findings by State. Note all references to PSAT results are based on 20% worst days, and contribution percentages are from WEP results.

<u>Washington</u>

Both Mt. Ranier and Goat Rocks Class I areas were heavily dominated by Washington sources. Contribution from Canadian point sources and Offshore Pacific shipping emissions were sizable for some pollutants, such as SO_2. Based on PSAT results, the Oregon contribution was

[39] In order to determine the extent of interstate contribution of fire and dust sources that is from anthropogenic sources such as prescribed burning and road dust, an exhaustive study would be required of each of the state Class I areas listed below. Therefore, for the purpose of this review, the Department primarily focused on SO_2 and NOx emission sources.

extremely low for SO_2 and NO_x, in the range of 0.05-0.08 µg/m^3. The highest impact from any source category from Oregon was SO_2 point sources, which was approximately 8%. Under the WEP projection for 2018, this contribution is expected to drop to about 4%. Additional reductions may occur as the result of BART, as described in Chapter 10, and from evaluation of non-BART industrial sources, described in Section 12.6.1 of the LTS. For all other pollutants, the Oregon contribution was also extremely low.

Idaho

Impacts in the Sawtooth Class I area was dominated by Idaho sources. The Oregon contribution of SO_2 and NO_x was very low, from 0.02-0.05 µg/m^3, based on PSAT. The largest impact from Oregon was SO_2 point sources, which was less than 10%. Much of this impact can be attributed to the PGE Boardman coal-fired power plant in NE Oregon. As described in Chapter 10, this source will be installing BART controls, which will significantly reduce its emissions, and have corresponding visibility benefits to the Sawtooth Class I area. Other Oregon emissions such as fire and dust were between 10-20%, but these are believed to be mostly natural sources. (Note, the portion of the Hells Canyon Class I area located in Idaho is not addressed here, as the majority of this area is located in Oregon and being addressed under the Oregon Regional Haze Plan. The interstate transport of emissions to Hells Canyon is discussed below in the review of Oregon Class I areas.)

Nevada

Overall the Jarbridge Class I area has very low concentrations of any pollutant. The contribution of SO_2 and NO_x from Oregon is extremely low, from 0.02-0.03 µg/m^3, based on PSAT. In general, the interstate contribution from Idaho, California, and Pacific Offshore is greater than Oregon. Of SO_2 and NO_x, the highest impact from Oregon is about 5% of all SO_2 point sources. As described above for Sawtooth, this contribution is likely from the PGE Boardman plant, which is installing BART controls and making significant reductions. Like Sawtooth, there is similar contribution of fire and dust sources from Oregon, but these are likely again to be mostly natural sources.

California

The Oregon contribution to Lava Beds and Redwoods Class I areas was very low. For Lava Beds, both SO_2 and NO_x concentrations were low, at 0.03-0.05 µg/m^3, based on PSAT. About 5% of the impact was from SO_2 point sources. This may be reduced under the evaluation of non-BART industrial sources, described in Section 12.6.1. For Redwoods, the highest contributing sources are fire and Pacific Offshore emissions. However, the Oregon contribution of NO_x mobile source emissions is about 0.22 µg/m^3. The reason for this is uncertain. By 2018, this is projected to drop to under 0.10 µg/m^3.

12.3.2 Oregon Class I Areas affected by Other States

The contribution of neighboring States of Washington, Idaho, Nevada and California to Oregon Class I areas is similar in most respects, however, the contribution from Washington and Idaho

into Oregon Class I areas is generally higher as a whole. This may be attributable to the proximity of several of Oregon Class I areas to the state boundary, meteorological factors, and location of certain types of sources. The following summarizes the Department's findings by Oregon Class I area. Note all references to PSAT results are based on 20% worst days, and contribution percentages are from WEP results.

Mt. Hood Class I area.

Mt. Hood is approximately 20 miles from Washington. Based on PSAT results, the contribution of Washington SO_2 and NO_x emissions to Mt. Hood ranges from 0.25-0.40 $\mu g/m^3$. The SO_2 is mostly from point sources (about 20%), and the NO_x is mostly from mobile sources (about 15%). Future projections show a 50% reduction in both of these source impacts at Mt. Hood by 2018. Chapter 10 identified 3 BART sources from Washington that impacted Mt. Hood over the 0.5 dv threshold. These sources will be subject to BART controls. A major reduction in mobile source emissions, as described in Chapter 11, is expected by 2018 from "on-the-books" federal mobile source regulations. This may be augmented by additional mobile source regulations in Washington, similar to those being adopted in Oregon. Also, the LTS section of the Washington regional haze plan is expected to have a similar measure as Oregon's to evaluate non-BART sources in the next 5-10 years to identify additional emission reductions that could benefit visibility at Mt. Hood.

Eagle Cap, Strawberry Mountain, and Hells Canyon Class I areas.

These Class I areas in Eastern Oregon are similar in terms of the contribution from Idaho and Washington sources. Washington contributes more to Eagle Cap and Strawberry Mountain, while Idaho contributes more to Hells Canyon (50% of the contribution to Hells Canyon is from Idaho, and 25-30% is from Oregon). PSAT results show a significantly higher NO_x contribution than SO_2. Idaho SO_2 contribution ranges from 0.03-0.05 $\mu g/m^3$, whereas NO_x is 0.23-0.38 $\mu g/m^3$. For Washington, SO_2 ranges from 0.03-0.10 $\mu g/m^3$, and 0.08-0.22 $\mu g/m^3$ for NO_x. The SO_2 is mostly from point sources, while the NO_x is mostly from mobile and area sources. In both Idaho and Washington, the BART process is expected to lower the SO_2 point source impacts. For the NO_x contribution that is mobile sources, these emissions are projected to decrease significantly by 2018. The area source NO_x is not projected to change much by 2018. The source of these emissions may be farming related. However, these relatively small NO_x emissions will more than be offset by significant NO_x emission reductions from PGE Boardman due to BART controls, as described in Chapter 10. Other emissions, such as from fire and dust sources, are primarily contributed by Idaho and Oregon.

Central and Southern Cascade Class I areas (Mt. Washington, Mt. Jefferson, Three Sisters, Diamond Peak, Crater Lake, Mountain Lakes and Gearhart Mountain).

This grouping of Oregon Class I areas in the central and southern Cascades have a similar pattern of interstate contribution. For SO_2, Washington contribution ranges from 0.05-0.12 $\mu g/m^3$, mostly point sources (about 13%). For NO_x, both Washington and California show a contribution, from 0.08-0.22 $\mu g/m^3$. As with the other NO_x emission sources, these are mostly

mobile source emissions (about 10%), which by 2018 are projected to be reduced by more than half. Fire emissions are almost entirely Oregon based, as are dust emissions.

Kalmiopsis Class I area.

The interstate contribution in this Class I area is very similar to Redwoods in California, as described above. These Class I areas are 30-40 miles apart. The highest contributing sources at both areas are fire and Pacific Offshore emissions. However, mobile source emissions are notable, with the majority originating from Oregon, while California and Washington contribute about 10 $\mu g/m^3$. The reason for this is uncertain. By 2018, this is projected to drop to under 0.05 $\mu g/m^3$.

12.3.3 Estimated International and Global Contribution to Oregon Class I Areas

Although not specifically addressed under the Regional Haze Rule in terms of interstate transport, it is important to identify the contribution to visibility impairment in Oregon from international sources, such as Canada and Mexico, offshore marine shipping in the Pacific Ocean, and "global" sources of haze. As described in Chapter 9, both the PSAT and WEP results show the contribution from both Canada and the Pacific Ocean marine shipping are sizable. Chapter 8 provides an emission inventory for offshore marine emissions. The contribution from Mexico is not significant, based on PSAT and WEP information. Global transport can be assumed to be most of the "outside domain" category identified in the PSAT results for SO_2 and NO_x. However, the extent of the contribution and understanding of global transport is difficult to assess, and will not be addressed in this plan.

In terms of addressing Canadian and Pacific offshore shipping emissions under this LTS, the Department does not have any authority over Canadian sources, and is therefore is not pursuing any new strategy for haze. However, for offshore shipping emissions, the Department believes this could be a possible future strategy, and will conduct further study on the transport and contribution of these sources, through its on-going participation in the WRAP, and in cooperation with the states of California and Washington, which are also impacted by the same offshore sources. The Department will prepare a report for the next Regional Haze Plan submittal in 2013 that addresses this topic, including an assessment of whether regulatory actions are likely in the future to meet other Clean Air Act requirements. This report will include recommendations on what actions Oregon and neighboring states could pursue that could benefit regional haze.

12.4 Summary of Interstate Consultation.

In addition to evaluating interstate transport, the affected States are required to consult with each other under Section 51.308(d)(3)(i), in order to develop coordinated emission management strategies. See Section 13.2 for information on the state-to-state consultation process.

12.5 Technical Documentation

Section 51.308(d)(3)(iii) of the Regional Haze rule requires documentation of the technical basis, including modeling, monitoring and emissions information, on which the State relied upon to determine apportionment of emission reductions needed to achieve progress goals in each Class I area it affects. The State of Oregon relied on exclusively on the technical information and analysis provided by the WRAP, through various projects and studies conducted by contractors, WRAP staff, and incorporated into the WRAP's TSS website. The following references the Chapters in this Plan which describes the technical information and documentation in more detail. Additional information on the TSS can be found in Appendix C of this plan.

Emissions Data

Chapter 8 describes the emission inventory information for state and regional emissions. Section 8.1 summarizes the Oregon statewide emissions, and Section 8.2 regional emissions for other states in the West.

Modeling Techniques

The modeling techniques used are described in Chapter 9. Section 9.1.1 describes on source apportionment analysis using the PM Source Apportionment Technology (PSAT) tool, for the attribution of sulfate and nitrate sources, and the Weighted Emissions Potential (WEP) tool, for the attribution of sources of sulfate, nitrate, organic carbon, elemental carbon, fine PM, and coarse PM. Section 9.1.2 describes the regional haze modeling using the Community Multi-Scale Air Quality (CMAQ) model.

Monitoring Data

Chapter 4 describes the IMPROVE monitoring network and monitoring sites in Oregon. Chapters 6 and 7 provide a summary of monitoring data, trends, and breakdown by pollutant for each of the site locations in Oregon.

12.5 Required Factors for the LTS

Under Section 51.308(d)(3)(v) of the Regional Haze rule, the factors listed below represent the minimum that must be considered by a State in developing the LTS. Section 12.6 identifies additional measures and controls being proposed by Oregon beyond those required for the LTS.

12.5.1 Emission Reductions Due to Ongoing Air Pollution Programs

The following summary describes ongoing programs and regulations in Oregon that directly protect visibility, or can be expected to improve visibility in Oregon Class I areas, by reducing emissions in general. This summary does not attempt to estimate the actual improvements in visibility that will occur, as many of the benefits are secondary to the primary air pollution

objective of these programs/rules, and consequently would extremely difficult to quantify, due to the technical complexity and limitations in current assessment techniques.

1. Prevention of Significant Deterioration/New Source Review Rules

As described in Section 10.1, the two primary regulatory tools for addressing visibility impairment from industrial sources are BART and the Prevention of Significant Deterioration (PSD) New Source Review rules. The PSD rules protect visibility in Class I areas from new industrial sources and major changes to existing sources. Oregon's Air Quality Analysis rules (OAR 340, Division 225) contain requirements for visibility impact assessment and mitigation associated with emissions from new and modified major stationary sources. Specifically, OAR 340-225-0070 references the need for protection of "Air Quality Related Values" (AQRV), which are specific scenic and environmentally related resources that may be adversely affected by a change in air quality. One of these AQRVs is visibility. The primary responsibility of the Department under these rules is visibility protection. Protection of all AQRVs (including visibility) is the primary responsibility of the Federal Land Manager. OAR 340-225-0070 describes mechanisms for visibility impact assessment and review by the Department, as well as impact modeling methods and requirements, the result of which is a demonstration of "no significant impairment of visibility in any Class I area". This modeling is conducted for sources typically out to 300 kilometers from a Class I area. Any new major source or major modification within this distance that is found through modeling to cause significant visibility impairment will not be issued an air quality permit by the Department unless the impact is mitigated. The definition of "significant" impairment for PSD is very similar to the significance level used for BART modeling (see BART Modeling Protocol in Section 10.3.1). For PSD, the significance level is an increase in visibility impairment above natural background of 5% (expressed as visibility extinction). For BART, the significance level is 0.5 deciview. Both represent essentially the same degree of impairment.

2. Reasonably Attributable Visibility Impairment BART

In 1986, the Department adopted Reasonably Attributable Visibility Impairment (RAVI) BART requirements as part of the Oregon Visibility Protection Plan (see below). These BART requirements are different from the BART requirements under EPA's Regional Haze Rule, as described in Chapter 10. While both apply to existing industrial sources, the RAVI BART requirements are triggered by a "certification" by the Federal Land Manager that visibility impairment exists in a federal Class I area. Upon such a certification, the Department would be required to identify and analyze BART for any contributing industrial source. Since the adoption of RAVI BART there has been no formal certification made in Oregon for reasonably attributable impairment.

3. Oregon's Phase I Visibility Protection Program

As described in Section 1.5.2 of this document, EPA's visibility regulations consist of two distinct rules. Phase I rules were adopted in 1980, and address visibility impairment that is "reasonably attributable" to one or small group of sources, in relatively close proximity to a Class I area. Phase II rules were adopted in 1999 to address regional haze visibility impairment

from multiple sources across a broad geographic area. In 1986 the Department adopted the Oregon Visibility Protection Plan (OAR 340-200-0040, Section 5.2) to address EPA's Phase I visibility rules. The Plan contains short and long-term strategies related to addressing reasonably attributable impairment. This includes the RAVI BART requirements and PSD New Source Review rules discussed above for industrial sources, as well as seasonal protection of visibility during the summer months from prescribed forestry burning and agricultural field burning.

The seasonal strategy was developed in order to protect visibility during the summer months, July 1 – September 15, known as the visibility protection period, when approximately 80 percent of the visitation occurs in Oregon's Class I areas. Visibility monitoring at that time focused on visibility conditions in Class I Areas in the Oregon Cascade Mountains. This monitoring showed that during the summer months in the northern and central Cascades, visibility was frequently impaired by smoke or "plume blight" from Willamette Valley agricultural open field burning, forest prescribed burning, and wildfire activity. The Department also determined that there was summer visibility impairment in the Eagle Cap Class I area caused by Union County agricultural open field burning, and that field burning in Jefferson County was contributing to summer visibility impairment in the central Oregon Cascade Class I areas as well.

As a result of this effort the Department adopted into the original plan specific visibility control strategies for these areas. This included smoke management requirements to avoid Class I visibility impacts from Willamette Valley, Jefferson County and Union County open field burning, and from forest prescribed burning in parts of Western Oregon. Special "weekend" restrictions on Willamette Valley field burning were added to prohibit burning activity during most summer weekends. The Jefferson and Union County smoke management programs adopted provisions to avoid any burning upwind of nearby Class I areas. The Oregon Department of Forestry Smoke Management Program was revised to shift prescribed burning in Western Oregon from the summer to the spring and fall, as part of an effort to eliminate burning during the summer. Both the forestry and Willamette Valley smoke management programs have commitments to pursue alternatives to burning through on-going research and development projects, and both use numerous emission reduction techniques when conducting burning during the year. Finally, between 1991 and 1998, Willamette Valley open field burning was reduced under a new state law from 180,000 acres to 40,000, which has resulted in significant visibility benefits, and led to increases in the use of non-burning alternatives, such as straw marketing and less-than-annual burning.

In 2002 the Department made minor revisions to the Visibility Protection Plan that contained several improvements. These improvements and an assessment of the effectiveness of the plan are described in the Department's report "Oregon Visibility Protection Plan Reasonable Progress Report, March 5, 2002."

The Oregon Visibility Protection Plan is can be found in Appendix F.

4. On-going Implementation of State and Federal Mobile Source regulations

As described in Section 11.4.3, mobile source annual emissions show a major decrease in NO_x, SO_2, and VOCs in Oregon from 2002 to 2018, and represent the greatest emission reductions of any single source category. This is from numerous "on the books" federal mobile source regulations (see list in Section 11.4.3). This trend is expected to provide significant visibility benefits. As noted, these emission reductions will likely be even greater than expected, due to increasing gasoline prices that are already reducing annual vehicle miles traveled across the West.

Beginning in 2006, EPA mandated new standards for on-road (highway) diesel fuel, known as ultra-low sulfur diesel (ULSD). This regulation dropped the sulfur content of diesel fuel from 500 ppm to 15 ppm. ULSD fuel enables the use of cleaner technology diesel engines and vehicles with advanced emissions control devices, resulting in significantly lower emissions. Diesel fuel intended for locomotive, marine and non-road (farming and construction) engines and equipment is required to meet the low sulfur diesel fuel maximum specification of 500 ppm sulfur in 2007 (down from 5000 ppm). By 2010, the ULSD fuel standard of 15-ppm sulfur will apply to all non-road diesel fuel. Locomotive and marine diesel fuel will be required to meet the ULSD standard beginning in 2012, resulting in further reductions of diesel emissions. These rules not only reduce SO_2 emissions, but also NO_x and PM.

In 2005, Oregon adopted California's emissions standards for light and medium duty vehicles. The new requirements were adopted as the Oregon Low Emission Vehicle (LEV) Program, and will take effect beginning with 2009 model year vehicles. Although the primary purpose was to reduce greenhouse gas emissions, these rules will also decrease NO_x and PM emissions.

The 2007 the Oregon Legislature authorized a clean diesel program that included funding for a grant/loan program to retrofit existing engines with exhaust controls, repowering nonroad diesels and scrapping older engines. Tax credits were also authorized for retrofitting, repowering and the purchase of 2007 and newer trucks. The Department projects that with no other intervention and relying on normal turnover bringing cleaner engines into the fleet, a 60% reduction in diesel $PM_{2.5}$ by 2018.

The Department operates two motor vehicle inspection/maintenance programs in Oregon. The first program began in the Portland area in 1975. The second program began in the Medford area in 1986. By inspecting exhaust emissions, DEQ identifies high-emitting vehicles that are producing more air pollution than expected. The result of these programs has been significant reductions in air pollution in the both areas, including NO_x and VOCs which contribute to regional haze.

5. On-going Implementation of Programs to meet PM_{10} NAAQS

In Oregon there are seven communities that are either currently or formerly nonattainment areas under the PM_{10} National Ambient Air Quality Standard (NAAQS). The following lists these communities by population size (largest first) and their current PM_{10} designation:

- Eugene-Springfield – Nonattainment Area
- Medford-Ashland – Maintenance Area
- Grants Pass – Maintenance Area
- Klamath Falls – Maintenance Area
- La Grande – Maintenance Area
- Oakridge – Nonattainment Area
- Lakeview – Maintenance Area

The significance of these PM_{10} nonattainment and maintenance areas in terms of regional haze is that each of these areas have made significant reductions in PM_{10} emissions in the last 10 years, by adopting similar strategies to address the primary emission sources in the community. The major contributing sources causing nonattainment in these communities are residential woodstoves, industry, mobile sources, road dust, and outdoor burning. These are the same sources which contribute to visibility impairment in Oregon. As Table 12.5.1-1 shows below, many of these communities are in close proximity to Oregon Class I areas.

Table 12.5.1-1 Proximity of Oregon Class I Areas to PM_{10} Nonattainment/Maintenance Areas

Community	Population	Distance to nearby Class I areas
Eugene-Springfield	205,660	Three Sisters – 35 mi, Mt. Washington and Diamond Peak – 50 mi.
Medford-Ashland	95,390	Mountain Lakes – 30 mi, Crater Lake – 40 mi, Kalmiopsis – 45 mi.
Grants Pass	30,930	Kalmiopsis – 25 mi
Klamath Falls	20,720	Mountain Lakes – 15 mi, Crater Lake – 40 mi, Gearhart Mtn – 45 mi.
La Grande	12,540	Eagle Cap – 20 mi, Hells Canyon – 50 mi.
Oakridge	3,700	Three Sisters and Diamond Peak – 20 mi.+
Lakeview	2,655	Gearhart Mtn – 30 mi.

The Department believes the ongoing PM_{10} reductions in these communities may provide significant benefits to visibility and regional haze.[40] The two most effective emission reduction strategies in these communities are the Department's residential woodheating rules (OAR 340, Division 262) and Major New Source Review (NSR) rules (OAR 340, Division 224). The Department's woodheating rules require woodstove curtailment programs in each of these communities. While some are voluntary and some are mandatory, these programs have been very effective in reducing PM_{10} levels during the heating months. The woodheating rules also specify that only certified woodstoves be sold in the state. These woodstoves can reduce emissions by 70%. The Department's NSR rules apply to new major industrial sources and major modifications, and require the Lowest Achievable Emission Rate (LAER) in

[40] Quantifying the total emission reductions achieved by the PM10 emission reduction strategies in these communities, as a means to demonstrate actual visibility benefits in nearby Class I areas, is beyond the scope of this document. This would be a difficult and complex undertaking. However, it is reasonable to conclude that the significant PM10 emissions reductions in the larger of these communities has clear secondary benefits in nearby Class I areas in terms of visibility improvements.

nonattainment areas (most stringent controls), and Best Available Control Technology (BACT) controls in maintenance areas.

In addition to the ongoing emission reductions in PM_{10} nonattainment and maintenance areas, the Department will be designating new $PM_{2.5}$ nonattainment areas, which will require adoption of new measures to reduce $PM_{2.5}$ emissions in these communities. These designations have not been made yet, so the communities are not listed.

12.5.2 Measures to Mitigate the Impacts of Construction Activities

In developing this LTS, the Department has considered the impact of construction activities, as a factor in improving visibility in Oregon. Based on general knowledge of construction activity in the state, and without conducting extensive research on the contribution of emissions from construction activities to visibility impairment in Oregon Class I area, the Department believes current state regulations adequately address this topic.

Current rules addressing impacts from construction activities in Oregon are primarily found in the OAR 340, Division 208. OAR 340-208-0110 includes general requirements that set opacity limits for "visible emissions" from any air contaminant source. OAR 340-208-0210 addresses "fugitive emissions" from a variety of sources, and would be the more applicable regulation to construction activities. This regulation requires "reasonable precautions" be taken to prevent particulate matter from becoming airborne from activities such as construction projects. Types of actions to be taken include the use of water or chemicals for control of dust from demolition, construction operations, unpaved roads at construction sites, material stockpiles, and containment of sandblasting or other similar operations. In addition to these rules, the Department's regulations on "Indirect Sources" in OAR 340 Division 254 address minimizing emissions (including visibility impairing pollutants such as NO_x and VOCs) from mobile sources associated with construction of buildings and parking structures.

12.5.3 Emission Limitations and Schedules of Compliance

The implementation of BART, as described in Chapter 10, will contain emission limits and schedules of compliance for those sources either installing BART controls or taking federally enforceable permit limitations. As noted in the Chapter 11, the four-factor analysis did not identify any additional measures that were appropriate for this first Regional Haze plan. As a result, no other emission limitations or schedules of compliance are included in this plan. The evaluation of non-BART sources as part of the LTS is expected to identify additional emission reductions and improve visibility by 2018. To the extent this effort identifies any emission limitations and schedules of compliance, these will be included in the next periodic plan update in 2013.

12.5.4 Source Retirement and Replacement Schedules

Part of this LTS contains an evaluation of non-BART sources, described below in Section 12.6.1. This evaluation will include a review of all existing industrial sources to identify scheduled shutdowns, retirements in upcoming years, or replacement schedules, such as

planned installation of new control equipment to meet other regulations or routine equipment replacement or modernization.

12.5.5 Agricultural and Forestry Smoke Management Techniques

Section 308(d)(3)(iv)(E) of the Regional Haze rule requires the LTS to address smoke management techniques for agricultural and forestry burning. These two sources of air pollution are significant in Oregon. Smoke from agricultural and forestry burning are major contributors to Class I area visibility and regional haze in Oregon and the West. The pollutant species contribution identified in Chapter 7 shows that a significant portion of the 20% worst days in all of Oregon's Class I areas is from organic and elemental carbon, an indicator of fire emissions. Much of this contribution is from wildfires, which fluctuates significantly from year to year. However, there is also a sizable contribution from controlled burning, which is dominated by agricultural and forestry burning.

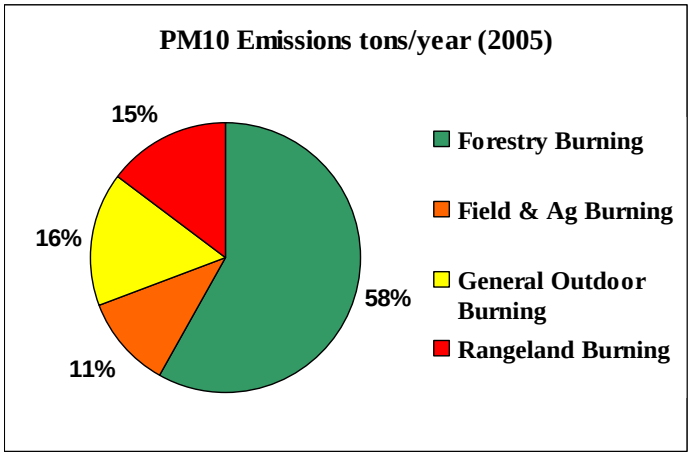
This section describes current smoke management programs for these sources, and how the advanced techniques used in these programs are expected to provide significant visibility benefits during the period of this LTS. Section 12.6.2 identifies a new LTS measure to evaluate if additional smoke management techniques can be developed for improving Class I area visibility from forestry prescribed burning.

Major Anthropogenic Fire Sources in Oregon

Figure 12.5.5-1 shows the major anthropogenic fire sources in the state. Prescribed forestry burning represents the largest source, at approximately 58% of the total burning in the state. Agricultural burning (including open field burning) is approximately 11%. General Outdoor Open Burning is 16%, and Rangeland Burning is 15%.[41] Since these two fire sources are not specifically mentioned in the Regional Haze Rule, they are not evaluated in this section. Instead, the Department has chosen to address both as additional measures in the LTS, in Section 12.6.3 and 12.6.4, respectively.

[41] The emissions for rangeland burning are based on rough estimates of acres burned each year. These emissions are 2002 estimates obtained from the WRAP EDMS. The LTS of this plan identifies an evaluation that will be made of rangeland burning to improve emission estimates, track burning, and consider the need for voluntary smoke management controls to protect visibility.

Figure 12.5.5-1 Oregon Anthropogenic Fire Sources



Fire Source	Statewide PM_{10} Emissions tpy (2005)
Forestry Prescribed Burning (public & private lands)	18,518
Open Field Burning & General Agricultural Burning	3,568
General Outdoor Open Burning (residential, construction, demolition, land clearing, etc.)	5,154
Rangeland Burning*	4,654

* 2002 estimate from WRAP EDMS

Forestry Prescribed Burning

As shown above, forestry prescribed burning is the largest anthropogenic fire source in Oregon, at an estimated 18,500 tons per year of PM_{10}, based on 2005 emissions. This burning occurs in most areas of the state, except for the remote desert region of southern Oregon, and is controlled under a mandatory smoke management program operated by the Oregon Department of Forestry (ODF). Under state statute ORS 477.013, the State Forester and the Department of Environmental Quality are required to protect air quality through a smoke management plan, which is included in the SIP. ODF smoke management rules are listed in OAR 629-048-0001 to 629-048-0500, 629-043-0043 and 629-043-0041.

On November 2, 2007, ODF adopted revisions to Oregon Smoke Management Plan, as part of a periodic plan review requirement. Numerous changes were made to plan related to protection of air quality. New visibility protection provisions were adopted (629-048-0130) that incorporated references to the Oregon Regional Haze Plan, included the Enhanced Smoke Management Program (ESMP) criteria in Section 309 of the federal Regional Haze Rule, and voluntary measures to protect visibility when burning inside and upwind of any Oregon Class I area, by using best practices, minimizing residual smoke, and avoid significant ground level smoke impacts. The Oregon Smoke Management Rules (OAR 629-048-0001 through 629-048-0500) can be found in Appendix F.

Agricultural Open Field Burning

The majority of agricultural burning in Oregon falls under the category of open field burning. This is burning is associated with mostly grass seed and wheat burning. As shown above, total open field burning estimated emissions in 2005 were 3,500 tons/year of PM_{10}. This burning is concentrated in specific locations during the summer months, with the majority in the Willamette Valley (about 50,000 acres) and smaller amounts in central and eastern Oregon in Jefferson and Union counties (about 10,000 acres combined).

The Willamette Valley burning is controlled under a smoke management program operated by the Oregon Department of Agriculture (ODA). Under state statute ORS 468A.590, ODA is required to conduct a smoke management program for the Willamette Valley. ODA field burning rules are listed in OAR Chapter 603, Division 77, OAR Chapter 837 Division 110, and OAR Chapter 340, Division 264. The rules apply to areas lying between the crest of the Coastal Range and the crest of the Cascade Range (in the counties Benton, Clackamas, Lane, Linn, Marion, Multnomah, Polk, Washington, and Yamhill).

Jefferson and Union county field burning is controlled through smoke management programs established by county ordinance and operated at that level. As described in Section 12.5.1, these country programs have requirements to avoid burning upwind of nearby Class I areas when smoke would impair visibility.

Other agricultural burning takes place in rural areas around the state, although the amount of this burning is not well documented. It is likely that estimates of general outdoor burning, as noted above in Figure 12.5.5-1, may include general agricultural burning as well. Improving estimates of agricultural burning is difficult due to lack of any reliable information on daily burning activity in most areas of the state.

1. Current Phase I Visibility Protection

The primary objective of the smoke management programs mentioned above has been to avoid smoke intrusions into urban areas, and minimize smoke exposure to the public for health reasons. Some protection of visibility from agricultural and forestry burning in Class I areas has been achieved as a result of efforts to conduct burning only under optimum ventilation conditions that achieve maximum smoke dispersion and by the use of emission reduction techniques. There is also some visibility protection provided under the Oregon Visibility Protection Plan, described above in Section 12.5.1. The plan was adopted by the Department to meet EPA Phase I visibility rules, primarily to protect Class I area visibility from nearby burning sources that can cause “plume blight”. One of the provisions in the plan prohibits Willamette Valley field burning on weekends between July 1 and September 15, known as the visibility protection period, which is the highest visitation period for Oregon Cascade Class I areas. The plan also incorporates the visibility protection provided by the Prevention of Significant Deterioration rules that apply to new and modified industrial sources. See Section 12.5.1 for further information on current visibility protection measures in the Oregon Visibility Protection Plan.

2. Current Phase II Regional Haze Protection, Section 309 ESMP requirements

Section 309 of the Regional Haze rule contains a requirement to include "Enhanced Smoke Management Programs for Fire". Although this plan addresses Section 308 of the Regional Haze rule, the Department believes the current smoke management programs operated by ODA and ODF meet the Enhanced Smoke Management Program (ESMP) requirements, and therefore represent an advanced level of smoke management. The ESMP elements include: (1) actions to minimize emissions; (2) evaluation of smoke dispersion; (3) alternatives to fire; (4) surveillance and enforcement; and (5) burn authorization. There are 4 additional ESMP elements, however the Department believes these five are the most applicable to regional haze, and highlights these below.

ODF rule 629-048-0130 states that the intent of ODF smoke management program is to "operate in a manner consistent with the Oregon Regional Haze Plan, including the Enhanced Smoke Management Program (ESMP) criteria". The following summarizes how the five ESMP elements listed above met under the ODF and ODA smoke management programs.

(1) Actions to Minimize Fire Emissions

Oregon Department of Forestry Smoke Management Program:

> The policy the State Forester is to "minimize emissions from prescribed burning, where appropriate, by encouraging: cost effective utilization of forest residue; alternatives to burning; and alternative burning practices". ODF smoke management rules 629-048-0210 require the use of best burn practices and emission reduction techniques to minimize fire emissions.

Oregon Department of Agriculture Field Burning Program:

> Under this program, growers utilize many different techniques which minimize emissions from field burning. Rapid ignition for open burning requires all sides of the field to be ignited as rapidly as practicable in order to maximize plume rise, which shortens burn time and significantly reduces emissions (compared to traditional, slower, headfire burning). Growers must ensure field residue is dry and in good burning condition. Growers may sanitize fields by propane flaming which also significantly reduces emissions. Prior to propane flaming, loose straw is removed from the field and the stubble cut close to the ground to prevent sustained open fire and reduce emissions.

(2) Evaluation of Smoke Dispersion

Oregon Department of Forestry Smoke Management Program:

> The ODF program determines appropriate conditions for prescribed burning throughout the state in order to avoid smoke impacts in urban areas identified as Smoke Sensitive Receptor Areas (SSRA). In addition to SSRA protection, burning is conducted in a manner to avoid

or minimize smoke impacts in any populated area. Appropriate conditions are determined based on evaluation of daily weather forecasts and existing air quality. ODF develop forecasts, burning instructions and advisories using national, regional and local weather forecast models and data to determine dispersion conditions. Smoke dispersal conditions are determined for each area of the state, considering factors such as wind direction, wind speed, mixing height, and dispersion index. ODF rule 629-048-0220 describes forecast procedures and smoke dispersion.

Oregon Department of Agriculture Field Burning Program:

This program uses a variety of meteorological tools to evaluate atmospheric conditions. Conventional surface weather reports and rawinsonde observations are used to assess atmospheric conditions. In addition, the program utilizes pilot reports, a vertical sounder, and information from doppler radar. These data are supplemented with strategically located wind monitoring sites. At periodic intervals, program personnel release pilot balloons at different locations in the Willamette Valley which are optically tracked to measure wind speed and direction from the surface to approximately 6000 feet above ground. A variety of computer models or simulations of the atmosphere are used as well.

(3) Alternatives to Fire

Oregon Department of Forestry Smoke Management Program:

ODF smoke management rule 629-048-0200 "Alternatives to Burning" encourages "practices that will eliminate or significantly reduce the volume of prescribed burning necessary". In this rule forestland managers are encouraged to consult the WRAP document "Non-burning Alternatives to Prescribed Fire on Wildlands in the Western United States". This document is a comprehensive reference manual of alternatives to prescribed fire, that contains an evaluation of non-burning vegetative management options, including a "decision-tree" for considering treatment options, and potential markets and funding sources for utilizing forest materials. It also describes how to develop a successful strategy for vegetation and fuel load management. This document is designed to provide forest landowners and land managers with a comprehensive list of viable options, and decision makers with the tools necessary to develop realistic non-burning strategies.

Oregon Department of Agriculture Field Burning Program:

For agricultural field burning in the Willamette Valley, state law (ORS 468A.555) mandates a research and development program to seek, develop and promote viable alternatives to agricultural field burning. To date these programs have made major strides in finding viable alternatives, such as straw marketing to Japan and other countries, minimum tillage, and less-than-annual burning. A major reduction of 180,000 to 40,000 in the number of acres that can be burned under state law occurred in the 1990's. As a result, there has been a significant increase in the use of alternatives, both in the Willamette Valley and other areas of the state. This high use of alternatives is expected to continue into the future.

(4) Surveillance and Enforcement

Oregon Department of Forestry Smoke Management Program:

ORS 477.515 requires that burning permits be obtained prior to burning. Violation of this statute by any individual may result in a legal citation and fine. Also, it is the policy of the State Forester to "achieve strict compliance with the smoke management plan, directive and instructions", as stated in the Operational Guidance for the Oregon Smoke Management Program, Directive 1-4-1-601. ODF rules 629-048-0500 address enforcement.

Oregon Department of Agriculture Field Burning Program:

The program is built on a foundation of cooperative compliance with rules governing open field burning. This compliance is supported by ODA enforcement rules OAR 603-077-0175. Direct observation by ODA field personnel and others provide information of possible rule violations. ODA staff and director evaluate the factors involved in each case and may assess warnings, notices of noncompliance, and civil penalties.

(5) Burn Authorization

Oregon Department of Forestry Smoke Management Program:

Under the program, the burn authorization process involves the issuance of smoke management forecasts and burning instructions. Burning instructions must be strictly complied with, as described above. Local field personnel then evaluate the burning instructions in coordination with landowners who have burn units that may be in prescription and are ready for burning. A burn might not occur if the local field administrator determines that a burn may not be advisable because of local factors, such as nearby burns being conducted, potential local smoke impacts, or adverse fire conditions. ODF rules 629-048-0230 address burn procedures and authorization.

Oregon Department of Agriculture Field Burning Program:

As previously described, ODA only allows field burning if weather conditions are favorable for avoiding smoke impacts in populated areas. Farmers obtain burn permits in their local fire protection district, and must monitor ODA radio broadcasts and pay close adherence to the burning authorized in these broadcasts. Meteorology varies in the Willamette Valley, and burning is authorized in specific areas as conditions are appropriate. Special field burning zones have been established throughout the Valley. Burning is authorized based on an evaluation of the number of acres that can be burned in a certain zone within an allotted time period. Farmers must burn in accordance with the location, time, and acreage limit specified by ODA. Failure to adhere to this authorization is subject to enforcement action, as described above. ODA rules for burn authorization are addressed in 603-077-0115 and other rule sections.

12.5.6 Enforceability of Oregon's Measures

Section 51.308(d)(3)(v)(F) of the Regional Haze Rule requires States to ensure that emission limitations and control measures used to meet reasonable progress goals are enforceable.

Oregon has ensured that all emission limitations and control measures used to meet reasonable progress goals are enforceable by embodying these in Oregon Administrative Rules, in accordance with Oregon state law, and under OAR 340-200-0040 State of Oregon Clean Air Act Implementation Plan (see Appendix H of this document). The Department has adopted the Oregon Regional Haze Plan into the SIP which ensures that all elements in the plan are enforceable. Oregon BART rules developed for this plan are found in Appendix E.

12.6 Additional Measures in the LTS

This section of the LTS identifies new measures being proposed by the Department for achieving reasonable progress. The sources identified below will be evaluated and fully discussed in the next plan update in 2013. This evaluation will take into account any new relevant monitoring and modeling information related to the contribution of Oregon anthropogenic sources to Class I impairment, new regulations that may benefit regional haze, and any new guidance related to the identifying additional control measures consistent with reasonable progress requirement of the regional haze rule. If additional controls are identified as a result of these evaluations, the 2013 plan update will include an implementation schedule for controls, necessary rulemaking, projected visibility improvements, and revised RPGs for 2018 (if applicable).

12.6.1 Evaluation of Non-BART Sources and BART-eligible Sources

The four-factor analysis in Section 11.3 of the previous chapter evaluated certain non-BART source categories for additional controls. This evaluation was limited to some degree by the lack of any specific guidance for identifying "significant" sources and a process for their evaluation, short of the four statutory factors. However, the four-factor analysis is only the first step in identifying various control options for anthropogenic sources. As described in this section of the LTS, a more comprehensive evaluation will be made of both non-BART sources and large fire sources such as forestry burning, in order to make additional emission reductions by the 2018 and beyond, for achieving reasonable progress.

In order to effectively evaluate non-BART sources for possible controls, an analysis similar to that applied to BART sources is needed. Outside of the four-factor analysis for evaluating controls for "significant" sources, EPA's Regional Haze Rule provides no guidance for addressing non-BART sources, in terms of identifying eligible sources, contribution threshold to visibility impairment, and a process for evaluating the need for controls (retrofitting). Although the Department recognizes that the BART requirements were specifically designed to address stationary sources built before federal PSD rules were adopted, and thus avoiding Class I visibility requirements, the process for evaluating non-BART sources must take into account that these sources did address visibility impacts when permitted, so any re-evaluation of visibility for these sources should, at a minimum, be no a less rigorous a technical evaluation

than for BART sources. For example, using a simple formula like "Quantity over distance" (Q/d) is an example of a less rigorous approach that would not be appropriate as the sole criteria for determining whether a non-BART source, which may have conducted full PSD CALPUFF visibility modeling only a few years earlier, should be evaluated for costly retrofitting.[42]

As such, the first element of this LTS will be the development of guidance for evaluating non-BART sources in Oregon. The Department will develop this guidance through a stakeholder process that includes review by EPA and FLMs. The following factors will be considered in developing this guidance:

1. Date of PSD permit issuance. A list of non-BART sources will be prepared based on the date of the original PSD review. Newer sources are likely to have newer, more state-of-the-art controls and technology. Older sources are more likely candidates for retrofitting with newer controls or other upgrades.
2. Quantity of emissions. A list of non-BART sources emitting SO_2, NO_x, and PM will be prepared and ranked by current emission levels. Both actual and permitted emissions will be identified.
3. Distance to nearby Class I areas. Non-BART sources will be identified by their proximity to nearby Class I areas. Geographic features, such as mountain ranges, will be noted as factors that should be considered along with distance.
4. Cumulative impacts. Consideration will be given to whether the guidance should address cumulative impacts, with preference given to any EPA or WRAP policy or technical assistance in identifying criteria that could be incorporated into the guidance.
5. Option for modeling. Included in this guidance will be the option for any non-BART source to conduct modeling, either screening modeling or advanced modeling. A modeling protocol and visibility threshold value will be developed for this guidance, similar to the BART Modeling Protocol developed for BART sources.
6. Control evaluation similar to BART. This guidance will identify a process for evaluating retrofitting similar to EPA's BART Control Determination Guidance. Included in this approach will be the factors listed above.
7. Planned shutdowns, retirements, and replacement schedules. Included will be a review of all existing industrial sources to identify scheduled shutdowns, retirements in upcoming years, or replacement schedules, such as planned installation of new control equipment to meet other regulations, compliance obligations, or routine equipment replacement/modernization.

Included in this evaluation of non-BART sources will be a review of sources that were identified as BART-eligible (see Chapter 10) and modeled below the visibility impact threshold of 0.5 dv. For those BART-eligible sources which modeled below the threshold and were not "subject to BART", they are still BART-eligible sources. As such under Section 308(e)(3) of the Regional Haze Rule, they are subject to the same reasonable progress requirements in Section 308(d) as other sources. However, given that there is no specific guidance to how to

[42] The Q/D formula divides the quantity or size of the source (emissions) by the distance, in this case miles to the nearest Class I area, as a means of determining if a source is contributing to visibility in that area. This simplistic approach has been suggested by EPA in lieu of actual modeling for estimating source contribution.

address these sources after the initial BART modeling phase, the Department is proposing to develop such guidance or policy at the same time it will develop similar guidance for evaluating non-BART sources. This guidance will be developed concurrently, and through the same stakeholder process, as that developed for non-BART sources, as described above.

Schedule for Completion and Implementation

Following the completion of guidance for evaluating non-BART and reviewing BART-eligible sources, the Department will use the guidance to conduct the evaluation and review, to be completed by the next scheduled plan update in 2013, in accordance with Section 13.4.2 of this plan. A final report will be included in this update that describes the following:

(1) identify the process used for developing the guidance, and summary of the guidance document;
(2) summary of the results of evaluation of non-BART sources and BART-eligible sources;
(3) summary of how the four-factor analysis in Section 11.4.3 was used as part of the evaluation of non-BART sources;
(4) identification of any controls to be installed, description of any proposed rulemaking needed and schedule for adopting new rules, and estimated implementation of any new controls
(5) an estimate of the expected visibility benefits from this LTS element, as part of the overall plan update to report on progress being made towards the 2018 RPGs.

~~Process for Requesting a Rule Change to PGE Boardman Control Requirements~~

~~The Department expects that state and federal regulations to reduce greenhouse gas emissions from power plants, and many other sources, will be developed in the next several years. Although it is uncertain how future greenhouse gas regulations will affect PGE Boardman, the two-phased approach to reduce haze pollution at PGE Boardman will allow some time for PGE to evaluate the cost of greenhouse gas regulation in context with costs associated with the SO_2 and NO_x controls for the Boardman facility. The Department acknowledges PGE's desire to avoid costly controls for SO2 and NO_x should the company choose to close the Boardman plan due to future greenhouse gas regulations.~~

~~Should PGE determine that the impact and cost of carbon regulations will require the closure of the PGE Boardman plant, PGE may submit a written request to the Department for a rule change to the regional haze control requirements for PGE Boardman. Although this request could be made at any time, an appropriate time would be during the 2013 regional haze plan update, where it could be considered along with the Evaluation of Non-BART Sources and BART-eligible sources identified in this section. The Department recognizes that such a request could change the need for significant capital investment in regional haze pollution control equipment at Boardman, and that a decision from the EQC would be needed as quickly as possible. The Department would evaluate the merits of PGE's request in consultation with EPA, and take action as appropriate upon that request as quickly as possible. The Department~~

~~would also seek input from the public, stakeholders, tribal nations, and a fiscal advisory committee in making its determination. The Department would also expect PGE to include an analysis of the estimated emission reductions and visibility benefits from an early closure, other controls that might be feasible and cost-effective during the interim, and further analysis comparing the emission reductions and other control options to the visibility benefits from the BART and Reasonable Progress controls required for the Boardman facility by rule.~~

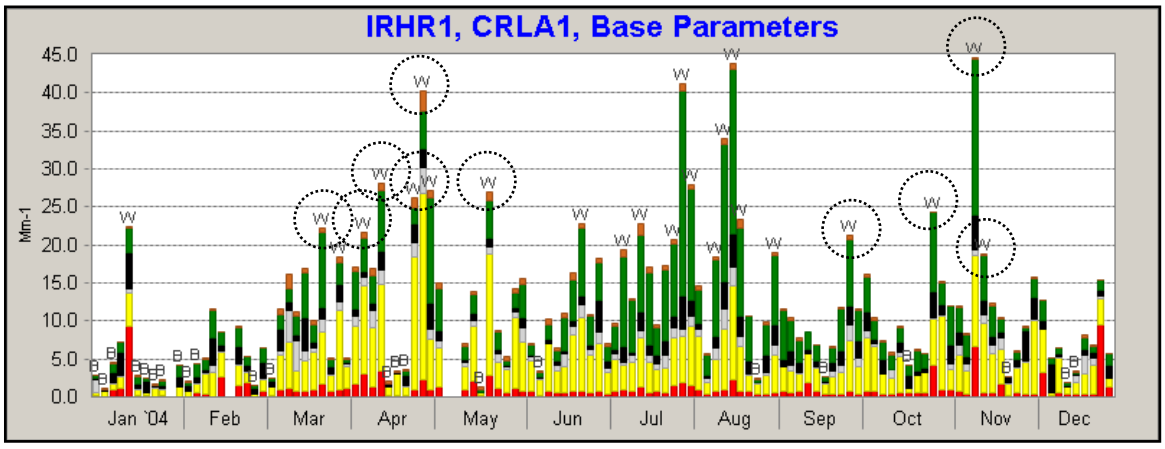
12.6.2 Evaluation of Prescribed Burning Contribution to Haze and Possible Controls

As described in Section 12.5.5, the current Oregon smoke management programs meet the ESMP requirements in Section 309 of the Regional Haze rule. However, there are also other provisions in Section 309 that address the need for state smoke management programs to "evaluate and address the degree of visibility impairment from smoke in their planning and application". Although this plan addresses Section 308, the Department believes these Section 309 requirements for fire and smoke management programs are relevant to this plan, due to the sizable contribution of smoke sources to Oregon's Class I areas. As described in Section 12.5.5, the current smoke management programs for agriculture and forestry burning are advanced programs, a play an important role minimizing visibility impacts from these activities. However, in order to make further achievements in reasonable progress, the Department believes greater efforts are need through smoke management.

Current Oregon smoke management programs have some provisions to "evaluate and address the degree of visibility impairment from smoke". The ODA Willamette Field Burning Program has provisions which prohibit weekend burning upwind of Cascade Class I areas. The Jefferson and Union County field burning programs evaluate conditions on a daily basis upwind of nearby Class I areas to avoid transporting smoke into those areas. The ODF Smoke Management Plan has "visibility objectives" in OAR 629-048-0130 that include voluntary measures to minimize smoke impacts in Class I area during the summer protection period, and use caution when burning upwind to avoid ground level plume impacts, outside of the summer protection period.

In order to determine if any additional smoke management improvements could be made to improve visibility as part of the LTS, one approach would be to look at IMPROVE monitoring data and pollutant species composition on 20% worst days, and in particular the contribution of OC and EC, as an indicator of vegetative burning. The information provided in Chapter 7 shows the average pollutant species contribution over the 2000-04 baseline period, as well as the annual variation in one year (2004), as an example of the different pollutant species typically found at Oregon Class I area. Table 12.6.2-1 below is an example from the Crater Lake IMPROVE site for 2004, showing the daily variations in pollutant species. The green represents OC, and the black EC. The peaks with a "W" represent the 20% worst case days. Those with a circle around the W are days in the spring and fall months.

Figure 12.6.2-1 Crater Lake IMPROVE Site – Pollutant Species Variation for All Days Sampled in 2004



In many ways this is typical of the impacts and variations in Oregon's Class I areas. Many of the 20% worst-case days (W) show a sizable contribution of OC and EC, which has a strong correlation to fire sources. The impacts in the summer months show an even greater contribution of these pollutant species, which is a likely indicator of wildfire. In this case, there could be some smoke contribution from Willamette Valley field burning, although the distance from the Valley to Crater Lake makes it unlikely any contribution would result in a worst day impact. Under the ODF smoke management program, there is little to no burning during the summer months.

However, during the spring and fall months, there is significant forestry burning which occurs in the state. Some of the peaks during these months show a distinct pattern of OC and EC contribution. Given the proximity of forested land around Crater Lake, this is an indication that forestry burning may be a major contributor to these spring and fall worst days. The Department believes further evaluation is needed to determine the extent of this contribution, and if additional smoke management controls could reduce the impacts on these worst-case days, and provide any substantial improvement in visibility.

The following summarizes the evaluation the Department will conduct to make this assessment of forestry smoke contribution, the type of smoke management controls that would be considered to reduce these impacts, and the schedule for completing these two evaluations by the next regional haze plan update in 2013.

Evaluation Method

As part of this LTS, the Department will evaluate monitoring data at all six IMPROVE sites for 2000-04, identifying the 20% worst-case day impacts in the spring and fall months, as in the example above in Figure 12.6.2-1, that have significant contributions of OC and EC. The general evaluation method will be as follows:

1. Compile a list of worst-case days over this 4 year period, and review ODF accomplished burn records to identify any recorded or observed smoke impacts in the Class I area or areas represented by the IMPROVE site.
2. Review burn records to identify corresponding days when prescribed burning activity was occurring, within a 50 mile radius of each IMPROVE site.
3. On days that impacts and burning match, review meteorological records to identify mixing height, transport wind direction, and other related data, on those days.
4. Compile a list of accomplished burns that correspond to the prevailing winds and mixing height, with a summary of the location, distance to impacted Class I area, estimated tons burned, and times of ignition and completion, if known. (Note - modeling may be included in this step.)
5. Provide a final assessment as to the probably each accomplished burn contributed to the impact, and an estimate of the extent of that impact.

A final report will be prepared that summarizes the overall contribution of prescribed burning to worst-case day impacts at each IMPROVE site. Included in this report will be the Class I area or areas represented by the site, the extent of the contribution from prescribed burning, any recommendations for additional smoke management protections, and the criteria or threshold level used as the basis for the recommendation. This report will be provided to ODF and federal land managers for review and comment.

Additional Smoke Management Protection Assessment

Additional smoke management protection will only be considered based on an affirmative finding from the evaluation described above, and on a case-by-case basis for each Class I area. The purpose of this additional protection would require more intensive management of prescribed burning within a certain distance upwind of an Oregon Class I area, with the objective of avoid any burning that would cause a prolonged smoke intrusion and heavy smoke concentrations, resulting in a 20% worst day impact. This additional protection would rely upon "basic" smoke management techniques, as opposed to adopting more advanced techniques. Pre-identification of burn units subject to this requirement would be necessary. Other specific provisions may be developed as needed.

The ODF smoke management program currently provides smoke protection for designated urban areas, or SSRAs. This effort requires more intensive smoke management when burning upwind of SSRAs, in order to avoid any smoke intrusion into the SSRA. The additional smoke management protection for Class I areas would be much less restrictive, as the primary objective is not to prevent any smoke, but to avoid major smoke impacts, that could result in a 20% worst day impact.

Identification of the "basic" smoke management techniques to be used for specific Class I areas would need to be determined by the Department in consultation with ODF and federal land managers. One possible approach would be to establish special protection zones of 50 miles around each Class I area. Burning within these zones would be managed to meet to visibility protection objective outlined here. Although this objective reflects the "plume blight" requirements of the Phase I visibility rules, the fact that this protection is directed at reducing

the number of 20% worst day impacts is more related to Phase II regional haze, and therefore is being proposed as part of the LTS.

Schedule for Completion and Implementation

The evaluation of forestry burning contribution to Oregon Class I areas and the need for additional smoke management protection, will be conducted in consultation with ODF, federal land managers, and other forest stakeholders. The 2013 update of the Oregon Regional Haze Plan will contain a final report on the results of this effort, and identify a schedule for revisions to the ODF Smoke Management Plan, if additional visibility protection is determined.

12.6.3 Evaluation of the Contribution from General Outdoor Open Burning

As described in Section 12.5.5, general outdoor open burning represents 16% of annual PM_{10} emissions from anthropogenic fire sources, based on 2005 estimates. The Department's Open Burning Rules in OAR Division 264 contain requirements for numerous types outdoor burning, such as domestic, land clearing, construction, demolition, and industrial. This burning occurs mostly year-round, although heaviest in the spring and fall. Each of these types of burning have different regulations to address them in various parts of the State, based primarily on the proximity population centers. These rules were adopted 20-30 years ago, mostly to address nuisance concerns, and have been revised intermittently. To date there has been no evaluation of the extent that general outdoor burning contributes to Class I visibility impairment. Unlike other types of burning, there are many different types of burning that make up this source category, and wide ranges emissions due to fuel type, fuel loading, combustion characteristics, which make difficult to obtain good emission estimates, and ultimately difficult to determine contribution to visibility impairment. However, the Department believes that an evaluation of this source is needed to determine if better emission estimations are possible, and methods for predicting how these emissions are contributing to nearby Class I areas. For the 2013 update to the Regional Haze Plan, the Department will conduct this evaluation and prepare a report with recommendations on the potential benefits to visibility by revising current open burning rules to minimize impacts on visibility, and a proposed schedule for rule revisions, if supported by the recommendations.

12.6.4 Evaluation of the Contribution from Rangeland Burning

As described in Section 12.5.5, rangeland burning represents 15% of annual PM_{10} emissions from anthropogenic fire sources, and is based on rough estimates. The majority of this burning occurs in the high desert regions in southeastern Oregon, with lesser amounts in Central Oregon. Much of the burning activity is on lands under the authority of the federal Bureau of Land Management. Due to the remote locations and lack of population in the areas where burning historically occurs, there has been little to no regulation of this activity. Information on acres burned is limited, and no smoke management controls have been considered necessary do to the infrequency of reported smoke problems. However, some estimates on the amount of rangeland burning in SE Oregon indicate 200,000-300,000 acres may be burned each year. This raises the possibility that nearby Class I areas are being impacted by this burning during certain times of year. During the 2007 review of the Oregon Department of Forestry's smoke

management program, the Department discussed with ODF the need for obtaining better information on the extent of rangeland burning, and smoke management coverage should be extended to that part of the state. For the 2013 update to the Regional Haze Plan, the Department will conduct evaluation on the extent and possible contribution of rangeland burning to Class I visibility impairment, and prepare a report with recommendations for next steps, that may include tracking acres burned and voluntary smoke management measures.

12.6.5 Efforts to Address Offshore Shipping

As described in Chapter 9, both the PSAT and WEP results show offshore marine vessel emissions as a major contributor to Oregon Class I areas, especially in Western Oregon. If compared to emission inventory data in Chapter 8, marine vessel emissions are 56% for SO_2 and 31% for NO_x of the total 2002 statewide emission inventory for these pollutants.

Currently, the Department has limited authority in Oregon to regulate offshore shipping emissions. State regulations on shipping apply only to vessels on the Willamette and Columbia rivers. On July 24, 2008, the State of California adopted new strict regulations for marine vessels within 24 miles of shore. The Department expects that implementation of these new regulations for marine vessels will have benefits in Oregon.

The Department will prepare a report for the next plan update in 2013, that includes any estimates on visibility improvements in Oregon from the California regulations, any new information or studies on the transport and contribution of offshore shipping, any new regulatory actions expected to meet other Clean Air Act requirements, and recommendations on what regulatory actions Oregon could pursue to address this source.

12.7 Projection of the Net Effect on Visibility

The anticipate net effect on visibility from emission reductions by point, area, and mobile sources during the period of the LTS has been estimated by the WRAP, based on monitoring, emission inventory, and modeling projections. The results of the CMAQ modeling described in Section 9.3 show anthropogenic emission sources declining significantly across the West and in Oregon through 2018. However, overall visibility benefits of these reductions are somewhat offset by emissions from natural sources such as wildfire and dust, and other uncontrollable sources. This includes international sources in Canada and Mexico, global transport of emissions, and offshore shipping in the Pacific Ocean. Despite this, it is clear that visibility improvements will be made due to the control of BART sources, numerous on-the-books regulations such as state and federal mobile source rules, and elements contained in the LTS to address non-BART sources and fire emissions over the next 5-10 years that may provide additional improvements by 2018. The WRAP has also committed to conducting final reasonable progress modeling when all BART results are complete, which will likely reveal additional progress toward the 2018 URP.

As part of the requirement to submit 5-year progress reports in Section 13.4.3 of this plan, the Department will include in the 2013 update any additional visibility improvements expected due to updated CMAQ or other regional modeling information from the WRAP, or other

pertinent new information related to the demonstration of reasonable progress in Chapter 11 of this plan. This will include information related to the visibility improvement expected from significant emission reductions from the PGE Boardman plant, under DEQ's BART rules associated with the 2020 closure, as described in Chapter 10, and the extent it can be determined how much the reduction in visibility impact from this plant affects the reasonable progress goals described in Chapter 11.

Summary of Public Comments and Agency Responses

Revisions to DEQ Regional Haze BART rules for the PGE Boardman Power Plant

Prepared by: Brian Finneran, Mark Fisher and Pat Vernon, DEQ Air Quality Division
Date: Nov. 30, 2010

Comment period	There were two public comment periods associated with this rulemaking. The first was from September 1, 2010, to October 1, 2010, with five public hearings. The second was from October 29, 2010, to November 15, 2010, with two additional public hearings.
Public hearings	DEQ held the following public hearings: • Sept. 21, 2010, 6 p.m. Metro Regional Center, Council Chambers 600 NE Grand Avenue Portland, OR 140 people attended the hearing; 42 people testified. • Sept. 23, 2010, 6 p.m. Eugene State Office Building, Willamette Conference Room 165 East 7th Avenue Eugene, OR 33 people attended the hearing; 15 people testified • Sept. 28, 2010, 6 p.m. Hermiston Conference Center 415 S. Hwy 395 Hermiston, OR 48 people attended the hearing; 22 people testified • Sept. 29, 2010, 6 p.m. DEQ Medford Office, Conference Room, Suite 201 221 Stewart Avenue Medford, OR 12 people attended the hearing; 9 people testified • Sept. 30, 2010, 6 p.m. Columbia Gorge Community College Health Sciences Building Building Three, Room 3.203 400 E. Scenic Drive The Dalles, OR 39 people attended the hearing; 21 people testified

	• Nov. 8, 2010, 6 p.m. Metro Regional Center Council Chambers 600 NE Grand Avenue Portland, OR 55 people attended the hearing; 41 people testified • Nov. 9, 2010, 6 p.m. River Front Room 2 Marine Drive Boardman, OR 32 people attended the hearing; 17 people testified Total attendance at public hearings: 359 persons Total number providing verbal testimony: 167 persons
Organization of comments and responses	Summaries of the comments received and DEQ's response are provided below. Comments are summarized by issue category. The full public record is available for review by the public at the Portland DEQ office (811 SW 6th Ave.). Copies are available upon request.
Explanation of acronyms used in this document	BART = Best Available Retrofit Technology DSI = Dry Sorbent Injection DEQ = Department of Environmental Quality EPA = Environmental Protection Agency EQC = Environmental Quality Commission LNB/MOFA = Low NOx Burner with Modified Overfire Air (control equipment) NOx = Nitrogen oxides PGE = Portland General Electric PM10 = Particulate Matter under 10 microns in size SO_2 = Sulfur dioxide SDFGD = Semi-dry Flue Gas Desulfurization (also called a "dry scrubber") SNCR = Selective Non-Catalytic Reduction (control equipment) SIP = State Implementation Plan VOC = Volatile Organic Compounds

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Overview of public comment process

DEQ presented this proposed rulemaking for public comment from Sept. 1, 2010 to Oct. 1, 2010, and from Oct. 29, 2010 to Nov. 15, 2010. Comments were received via email, in writing and orally. DEQ received the following types of comments:

- 1795 emails
- 91 written letters (by mail, at hearings or attached to emails)
- 5728 postcards
- 167 persons testified at the public hearings. (see DEQ's Hearing Officer's Report on Public Hearings, Attachment C)

Overall, DEQ received 8193 comments.

All comments received have been made part of the public record and have been reviewed by DEQ. In addition to this summary, the full record of individual comments will be made available to the Environmental Quality Commission. A copy of the full public comment record is available for the DEQ Headquarters, 811 SW 6th Ave. Portland. Photocopies of the record are available for a fee.

Overview of this comment and response document

Due to the large number public comments, this document is organized by type of comment, rather than name of commenter. Comments are grouped into six issue categories, as described below. DEQ responses correspond to the order of the comments listed in each issue category. In a few cases, there may be one DEQ response addressing several comments. Due to this format of grouping comments by issue category, most comments have been summarized or paraphrased.

The following describes the six sections in this document:

1. Comments related primarily to DEQ's proposed three emission reduction options. Subcategories in this section address various comments on each of the three options, the cost effectiveness threshold of $7,300 per ton, DEQ's fiscal impact analysis, and miscellaneous related comments.

2. Comments related primarily to support of PGE's "BART III" 2020 plan. Subcategories in this section include the proposed pilot study for dry sorbent injection (DSI) controls, specific DSI feasibility comments, and the BART approvability of PGE's plan.

3. Comments primarily in support of other options or approaches to the proposed early closure of the Boardman plant by PGE. Subcategories include comments opposed to any plant closure, various comments supporting immediate closure, or prior to 2020, and comments in favor of postponing or taking no action.

4. Comments related primarily to PGE's revised 2020 proposal and DEQ's re-opening of the comment period. Subcategories include comments in favor or opposed to the proposal, and whether to add earlier closure options to the rules.

5. Other comments and issues related to this rulemaking, but not falling into any of the above sections. Subcategories include comments on impacts on air quality and public health, opposition to coal burning, and comments related to DEQ's BART analysis for the Boardman plant. In most cases these comments are beyond the scope of this rulemaking, but DEQ responses have been provided.

6. Miscellaneous comments, similar to Section 5, but beyond the scope of this rulemaking with no DEQ response. These are included as general issues and concerns being included for the record.

How to find your comments

Using the overview described above, go to the section that corresponds to the comment you provided to DEQ. DEQ made every effort to identify as many comments as possible, and has provided a response to each one. However, due to the extremely high number of comments, DEQ was not able to cross reference each comment to the person or organization providing the comment.

All persons who provided comments are listed at the back of this document, starting on page 28. This list is divided into (1) written letters, sent by mail, provided at a hearing or attached to an

email; (2) oral testimony provided at the public hearings; and (3) email comments.[1] Commenters are also listed by whether the comment was provided in the first or second public comment period. To avoid duplication, those who provided both oral and written comments, priority was given responding to comments provided in writing rather than oral testimony, based on time limitations on testimony that were necessary at the hearings. Also, many of the comments were provided via a form letter, either by email or a postcard. These names are listed separately in an attachment to this document, due the very high volume of names. See Attachment 1. Both this document and Attachment 1 are provided on DEQ's website at www.deq.state.or.us/aq/pge.htm.

General guide to comments

To assist in finding your comments, the following is a summary of the different groups that commented on this rulemaking, and notes where in this document the responses can be found. This is intended to be a general guide to finding most of the comments, but not all.

1. *Comments provided by EPA, National Park Service, and the U.S. Forest Service.* These comments focused on the technical and cost aspects of DEQ's three proposed emission reduction options, citing general support of them, but suggesting more stringency in some cases. These comments also did not support PGE's BART III 2020 proposal, citing technical and cost concerns.

2. *Comments from PGE, Industry, Business and Utility related groups, city and county governments, chambers of commerce, and Morrow County government.* The majority of these comments supported PGE's BART III 2020 proposal and PGE's revised 2020 proposal, and generally opposed DEQ's proposed three options, citing concerns primarily about the cost and timing of DEQ's options. There were also comments about potential impacts to the economy under any early closure scenario.

3. *Comments provided by environmental organizations*. This included the Oregon Environmental Council, Sierra Club, Northwest Environmental Defense Center, Friends of the Columbia Gorge, Columbia Riverkeeper, Hells Canyon Preservation Council, Environment Oregon, National Parks Conversation Association, Greenpeace, and others. These comments generally supported DEQ's proposed three options, but also suggested more stringency in some cases. They focused on the importance of an early closure of PGE Boardman plant, citing concerns about the plant's visibility impacts in Class I areas and the Columbia Gorge, on public health and the environment, and global warming. Some cited specific technical and cost reasons for more stringent emission limits prior to an early shutdown of the plant. Other comments focused on the need to end reliance on coal energy, avoid making additional major investments in the Boardman plant if it is closing, and instead invest in cleaner, lower-carbon energy resources.

4. *Comments from the general public.* These comments reflected the divergent opinions between support of PGE's two proposals, and those in favor of an earlier closure. Many of the latter comments supported a 2015 plant closure, such as DEQ's Option 3, or the earliest possible

[1] Those who submitted written letters with verbal testimony or attached to an email are listed under "written letters." This grouping of comments is based on ease of organization, and does not reflect any ranking or priority order based on type of comment provided to DEQ.

closure of the plant. Separate from these comments were some which did not support any early closure, and instead urged PGE to continue operating the plant until 2040 and beyond.

SUMMARY OF COMMENTS AND DEQ RESPONSES

I. Comments on DEQ's Proposed Three Emission Reductions Options 1, 2 and 3

1. DEQ's Option 1 should consider selective catalytic reduction for NO_x	a) In determining that selective catalytic reduction was not cost effective for Option 1, DEQ overestimated the cost of Option 1 controls, and underestimated the control effectiveness of selective catalytic reduction, which can achieve a 90 percent NOx reduction. DEQ should consider selective catalytic reduction as BART for Option 1. b) Selective catalytic reduction can reduce emissions by 90 percent. The emission limit that is achievable for selective catalytic reduction is 0.02 lb/mmBtu heat input, not 0.07 lb/mmBtu, as currently in DEQ's rules. c) Using EPA's Cost Manual, if selective catalytic reduction is operated for at least five years, the cost meets the $7,300/ton threshold used by DEQ.
Response	*a) DEQ evaluated the cost of selective catalytic reduction for the rules adopted in 2009. DEQ contracted with ERG to specifically evaluate the costs of selective catalytic reduction. ERG concluded that PGE's analysis is on the high end of the range of costs associated with selective catalytic reduction retrofits. DEQ accepted PGE's cost analysis due to the unique technical difficulties associated with retrofitting the Boardman plant with selective catalytic reduction. DEQ agrees that selective catalytic reduction on some units can achieve actual emissions at or below 0.05 lb/mmBtu, but setting an emission limit at those levels would be difficult to comply with at all times. The limit that would represent BART for selective catalytic reduction was chosen at a level that can be achieved at all times. The limit was then used to evaluate emission reductions due to selective catalytic reduction.* *b) DEQ does not agree that the Boardman Plant could consistently achieve 0.02 lb/mmBtu, if at all.* *c) DEQ's consultant, ERG, concluded that the actual cost of retrofits is higher than the estimates provided by CUE cost and EPA's Cost Manual. DEQ understands this is due to a very dramatic increase is labor and material costs in recent years.*
2. DEQ's Option 1 is too costly.	a) Cost information provided by the engineering company Sargent & Lundy indicates that the true cost of SDFGD is 30 percent higher that DEQ's estimate, and thus exceeds the $7,300 cost-effective threshold, making Option 1 too costly. b) DEQ's Option 1 is just too expensive. Claiming this option cost $177 million less than the existing rules makes no sense either, as both approaches are too expensive and unsound investments. c) DEQ's Option 1 imposes significant costs ($300 million) with little or no

	environmental benefit, and just doesn't make sense. d) DEQ's Option 1 cost $217 million more than Option 2. That is significant, and the money would be better spent on securing the cleanest and most reliable power by 2020.
Response	*a) DEQ is not relying on the cost estimates provided by Sargent & Lundy because the analysis did not include any supporting documentation.* *b) Option 1 was based on PGE's BART proposal in April, which did not include consideration of dry sorbent injection (DSI). Without DSI as a consideration for a 2020 closure, DEQ determined that semi-dry flue gas desulfurization is a cost effective control for a 2020 closure. DEQ concluded that selective catalytic reduction is not a cost effective control for a 2020 closure. In comparison to the rules adopted in 2009, Option 1 would save $191 million dollars in capital investment for selective catalytic reduction. DEQ concluded that the suite of controls associated with the 2009 rules were cost effective considering the plant could operate indefinitely.* *c) Option 1 provided significant environmental benefit: SO2 reduction of 11,988 tons/yr and visibility improvement of 3 dv in the Mt. Hood Wilderness area, not to mention the visibility improvement in 13 other Class I areas.* *d) PGE could decide to close the plant in 2018 and use the $217 million to develop replacement power.*
3. DEQ Option 2 should not have been proposed	a) DEQ should not propose an option that anticipates a 2018 closure, since PGE has not offered such a closure date, and DEQ lacks legal authority to require it.
Response	*a) DEQ's Option 2 was not being proposed as a required closure date. This decision is to be made by PGE. DEQ's Option 2 was a choice for PGE, should it desire an earlier date than 2020. Option 2 represents an alternative for meeting BART that has a significantly lower cost associated with it, due to different SO_2 controls being proposed than DEQ's Option 3.*
4. DEQ Options 1 and 2 need modeling	a) DEQ failed to conduct a complete modeling analysis for Options 1 and 2.
	a) DEQ evaluated the impacts in 6 of the 14 Class I areas, as well as the Columbia River Gorge. Total impacts for all Class I areas was estimated by interpolation of the existing modeling data. Since the rules were proposed, DEQ has completed modeling of all Class I areas. The results are provided in an addendum to DEQ's BART report.
5. DEQ's Option 2 should consider SDFGD for SO_2	a) In determining that Semi-dry flue gas desulfurization (SDFGD) was not cost effective for Option 2, the cost of SDFGD was overestimated and its effectiveness was underestimated. DEQ should consider SDFGD as BART for Option 2. b) SDFGD can reduce emissions by 95 percent. A permit recently issued to a plant in Nevada set an emission limit of 0.09 lb/mmBtu heat input, based on a 24-hr rolling average, and not 0.07 lb/mmBtu, as currently in DEQ's rules. d) Using EPA's Cost Manual, if SDFGD is operated for three years, the cost meets the $7,300/ton threshold used by DEQ.

Response	*a) Based on DEQ's evaluation of PGE's cost analysis of selective catalytic reduction, as discussed above, DEQ concluded that PGE's cost analysis for SDFGD was acceptable. DEQ evaluated the performance of SDFGD at other plants and concluded that a limit of 0.12 lb/mmBtu could be achieved at all times and represents BART. Lower limits may not be achievable at all times for a retrofit installation.* *b) 95 percent reduction depends on the uncontrolled SO2 limits. The higher the uncontrolled emissions, the more emission reduction is possible. The federal New Source Performance Standards take this into consideration, so it is reasonable to also consider it for BART. The Boardman Plant's uncontrolled emissions are relatively low due to the use of low-sulfur coal. New plants are expected to meet lower limits because they can be specifically designed to meet the lower limits.* *c) Please see the response to (a).*
6. DEQ's Option 2 DSI controls can achieve much higher efficiency	a) DEQ has assumed that Dry Sorbent Injection (DSI) can only achieve a 35 percent SO_2 emission reduction, when 90 percent efficiency can be achieved. DEQ should require the lowest emission limit possible.
Response	*a) DEQ is not aware of a DSI system such as proposed for the Boardman Plant to have been installed on a similar sized unit. DSI has been used on smaller units that also included fabric filters, which both contribute to improved efficiency of the DSI system. DEQ's proposal relies on the existing ESP and does not include the installation of a fabric filter, which would cost over $100 million. In addition, the ducts between the air heater and the ESP are much larger at the Boardman Plant. It is more difficult to adequately disperse the sorbent reagent in larger ducts and still maintain enough residence time for the sorbent to react with the SO2. 35 percent efficiency is probably a little conservative, but a BART limit should be achievable at all times.*
7. DSI controls should be installed sooner rather than later	a) The DSI controls being proposed as part of this rulemaking should be installed as expeditiously as possible, in according with BART requirements.
Response	*a) The BART rules allow controls to be installed up to 5 years after EPA approves revisions to the state implementation plan (SIP). EPA may approve the SIP revision as early as May 2011, so the absolute latest the controls could be installed would be May 2016. DEQ recommends the DSI controls be installed by 7/1/14, nearly two years before the BART rules would require. The proposed compliance date allows PGE three years to design the system and conduct the pilot study, which may involve evaluation of several types of sorbent materials and injection locations, along with particulate matter stack testing. Given the extent of the pilot study, three years to install the controls is considered "as expeditiously as possible."*
8. DEQ's Option 2 emission limit enforceability	a) If DEQ agrees to PGE's proposal for a DSI pilot study to evaluate the feasibility of DSI technology, DEQ rules will need to ensure that the emission limit found to be achievable is also enforceable.

Response	*a) DEQ agrees. The revised rules include provisions for establishing the alternative limit in the Oregon Title V Operating permit to ensure that the limit is federally enforceable.*
9. DEQ's Option 2 should extend to 2020.	a) Since there is some question about DSI equipment on facilities as large as Boardman, technology, a reasonable compromise may be to extend DEQ's Option 2 to 2020, but include more stringent emission limits of 0.35 lb/mmBtu in 2019, and 0.30 lb/mmBtu in 2020. b) Allow the Boardman plant to operate until 2020, but for the last 3 years (2017-2020), limit the plant's emissions by two-thirds, so that total emissions during this time would be the same as DEQ's Option 2, which has a 2018 closure date. c) Pursue a compliance agreement that combines Option 2 and PGE's BART III, and achieves the optimum pollution control at a reasonable cost to PGE, based on reduced hours of plant operations during the final two to three years of plant operation. d) DEQ's Option 2 should extend to 2020, provided PGE take immediate steps to develop replacement power to offset the early closure. PGE's proposed 2020 shutdown is reasonable because it is only two years beyond the 2018 date in DEQ's Option 2, and is technically similar.
Response	*a) DEQ agrees this approach may be a reasonable compromise, subject to conducting a pilot study of DSI to determine the feasibility of this technology, as proposed by PGE. DEQ is recommending a limit of 0.40 lb/mmBtu in 2014 and 0.30 lb/mmBtu in 2018, contingent on the results of the pilot studies.* *b) DEQ evaluated lowering the limit to accommodate 2 additional years of operation and determined that limits in 2014 and 2018 are reasonable considering the time it will take to conduct the pilot studies.* *c) DEQ believes that limits on hours of operation would have to be proposed by PGE, much the same as a commitment to closing the plant. DEQ does not have the authority to close a plant or limit hours of operation, unless specifically requested by the owner of the facility.* *d) DEQ has no authority over the development of replacement power. DEQ must ensure that the BART requirements are met for the existing unit during the time that it is operating.*
10. DEQ's Option 2 cost is uncertain	a) DEQ's analysis suggests Option 2 will cost $103 million. However, if the DSI controls increase particulate emissions and triggers the need for a baghouse, the cost could double. This would make Option 2 no longer cost effective. b) Cost of the controls under this option won't be determined until this equipment is installed. This option does not make sense.
Response	*a) DEQ agrees. DEQ's analysis of DSI did not include a fabric filter. DEQ has revised the proposed rule to include a pilot study to ensure that a fabric filter will not be required.* *b) DEQ's cost estimate is based on vendor data, but the cost may be overstated because it is not clear whether the vendor would include a fabric filter or not. PGE provided a cost estimate that does not include a fabric filter. PGE's cost estimate is less than DEQ's estimate by about $28 million.*

11. DEQ's Option 3 should consider DSI for SO_2	a) Under BART, the five-year requirement to install BART says "as expeditiously as practicable." It is possible that DSI could meet DEQ's cost-effectiveness threshold if only used for a few years, and therefore should be required under Option 3.
Response	*a) DEQ has agreed to a pilot study to ensure that the DSI limit will not result in a requirement to install a fabric filter. PGE will probably not initiate the study until the rules are approved by EPA in 2011. This allows PGE about 3 years to conduct the pilot study and make any permit revisions necessary to install and operate the DSI system. A compliance date of 7/1/14 will require installation of the DSI system as expeditiously as practicable.*
12. DEQ's Option 3 should include SNCR	a) In addition to Low NOx burners and Over-fire air system, Option 3 should include Selective Non-Catalytic Reduction, as it meets DEQ's $7,300 cost effectiveness threshold.
Response	*a) DEQ included SNCR in Options 1 and 2, but no longer recommends SNCR because it will only provide 0.18 dv improvement and there are concerns with the ammonia slip contributing to fine particulate matter emissions. DEQ does not believe it is cost effective for Option 3, which will result in closure of the plant 5 years sooner than the 2020 option.*
13. DEQ's Option 3 closure date	a) The closure date under Option 3 needs further clarification, as it is tied to EPA approval of the Oregon SIP within 5 years. In case approval is delayed, the following language should be added: "but in no event later than May 16, 2016."
Response	*a) DEQ does not agree. The whole concept of Option 3 is tied to EPA's approval of the SIP as specified in the BART requirements.*
14. DEQ's Option 3 should be adopted.	a) The PGE Boardman plant is Oregon's largest source of smog, acid rain, haze, and carbon dioxide. DEQ's Option 3 2015 closure is the best alternative. b) Option 3 represents the best balance between the environment, public health, and electricity rates.
Response	• *DEQ appreciates the support for Option 3.*
15. Support 2015 closure	a) Support ending coal burning by 2015 and transitioning to cleaner energy sources, in order to reduce haze, acid rain, and mercury contamination, especially in Columbia Gorge. b) Closing the Boardman plant in 2015 gives PGE enough time to develop alternatives and cleaner energy. c) The pollution from the PGE Boardman plant poses a major risk to public health and global warming, and the cheapest and environmentally responsible option is to close the plant by 2015.
Response	• *DEQ believes the proposed Option 3 is the best approach to a plant closure in 2015, should PGE choose this option.*
16. DEQ's 3 options should be adopted.	a) DEQ's 3 proposed options should be adopted as proposed. They provide the greatest practicable protection of visibility in the Columbia Gorge, when considering technical feasibility, costs, and other important socio-economic values. b) DEQ's three early closure options should not be watered down.

Response	• *DEQ appreciates the support for the three options being proposed.*
17. DEQ's cost effectiveness threshold of $7,300	a) DEQ's cost effectiveness threshold is too high, as other BART analyses across the country are much less. DEQ used the highest cost it could find, citing a proposed BART determination in another state that has not yet been officially approved. b) DEQ's cost effectiveness threshold is too high and too expensive. c) DEQ's cost effectiveness threshold does not take into account the benefits associated with early closure, and should be lower. d) DEQ's approach to cost effectiveness is problematic, in that it is much different than the PUC's view of cost effectiveness. It should be more flexible. e) DEQ should not be proposing one of the highest thresholds of $7,300, but rather a reasonable lower cost way to meet federal requirements. DEQ should be trying to make this affordable for customers, not the most expensive. f) Using DEQ's $7,300 per ton cost threshold, installing selective catalytic reduction controls for the remaining useful life of 5 years under this threshold, and should be considered under DEQ's Option 1. g) Using DEQ's $7,300 per ton cost threshold, installing SDFGD controls for the remaining useful life of 3 years falls under this threshold, and should be considered under DEQ's Option 2. h) Using DEQ's $7,300 per ton cost threshold, installing SNCR controls for the remaining useful life of 2 years is under this threshold, and should be considered under DEQ's Option 3.
Response	*a) BART is based on several factors. No single factor can determine BART. DEQ considers $7,300 to be cost effective considering the number of Class I areas impacted and the magnitude of the impacts. Plant closure will provide significant visibility improvement in the long term, but not for the short term. BART must address both short and long term impacts. The remaining useful life of the plant is a significant factor for determining the cost effectiveness of a control option. DEQ has included the remaining useful life of the plant in its analysis.* *b) See response (a).* *c) See response (a).* *d) DEQ is unable to respond to this comment.* *e) DEQ is aware of the potential cost to rate payers. The modified 2020 proposal does not include SDFGD or selective catalytic reduction, which are the most expensive control options.* *f) DEQ does not agree that selective catalytic reduction is cost effective for 5 years. The incremental cost as compared to LNB is greater than $10,000/ton if selective catalytic reduction is installed on 7/14, which is 6.5 years of operation. The incremental cost would be even higher for 5 years of operation.* *g) According to DEQ's analysis, the cost effectiveness of SDFGD is approximately $7,300/ton, which is the threshold for cost effectiveness. That is why SDFGD is not included in option 2. The incremental cost as compared to DSI is approximately $7,200/ton if the plant runs until 12/31/20. Therefore, DEQ does not consider SDFGD cost effective for a 2020 closure, as well.* *h) DEQ agrees that SNCR is cost effective, but SNCR will only achieve .018 dv further visibility improvement as compared to LNB. Considering the negligible*

	improvement and the potential PM issues associated with ammonia slip, DEQ does not recommend SNCR.
18. DEQ's cost per deciview	a) DEQ used a cost per deciview of $10 million/dv as a factor in determining BART. This is below the national average of $14-$18 million/dv.
Response	*a) Cost effectiveness in terms of deciviews is not a well established parameter. DEQ has tried to incorporate the parameter into its BART analysis using information from several, but not all BART evaluations. DEQ appreciates the additional information.*
19. DEQ's use of incremental cost	a) According to EPA's BART Guidelines, incremental cost should be used in combination with the average cost effectiveness in determining BART. To use incremental cost correctly, it must be compared to other similar situations. DEQ did not provide comparisons of incremental cost used by other states for BART. b) DEQ should clarify that the $7,300/ton threshold applies to both the annualized cost effectiveness and the incremental cost effectiveness.
Response	• *DEQ used incremental cost in addition to average cost effectiveness in its analysis. The same threshold is used for incremental cost as is used for the average cost effectiveness.*
20. Emission reductions after closure	a) DEQ's proposed rulemaking fails to fully consider or recognize the impact of an early closure, in terms of the elimination of all emissions.
	a) DEQ acknowledges that plant closure will eliminate 25,700 tons of visibility impairing pollutant emissions from the coal-fired power plant and will eliminate its impact on the visibility in Class I areas. This is a significant factor for meeting the reasonable progress goals of the regional haze program. However, DEQ must also satisfy the BART requirements in the near term.
21. Determining compliance with NOx limits	a) As currently proposed, DEQ's rules allow PGE an entire year to demonstrate compliance with the 30-day rolling average NOx emission limit. This amount of time is unnecessary, and should be changed to 30 days after the emission limit goes into effect.
	a) DEQ recommends changing the evaluation period to 180 days based on a 30-day rolling average. This will provide PGE time to fine tune the low NOx burners.
22. Startup/shutdown emissions not addressed	a) DEQ's proposed BART rules improperly exclude emissions during periods of startup and shutdown, related to the emission limits proposed for NOx, SO2, and PM. The rules need to account for the frequency and duration of these periods, the quantity of emissions, and the visibility impacts during these periods in Class I areas.
	a) DEQ does not necessarily agree that BART was intended to establish emission limits and controls for startup and shutdown periods. The BART guidelines specifically state that emissions during startup and shutdown should not be used in the visibility analysis used to determine if a source is subject to BART.

	(Guidelines III.A.2.Option 1) This analysis is not only used to establish whether a source is subject to BART, but also establishes the baseline for evaluating the visibility improvement due to various control technology options. Without determining the visibility impacts during periods of startup and shutdown in the baseline period, it is not possible to evaluate the visibility improvement of retrofit control technologies during periods of startup and shutdown. However, to minimize the emissions during periods of startup and shutdown, DEQ recommends making the current NSPS limits for SO_2 and NO_x applicable at all times. For PM, DEQ recommends adding a reference to DEQ's excess emission rules that require approved startup/shutdown plans for minimizing emissions to the extent practicable, including minimizing the duration of startups. (see OAR 340-214-0310)
23. DEQ's Fiscal Impact Statement	a) DEQ's Fiscal and Economic Impact Statement was flawed, in that it failed to consider the cost of replacement power associated the with Boardman plant closure. b) The cost of any BART option that includes mandatory or premature plant closure must include cost of replacement power. c) In identifying increases in electricity rates, DEQ did not consider factors such as the timing of these rate impacts and whether they might affect different customer classes disproportionally. d) DEQ's Fiscal and Economic Impact Statement should have included an analysis of the benefits of greenhouse gas reductions associated with early plant closure. e) DEQ's Fiscal and Economic Impact Statement did not adequately consider the impact of plant closure on the economy, such as loss of employment and tax revenue.
Response	*a) DEQ is required to conduct a fiscal and economic impact analysis on the costs related to the rulemaking it proposes. This rulemaking would require the installation of pollution control equipment, or other changes at the Boardman plant to meet emission limits based on DEQ's BART determination. As a result, the costs identified in the fiscal and economic impact statement address the costs of purchasing, installing, and operating the pollution controls. It should also be noted that the proposed rules provide PGE with the option of closing or continuing to operate to 2040 and beyond, under the existing rules. DEQ is not requiring early closure, nor has the authority to do so. Decisions that PGE may make in the future about replacement power, should Boardman close, is part of the Integrated Resource Planning process that involves PGE and the Public Utilities Commission, and therefore beyond the scope of this rulemaking. Having said this, DEQ did include did include information provided by PGE on likely rate impact increases if PGE decides to close the plant, that included potential cost of replacement power, and cost associated with decommissioning the plant.* *b) See response (a).* *c) DEQ's Fiscal and Economic Impact Statement did include estimates of electricity rate increases on different customer classes, such as residential, small business, local government, and others, based on the three options being proposed, and in comparison to the rate impacts under the current 2009*

	rules. The estimates of rate increases did vary between these customer classes, showing how the potential impacts could be disproportional between these classes. *d) DEQ's Fiscal and Economic Impact Statement did not an analysis of the greenhouse gas emission reduction benefits. As noted above, this rulemaking addresses regional haze/BART requirements, not carbon regulation. An analysis of these benefits is beyond the scope of this rulemaking.* *e) DEQ did include a preliminary assessment of the potential economic impacts on employment and local government tax revenues, even though these costs are not a direct result of the proposed rules, but rather the result of a decision made by the PGE and owners of the Boardman plant to close early.*
24. Miscellaneous	a) DEQ should add to its proposed rules additional time for compliance, if DEQ cannot act on a permit application to install controls in a reasonable timeframe. b) Remove the reference in the rules to the "Foster-Wheeler boiler" at the Boardman plant. DEQ should strike this name, and replace it with "any coal-fired boiler", so that no other coal-fired boiler could be installed. c) The enforceability of DEQ's three options is not strong enough. The rules should void the operating permit for the plant if PGE fails to comply with the selected closure deadline. Also, the rules should state that non-compliance would result in the state, EPA, and citizens are able to apply for both injunctive and civil penalty relief. d) DEQ should correct its definition of deciview in Section 340-223-0020 to: $(dv) = 10\ln(b_{ext}/10\ Mm^{-1})$ e) In Section 340-223-0040, please specify the averaging period for the 0.070 lb/mmBtu NOx emission limit. f) Please specify the control technologies assumed to be implemented to achieve the emission rates in each rule section on DEQ's three options. g) As currently proposed, the rule allows PGE an entire year to demonstrate compliance with the 30-day rolling average NOx emission limit. Rather than a year, the rule should say "within 30-days after the emission limit goes into effect." h) Section 340-223-0080 in (2)(b)(A) has a typo. It says the emission limit is 0.40 lb/mmBtu, but it should be 0.12 lb/mmBtu. i) DEQ should work openly and collaboratively with the Oregon PUC and utilities to find a workable solution. j) DEQ's proposed rules, when combined with many other federal regulations, such as greenhouse gas emissions and hazardous air pollutants, impose such significant costs that they are essentially regulating the plant out of business.
Response	*a) DEQ has added provisions for extending the compliance date in the event the DEQ does not issue a timely permit revision, but the extension is limited to no more than 5 years from the date EPA approves the SIP revision.* *b) DEQ has revised the rules to "cease firing coal" instead of requiring shutdown of the Foster Wheeler boiler.* *c) DEQ believes that the rules for ceasing to fire coal are enforceable by the state and will be federally enforceable once EPA approves the revision to the SIP.* *d) The proposed rules have been revised as requested.* *e) DEQ will add a 30-day rolling average to the limit.*

	f) Option1 and 2 are now combined. The control technologies are low NOx burners with over-fire air on 7/1/11, SNCR contingency by 7/1/13 if 0.23 lb/mmBtu can't be met by 7/1/11 with the low NOx burners, dry sorbent injection on 7/1/14 with a limit of 0.40 lb/mmBtu and dry sorbent injection with a limit of 0.30 lb/mmBtu by 7/1/18. *g) DEQ agrees. The evaluation period has been shortened to 180 days.* *h) DEQ has made the correction.* *i) The PUC is considered a significant stakeholder for DEQ's rulemaking.* *j) DEQ agrees there are many uncertainties associated with future regulations and the viability of the plant.*

II. Comments on PGE's BART III 2020 Proposal alternative to DEQ's three options

A. Comments in Support

1. 2020 closure is reasonable	a) PGE's BART III proposal meets federal requirements, is cost effective, and is the best approach for the economy in meeting PGE's objective for an early closure. b) PGE's BART III proposal should be supported as it is reasonable approach for closing the plant 20 years earlier than planned. c) PGE's BART III proposal is the least expensive to customers and provides environmental benefits. d) PGE's BART III proposal is a reasonable, cost-effective step to improve air quality in the near term, while providing even greater improvements over the long term. e) PGE's BART III proposal for a 2020 shutdown is reasonable, in that it provides enough transition time to buy or build affordable replacement power. f) PGE's BART III proposal for a 2020 shutdown is reasonable, in that it would lessen the economic impact, and allow workers at the plant and nearby communities to make transition and adjust to this shutdown. g) With 110 full-time employees, 30 contractor positions, and 225 seasonal workers, the Boardman plant is a critical employment source in the region. PGE's BART III proposal is the best approach to address early closure and loss of these jobs. h) Prefer the plant operate until 2040, given the impact early closure would have on jobs and the economy. But if early closure must happen, support PGE's BART III proposal. i) While I'm not convinced the plant should be closed in 2020, PGE has made a generous offer that should be considered. j) Closing the plant too early could have significant impact on low-income families. For them, low cost power is essential. k) PGE's BART III plan gives enough time to develop renewable energy. l) Global warming is a real problem. But we need to find environmentally sound business solutions to meet all of our needs. PGE's proposal is the kind of compromise that can be an example for the rest of the country.
Response	• *DEQ appreciates these comments and understands the concerns about the economic impact of PGE's decision for early closure, the need for time to*

	develop replacement power and transition to a new technology, the importance of providing reliable, affordable, and renewable energy to PGE customers, and the others concerns expressed above.
2. DSI Pilot Study	a) If the pilot study that PGE is proposing demonstrates that the 0.4 lb/mmBtu SO2 limit cannot be reached, DEQ will need to set an alternate limit that PGE can meet without affecting the performance of mercury controls or triggering PSD for PM2.5. b) The DSI pilot studies need to focus on technical issues and not cost.
Response	*a) DEQ has restructured the rules to add provisions for conducting a pilot study and establishing alternative emission limits.* *b) The proposed rules specifically state that alternative limits for DSI would be considered if it is demonstrated that DSI would either reduce the efficiency of the mercury controls or increase fine particulate matter that would result in ambient concentrations above the significant impact level. DEQ believes it is very important that the mercury emissions be reduced by 90 percent if at all possible. DEQ did not intend for the DSI system to include a fabric filter in place of the existing ESP. Adding a fabric filter would increase the efficiency of the DSI system, but would not be cost effective considering the capital cost of a fabric filter is approximately $100 million. DEQ proposes a limit of 0.40 lb/mmBtu for the DSI system specifically to avoid a requirement to install a fabric filter. The pilot study will further evaluate whether the limit can be met without affecting the mercury controls and/or increase PM ambient concentrations above the significance level. The pilot study is not intended to further evaluate the cost effectiveness of a fabric filter.*
B. Support Opposed	
3. Not protective enough	a) PGE's BART III plan will not protect Oregon's special places, air quality, or the health of our families and should be rejected.
Response	*a) DEQ's proposed three options would provide more emission reductions and visibility improvement than PGE's BART III plan. However, all approaches include a shutdown of the plant, which eliminates all emissions, and therefore would have significant benefits to visibility, as well as result in improvements in air quality.*
4. Disagree with PGE on SDFGD being BART in 2020	a) DEQ's Option 1 states that SDFGD is BART in 2020. PGE submitted costs that SDFGD is 30 percent over its previous estimates, but has not provided sufficient information to support this claim.
Response	*a) DEQ agrees. DEQ is not relying on PGE's revised cost analysis. DEQ believes SDFGD is still cost effective if the plant operates through 2020 based on the average cost effectiveness of the controls. However, with DSI included in the rules, the incremental cost of SDFGD is nearly $7,300/ton. Therefore, DEQ does not believe SDFGD is cost effective if the plant closes down on12/31/20 and DSI is installed on 7/1/14.*
5. PGE's claim DSI is infeasible is	a) Just because no DSI system has been demonstrated on a boiler exactly the same the Boardman plant does not mean the technology is infeasible. DSI

without merit	technology is feasible for this plant. (23)(49) b) In looking at other similar plants in the country, the PPL Montour power plant in Washingtonville PA is currently installing DSI on two 750 MM coal-fired boilers.
Response	• *As stated in DEQ's BART Report for PGE Boardman Plant, DEQ has determined that DSI is BART for this facility, even though this technology has been only demonstrated on smaller boilers than the one at the Boardman plant. DEQ sees no reason why DSI would not be feasible for the Boardman boiler. The proposed pilot study to test the effectiveness of DSI will allow the control effectiveness of this technology to be fully evaluated.*
6. DSI would trigger PSD is without merit	a) PGE's claim that DSI would increase particulate emissions and trigger pollution controls such as a baghouse is premature and without merit, unless further documentation, such as modeling, can be provided and verified.
Response	*a) DEQ acknowledges that the use of sorbent injection will increase particulate emissions, but not to the point of triggering additional pollution controls. This will be confirmed by further evaluation through the pilot study being proposed as part of these rule changes. The pilot study will include an evaluation of available sorbent materials, the effect of the sorbent materials on the existing particulate matter control system and mercury control system, and finally, air dispersion modeling will be conducted if necessary to determine if PM emissions will have an adverse impact on air quality.*
7. PGE's BART III fails to satisfy BART	a) If interim controls such as DSI are not feasible, PGE proposes to use low-sulfur coal, which would reduce SO2 emission by less than 2 percent from the baseline emission rate. A 2 percent reduction for a facility that continues to operate five years after EPA's approval of the SIP is not BART, and would not be approvable by EPA.
Response	*a) DEQ believes DSI is feasible and will achieve emission reductions in the range of 20 to 35 percent initially.*
8. PGE's BART cost analysis needs more evaluation	a) PGE's cost analysis for its' BART III proposal needs to be reviewed to determine if it was done in accordance with EPA's OAQPS Cost Manual. PGE should not have included the cost of replacement power in its' BART analysis.
Response	*a) The cost analysis performed by PGE was not in strict adherence to EPA's OAQPS Cost Manual. PGE's estimates more closely reflect real world cost due to higher than normal escalation of costs in recent years. PGE did not include the cost of replacement power in its BART analysis. The cost of replacement power is a concern, but the cost was not included in the BART analysis.*
9. Miscellaneous	a) The heat input rates in PGE's proposal are unclear. DEQ should clarify the appropriate heat input from which to measure the emission reductions that are claimed by PGE, and how these calculations were done. a) DEQ should also ensure that the calculations of annual pollution under BART are correct given PGE Boardman's maximum capacity to emit for purposes of setting the PSEL.

Response	*a) The heat inputs for each pollutant represent the highest 12-month heat input associated with the highest 24-hour emissions during calendar years 2003 through 2005. This information is provided in Table 5-1 of PGE's report. The values are 48,630,688 mmBtu/yr for NO_x, 48,571,330 mmBtu/yr for SO_2, and 49,093,487 mmBtu/yr for PM. These values were also used to calculate the projected actual emissions after installing the BART controls.* *b) The heat inputs were used to calculate the projected annual emissions after the BART controls are installed for the purpose of determining emission reductions and visibility analysis. The Plant Site Emission Limits will be based on the capacity of the facility using the BART control limits.*

III. Comments in support of other options related to an early closure of the PGE Boardman plant.	
1. Do not allow Boardman plant to continue operation to 2040	a) The PGE Boardman plant should not be allowed the option of continuing to operate until 2040 and beyond, due to the amount of air pollution it produces. The existing rules should be eliminated. b) The PGE Boardman plant should not be allowed to continue to operate through 2040 due to its mercury emissions, and the resulting impact on water quality and fish. c) Keeping the PGE Boardman plant running until 2040 is ludicrous, and the plant should be shutdown in 2020. d) Most important goal is to avoid making a large investment in coal that results in Boardman operating thru 2040, and find a single closure option that is reasonable, and meets both DEQ and PGE needs. e) DEQ's existing rules will cost the PGE Boardman plant over $500 million. Investing this amount of money in coal power is not in the best interests of Oregon.
Response	• *PGE's revised 2020 proposal would eliminate the 2009 rules adopted for the PGE Boardman plant, which allowed the plant to continue to operate indefinitely, and would instead establish a firm closure date of Dec. 31, 2020. The control technologies identified as BART with a 2020 closure were chosen taking into consideration the remaining useful life of the plant. The revised recommendation does not require selective catalytic reduction or SDFGD, but would require the less expensive DSI system.*
2. Find a middle ground between Option 2 and PGE's 2020 proposal	a) Efforts should be made to finding an agreeable result between DEQ's Option 2 and PGE's BART III 2020 proposal, with adjustments to avoid triggering additional pollution controls, and then closing the plant. Both approaches involve the same DSI technology, and only two years apart, which could be a time to find cleaner replacement power. b) Since there is some question about DSI equipment on facilities as large as Boardman, technology, a reasonable compromise may be to extend DEQ's Option 2 to 2020, but include more stringent emission limits of 0.35 lb/mmBtu in 2019, and 0.30 lb/mmBtu in 2020. c) Allow the Boardman plant to operate until 2020, but for the last 3 years (2017-2020), limit the plant's emissions by two-thirds, so that total emissions during

	this time would be the same as DEQ's Option 2, which has a 2018 closure date. d) Pursue a compliance agreement that achieves optimum pollution control at a reasonable cost to PGE, based on reduced hours of plant operations during the final two to three years of plant operation. e) Keeping the PGE Boardman plant running until 2040 is ludicrous, and the plant should be shutdown in 2020. f) DEQ should remove the 2040 option and work with PGE and other stakeholders to find practical options for closure no later than 2020. g) PGE has voluntarily offered to cut the plant's useful lifespan by 20 years. DEQ needs to find a practicable approach to balancing the environmental and economic issues. h) Give PGE the time it needs to develop replacement power that is affordable.
Response	• *PGE's revised 2020 proposal does represent a middle ground between their BART III proposal and DEQ's 2018 Option 2. First, it removes the 2040 option, and establishes a firm 2020 closure date. Second, after 2018, it establishes a lower SO_2 emission limit for the two years prior to 2020 closure*
3. Close the plant earlier than 2015	a) Close the PGE Boardman plant in 2014, rather than 2020, and transition to cleaner energy sources.
Response	*a) DEQ's Option 3 includes a closure date of 2015-16, which is based on the federal requirement to install BART in five of EPA approval of the Oregon Regional Haze Plan. Under this option, PGE may choose to close the plant at that time, and not install any BART controls, beyond those required in 2011 for NOx. As noted below, DEQ does not have authority to require an earlier shutdown (or any shutdown other than those established by rule as an option for PGE).*
4. Close the plant as soon as possible	a) The PGE Boardman plant should be closed at the earliest date possible, to end reliance on coal, and transition to cleaner energy sources.
Response	*a) DEQ lacks the authority under its current regulations to simply close the PGE Boardman plant. This facility currently operates under an approved air quality permit, and therefore cannot be shutdown, unless there is regulatory authority to do so. DEQ has proposed three options to meet federal BART requirements that allow PGE to close the plant early. Should PGE choose one of these options, the date for plant closure under that option would be mandatory and enforceable. Outside of this regulatory authority, there is no other means to require plant closure.*
5. Postpone this rulemaking	a) DEQ should postpone any decision on this rulemaking. Shutting down the PGE Boardman plant is unnecessary. The economic impact would be too severe, and now is not the time to be considering this action.
Response	*a) DEQ is required under the federal Regional Haze Rules to meet BART regulations that apply to facilities like PGE Boardman. In 2009, the EQC adopted the Oregon Regional Haze Plan that included rules to meet federal BART requirements, and then submitted this plan to EPA for approval. The plan included a provision that allowed PGE to make a formal request for a rule*

	change to the newly adopted BART rules, should PGE wish to close the plant early. This rulemaking is in response to such a request from PGE. Postponing this rulemaking would require PGE to rescind their request, and continue under the 2009 rules. Over the last six months, PGE has made it clear to DEQ, the PUC, and their stakeholders that they seek rule changes to allow for an early closure of the plant.
6. More collaboration and less regulation	a) DEQ should take a balanced, reasonable approach to this rulemaking with PGE, which focuses more on collaboration than regulation. b) DEQ should work openly and collaboratively with the Oregon PUC and utilities to find a workable solution. c) DEQ should adopt a proposal that inflicts the least cost on Oregon's ailing economy and minimizes further job losses. d) First approach should be to develop comprehensive energy plan, which involves collaboration between PUC, EFSC, and DEQ. Need an impact analysis on jobs and economy if plant were to shutdown.
Response	• *As noted above, this rulemaking was triggered by a formal request from PGE for a rule change. Upon receiving this request, DEQ has taken a collaborative approach in working with PGE to develop regulatory options to address PGE's stated objective for an early closure of the plant. This has included seeking public comment on two proposals developed by PGE, as part of this rulemaking effort.*
7. Set 2011 as decision date	a) Set 2011 as the decision point to either close Boardman or make PGE comply with new rules on an accelerated schedule.
Response	*a) In essence, PGE will be required to decide what option to take in 2011 because of the lead time to procure and install the control equipment. The decision date in the rule merely requires PGE to confirm what option they have chosen before the compliance dates in Options 1 and 2.*
IV. Comments related to the new PGE BART proposal on 2020 closure, associated with the re-opening of the comment period.	
1. Support the revised proposal	a) PGE's new BART proposal is a reasonable approach that sets one date, eliminates the existing rules and ability to operate until 2040, and is a good compromise with DEQ's Option 2. b) In addition to the revised proposal, also still support PGE's BART III proposal. c) Would prefer the plant to continue operating until 2040, but if early closure must happen, support PGE's revised 2020 proposal.
Response	• *DEQ agrees with PGE's proposal to close the plant in 2020. By presenting the 2020 proposal, PGE has decided not to run the plant beyond 12/31/20.*
2. Do not add early closure options to the rules	a) Support PGE's new 2020 proposal, and do not add any earlier closure date options to the rules, such as 2018 or 2015-16. Rules should just have one closure date.

Response	*a) DEQ appreciates these comments, but believes there is still merit in retaining the 2015/2016 closure option. If PGE chooses to close the plant within 5 years of the date EPA approves the SIP, the cost savings from not purchasing and installing the dry sorbent injection system could offset the costs of replacement power. The 2015/2016 option may also be useful in responding to future regulatory requirements, such as the National Emission Standard for Hazardous Air Pollutant Standard scheduled for adoption in 2011 and carbon regulations.*
3. Add early closure date options	b) Both the 2015/16 and 2018 closure options should be added to the rules.
Response	*b) As noted above, DEQ recommends adding the 2015/16 closure option, within 5 years after EPA approves the SIP revision. The Boardman plant would have to comply with NO_x limits in 2011, but not the SO_2 limits in 2014. DEQ does not recommend including BART requirements for a 2018 closure because it would not be substantively different than the BART requirements for the 2020 closure.*
4. Opposed to the revised proposal	a) The new proposal from PGE is not much different than the prior proposal, and is therefore not much of an improvement, or supportable. b) Still support early closure in 2015 or sooner. c) Still support closure as soon as possible.
Response	• *The revised proposal from PGE is different than their prior BART III proposal, in that it proposes to eliminate the current rules and the 2040 option and set a firm closure date of 2020, and also establishes a lower SO_2 emission limit for the two year period from 2018 to 2020 closure.*
5. 2020 closure must be federally enforceable	a) Under PGE's new BART proposal, any rule requirement for permanent closure in 2020 must be federally enforceable.
Response	*a) The requirement to cease burning coal by 12/31/20 will be federally enforceable if the requirement is approved by EPA as a revision to DEQ's state implementation plan. Failure to comply with the requirement would result in enforcement action (civil or criminal).*
6. Repowering the plant after closure	a) The plant can't be repowered without permitting it as if it were a new source.
Response	*a) The proposed rules require PGE to cease burning coal in the Foster-Wheeler boiler by 12/31/20. Since the Foster-Wheeler boiler is currently designed to burn only coal, other than during short periods of startup, the requirement to cease burning coal will eliminate the netting basis for the Foster-Wheeler boiler in accordance with the definition of "netting basis" in OAR 340-200-0020. If there are future modifications to the boiler, such as re-powering using fuels other than coal, the requested emissions associated with the modification will be compared to the netting basis in accordance with the definition of "major modification" in OAR 340-200-0020. If the requested emissions due to*

	the modification are equal to or greater than a significant emission rate above the netting basis, the modification would be subject to PSD because the source will still be a federal major source by virtue of the co-located Carty Plant (permit pending). It would be physically impossible to re-power a boiler the size of the Foster-Wheeler boiler with any type of fuel without at least one criteria pollutant emissions greater than a significant emission rate. Therefore, repowering would be subject to PSD.
7. Opposed to any plant closure	a) Opposed to this rulemaking, and to any early closure of the plant. b) Coal burning is still a viable option and should not eliminated
Response	• *As noted above, this rulemaking was triggered by a request from PGE for a rule change to reflect their desire for an early plant closure. This decision is being made by PGE and other co-owners of the plant, and will be subject to review by the Public Utilities Commission.*

V. Other Comments and Issues Raised during this proposed rulemaking	
1. PGE Boardman plant is health threat	a) PGE Boardman is a large source of mercury, toxic air pollutants, and other dangerous pollutants, which represent a serious threat to public health. DEQ should be addressing this as well as regional haze. It's time to move beyond coal and transition to cleaner energy source.
Response	*a) DEQ recognizes these concerns. While the Boardman plant is a major source of air pollutants, it is a permitted source, and as such is required to operate in compliance with established air quality health standards, which DEQ is responsible to enforce. The purpose of this rulemaking is to meet the requirements of the federal Regional Haze Rule, related to improving visibility in Class I areas. DEQ's Air Quality Division conducts other rulemakings directed at protecting public health and meeting the requirements of the Clean Air Act. It should be noted that if PGE does decide to close the plant early by a certain date, this will eliminate all of the plant's emissions, which will have public health benefits, and reduce acid deposition, greenhouse gases, and other air pollutants.*
2. Comments on DEQ's existing 2009 rules for PGE Boardman	a) DEQ should significantly strengthen the rules involving the "no closure option" (i.e., the existing 2009 rules). The NOx, SO2, and PM emission limits set forth in these rules do not reflect the best demonstrated system of continuous emission reduction that can be achieved at Boardman, and thus do not meet BART.
Response	*a) DEQ's existing regional haze rules that were adopted for the PGE Boardman plant in 2009 are not part of this rulemaking, and therefore DEQ is not seeking comment on these rules. Additionally, these comments were previously submitted by the commenter during the 2009 rulemaking (on Jan. 30, 2009) and were specifically addressed by DEQ at that time.*
3. PGE Boardman plant is out of	a) DEQ needs to take action to remedy the violation of the Clean Air Act, related to the failure to comply with New Source Performance Standards and

compliance	Prevention of Significant Deterioration requirements, including a Notice of Violation recently issued by EPA against the PGE Boardman plant
Response	*a) The recent action taken by EPA involving the issuance of a Notice of Violation against the PGE Boardman plant is not related to this rulemaking.* *b) DEQ acknowledges that there is a pending law suit with allegations that PGE has not complied with PSD and NSPS requirements that were applicable to the facility due to physical modifications in the past. More recently, EPA issued a Notice of Violation for not complying with the NSPS requirements due to physical changes in 1998 through 2004. Given the complexity of the factual and legal issues involved in resolving whether the Boardman facility undertook a modification or a series of modifications which triggered NSPS requirements, and given that these issues are being litigated in the case of Sierra Club, et al. v. PGE, Federal District Court for the District of Oregon, Case No. CV 08-1136 HA, DEQ declines to make a specific finding of non-applicability of any NSPS modification requirements.* *The issuance of an NOV by EPA is not, by itself, sufficient to demonstrate that the Boardman Plant is not in compliance with the Clean Air Act, pursuant to section 502(b)(2) of the Act. An NOV is an early step in the process for determining whether a violation has occurred, and is not a final EPA determination that a violation occurred. Likewise, as a legal matter it is not final agency action subject to judicial review. DEQ understands that EPA is still in the process of obtaining further information from PGE about whether a violation occurred. Therefore, DEQ lacks sufficient information at this point to reach a conclusion about whether PGE violated NSPS requirements. Like EPA, DEQ will consider additional information from PGE before reaching a conclusion.*
4. Adopt CO2 rules now	a) Climate change and greenhouse gases are the most important issue that DEQ should be addressing.
Response	*a) This rulemaking is not being proposed to adopt greenhouse gas limits or requirements for the Boardman plant, but rather meet federal requirements for BART.*
5. DEQ should not aggregate PGE Boardman impacts.	a) By stating that PGE Boardman impacts 14 Class I areas, DEQ is aggregating these impacts, which distorts and exaggerates the true impact on these areas.
Response	*a) DEQ does not intend to exaggerate the impacts of the Boardman Plant, but it is important to recognize that the Boardman Plant impacts numerous Class I areas. The purpose of the regional haze rules is to reduce the visibility impacts in all Class I areas, not just the one closest to a plant.*
6. Only DEQ has authority to determine BART.	a) Legally, DEQ not EPA has the authority to determine BART. EPA has a limited role.

Response	*a) EPA must take action on DEQ's regional haze plan, which must include a BART determination for affected facilities. EPA can disapprove the plan if it does not meet the requirements of the Clean Air Act.*
7. Issues with DEQ's BART analysis for the Boardman plant	a) Costs associated with the BART control options have been overstated. b) The BART control options can achieve lower emission limits. c) DEQ's BART analysis fails to account for the cost of replacement power, should the plant close early. d) DSI is an unproven technology that has not been demonstrated for a plant with a boiler the size of the one at PGE Boardman. For that reason, it is neither technically feasible nor cost effective for BART. Also, it is reasonable to expect that the sorbent injection will trigger PSD for PM2.5, requiring additional controls. e) Using Indonesian coal to reduce SO2 emissions is neither technically feasible nor cost-effective for BART. f) DEQ's BART analysis failed to take into account the rate of progress at the 14 Class I areas within 300 kilometers of the Boardman plant. g) In the modeling, if SDFGD controls are compared to DSI, the visibility improvement is below 0.5 deciviews, which is not a perceptible change. h) DEQ's modeling of the PGE Boardman plant's visibility impacts is highly questionable. The modeling results are not credible. i) The visibility improvement needs to be documented for all the affected Class I areas.
Response	*a) DEQ disagrees. DEQ was concerned with PGE's cost estimates when evaluating their BART analysis for the rules adopted in 2009 because PGE concluded that selective catalytic reduction was not cost effective for BART. As a result, DEQ contracted with ERG to evaluate the cost of selective catalytic reduction. ERG concluded that the tools usually used to estimate costs (e.g., CUE Cost and EPA's Cost Manual) underestimated real world costs. ERG further concluded that PGE's cost estimates were within the range of real world costs, albeit at the high end of the range. Although DEQ did not request ERG to specifically evaluate PGE's cost estimates for SDFGD, DEQ assumed that the real world costs for SDFGD would also be higher than estimates obtained from the usual cost estimation tools. The overall cost estimate using ERG's estimates was about 11 percent less than PGE's cost estimate. Due to the uncertainties associated with the cost estimates, DEQ decided to use PGE's cost estimates. The cost estimates for the 2009 rules were based on 2007 dollars. PGE adjusted the costs to 2010 dollars using a factor of 9.2 percent for the three year period. DEQ received a comment that the adjustment factor should only be 5.9 percent. DEQ acknowledges this discrepancy, but does not believe that a correction of 3.3 percent would change the BART conclusions.* *b) As noted in Section 1 of this document, DEQ received several comments that selective catalytic reduction and SDFGD can achieve lower emission rates than proposed by DEQ. If the control effectiveness were based on lower limits, there would be more emission reductions and the controls might be considered cost effective even if the plant were to shutdown on 12/31/20. The requests for using lower limits for the control technologies (~0.05 vs. 0.07*

	lb/mmBtu for selective catalytic reduction and ~0.09 vs. 0.12 lb/mmBtu for SDFGD) are based on actual emissions data from other coal-fired plants, as well as permit limits in recently issued permits for new sources. DEQ agrees that in some cases the controls can achieve lower emissions than the limits used in the BART analysis. In fact, DEQ expects that the actual emissions will be less than the limits because the source would otherwise be out of compliance. DEQ does not believe that the actual emissions of other plants justifies establishing lower limits considering normal process and control device variables. DEQ believes that it is important to establish a limit that will require at least the type of control being considered in the BART analysis, but can be met at all times provided the controls are operated properly. DEQ does not believe a limit should be established that can be met only part of the time under ideal conditions. DEQ also believes it is not appropriate to use emission limits established for new sources for retrofit technologies; especially if it has not been demonstrated that the sources can actually meet the limit. Controls for new sources are an integral part of the design and should be able to achieve slightly lower limits. *c) DEQ agrees. The BART determination includes an analysis of the cost of compliance, energy impacts, non-air quality environmental impacts, and the remaining useful life of the plant. The BART guidelines specify that "the analysis should focus on the direct impact of the control alternative." [BART guidelines III.Step 4]* *d) DEQ disagrees. DSI is a proven technology that is feasible for the Boardman plant. DEQ agrees that there are potential side effects that need to be evaluated before establishing a firm limit for DSI.* *e) DEQ agrees that using Indonesian coal may not be feasible at this time. However, it is possible that coal from the western US may be shipped to other countries from western ports in the future. If the infrastructure is developed to ship coal out of the country, it is possible that coal could be shipped into the country using the same infrastructure.* *f) The rate of progress in the Mt. Hood Wilderness area as a result of the proposed BART requirements for the Boardman plant will be approximately 1.44 dv on 7/1/11, 2.41 dv on 7/14, 2.75 dv on 7/1/18, and 4.98 dv on 12/31/20.* *g) DEQ agrees that SDFGD only provides about 0.4 dv improvement over DSI in 2014, assuming that the DSI system can meet a limit of 0.40 lb/mmBtu. In addition, DEQ has determined that the incremental cost of SDFGD over DSI is nearly $7,300/ton. For these reasons, DEQ does not believe SDFGD is BART if the plant closes on 12/31/2020 and DSI is installed and operated from 7/1/14 through 12/31/20.* *h) DEQ and PGE conducted modeling in accordance with a modeling protocol developed and approved in corroboration with EPA, the National Park System, US Forest Service, Washington DOE, and Idaho DEQ. Air dispersion modeling is a tool for estimating the impacts of sources and tends to be conservative. The model uses actual meteorological data from the period of 2003 through 2005. Haze in the Columbia River Gorge and Class I areas has been documented with actual monitoring data.* *i) DEQ has conducted additional modeling. The results of the modeling for each Class I area are provided in Table 10.5.1-2 under Section 10.5.1, Chapter 10,*

	of DEQ's revised 2009 Oregon Regional Haze Plan.
8. BART is not "all or nothing"	a) The regional haze BART requirements was never intended to be an all-or-nothing approach forcing plant closures or intended to apply control technology considerations similar to MACT.
Response	*a) DEQ agrees. BART requirements are intended to achieve emission reductions and visibility improvement based on an analysis of available controls. They were not intended to close down a plant. However, PGE has requested that the remaining useful life of the plant be considered in the BART determination process. For this to be possible, the remaining useful life of the plant must be federally enforceable. PGE has decided to close the plant, not DEQ. The rules adopted in 2009 did not include a closure date for the plant.*
9. Hold local meeting before adopting rules.	a) It is vital that meetings be held in both Morrow and Umatilla Counties before a final decision is made. It is important to understand the impact in these areas.
Response	*a) DEQ agrees on the importance of holding local meetings, and for that reason held two of the public hearings in this area – one in Hermiston, and one in Boardman. These hearings allowed local citizens to voice their concerns about the possible closure of PGE Boardman plant, and DEQ's proposed rule options related to this decision by PGE. At the beginning of each hearing, DEQ presented information on this proposed rulemaking, and participated in a question and answer discussion prior to accepting public testimony. The comments DEQ received at these public hearings expressed many of the concerns of local residents about the impact of this rulemaking. DEQ is carefully considering all of the comments submitted in making its final recommendation on this rulemaking to the EQC.*
10. Keep the plant open through 2040	a) PGE Boardman provides cheap electrical power and jobs. Do not close the plant by 2020. It should be kept open until at least 2040. b) Given the current economy, please do not impose expensive and burdensome regulations on PGE. This especially affects the jobless, elderly, and the poor.
Response	• *DEQ agrees that the Boardman plant currently provides cheap and reliable power. A decision to close the plant can only be made by PGE, not DEQ. Consistent with this, DEQ has proposed rule changes with less expensive controls, which contain early closure date options for PGE. PGE could also continue to operate the plant if they so choose.*
11. DEQ's reasonable progress demonstration	a) In the Oregon 2009 Regional Haze Plan, DEQ's reasonable progress demonstration shows a slower rate of progress than what is needed to attain natural conditions in 2064. Under federal rules, DEQ needs to show that the 2064 target is not reasonable.
	a) Oregon's haze plan does not assert the 2064 glideslope or target is "not reasonable." In fact, DEQ maintains that rate of progress identified in the plan to attain natural conditions in 2064 is reasonable. DEQ notes that it would be

	premature to reject or replace the 2064 glideslope to reach natural conditions just because initial projections for the worst 20 percent days in the first haze plan were less than the 2018 milestone. The next plan update in 2013 will contain several work products that are likely to provide additional emission reductions needed for reasonable progress. In addition, revisions to Oregon's regional haze plan based on this rulemaking do acknowledge the PGE Boardman emission reductions after 2018, which could be considerable, as part of the reasonable progress demonstration in the plan.
12. Comments on coal burning	a) Coal contributes to four of the five leading causes of mortality in the US – heart disease, cancer, stroke, and COPD. DEQ should consult regularly with the Center for Research on Occupational and Environmental Toxicology at OHSU and the Department of Environmental and Molecular Toxicology at OSU. b) Oregon should be coal-free. c) Clean coal does not exist. d) Coal is plentiful and very economical compared to other fuels, and is reliable for base load applications. Emissions from coal burning can be effectively controlled.
Response	• *DEQ agrees there are other cleaner sources of electricity than coal, such as natural gas, wind, and solar energy. Decisions regarding the future of coal use, or the continued operation of the PGE Boardman plant, are beyond the scope of this rulemaking.*

VI. Miscellaneous Comments

- There is no credible evidence that regional haze is a problem, or that the Boardman plant is causing haze problems.
- Replacing the Boardman coal plant with biomass combustion is just as bad as coal, in terms of carbon emissions and contributing to global warming.
- The 2020 closure date allows sufficient time to evaluate a different fuel source such as biomass.
- DEQ should conduct more monitoring of priority pollutants, visibility, and mercury, so that data can be properly shared and analyzed.
- PGE Boardman has been operating for far too long without any pollution controls, and causing impacts on public health. Enough is enough. The plant should be closed as soon as possible.
- Aggressive action is needed to pursue energy conservation and energy efficiency programs.
- Replacing the Boardman coal plant with a natural gas plant just replaces one type of pollution with another.
- Electricity costs are going up because of regulations like this. Nuclear power and increased use of hydroelectric power should be pursued.
- DEQ is not adequately considering the well-being of the state's manufacturing sector in requiring unnecessary controls which will drive up operational costs for the state's remaining manufacturing base. DEQ should adopt rules that inflict the least cost to Oregon's ailing economy and minimizes further job loss.
- Further investment in coal will prevent us from meeting state climate goals

• Regulations on climate change are currently being developed, and reducing Boardman plant's greenhouse gas emissions is therefore important.
• PGE should develop a plan for closing the Boardman plant as soon as possible, and develop a long-range master plan for transitioning into more energy conservation and renewable energy.
• The PGE Boardman plant is a critical base load facility, and as such is a key source of reliable energy. It is important to provide enough time to replace such energy generation for overall grid reliability, especially as we transition to more renewable generation sources.
• I believe in global liberation

List of People and Organizations Submitting Comments

Public Comments from first Comment Period 9/1/10 to 10/1/10

Letters

Letters include written comments received by mail, at public hearings, and attached to emails. Does not include attachments (see footnote [2])

No.	Name	Location	Affiliation or Organization	Submit Date
1.	Arya Behbehani [2] Manager, Environmental Services	Portland	Portland General Electric Company	9/08/2010 10/01/2010
2.	Catherine Collins	Gresham		9/11/2010
3.	Keith Mays, Mayor	Sherwood	City of Sherwood	9/14/2010
4.	Andy Duyck Washington County Commissioner, District 4	Hillsboro	Washington County Board of County Commissioners	9/15/2010
5.	Denny Doyle, Mayor	Beaverton	City of Beaverton	9/15/2010
6.	Steve and Patricia Mosbacher	Beaverton		9/15/2010
7.	Craig E. Dirksen, Mayor	Tigard	City of Tigard	9/16/2010
8.	Pat Shaw Gilliam County Judge	Condon	Gilliam County	9/20/2010
9.	Martin Donohoe, MD	Portland		9/21/2010
10.	Jonathan Schlueter Executive Director	Tigard	Westside Economic Alliance	9/21/2010
11.	Elizabeth B. Kaplan	Portland		9/21/2010
12.	Bernie Bottomly	Portland	Portland Business Alliance	9/21/2010
13.	Maye Thompson	Portland	OR Physicians for Social Responsibility	9/21/2010
14.	Borden Beck	Portland		9/21/2010
15.	Caitlin Piserchia	Portland		9/21/2010
16.	Louise Waitt	Portland		9/21/2010
17.	Andrew Sherman	Vancouver		9/21/2010
18.	Tom Stodd	Portland		9/22/2010
19.	Stephen M. Amy Robin Bloomgarden	Beaverton		9/22/2010

20.	Casey Gifford	Eugene		9/23/2010
21.	Katie Taylor	Eugene		9/23/2010
22.	Enid Griffin	Portland		9/24/2010
23.	Mary Wagner [2] Regional Forester	Portland	U.S. Forest Service Pacific Northwest Region	9/27/2010
24.	Joanne Delmonico	Portland		9/27/2010
25.	Lorraine Heller Sandy Sieglinger	Portland		9/27/2010
26.	David Sykes, President	Heppner	Willow Creek Valley Economic Development Group	9/27/2010
27.	Claire Sponseller Lisanne Currin Sheryll Bates	Heppner	Heppner Chamber of Commerce	9/27/2010
28.	Elwood Patawa, Chairman	Pendleton	Confederated Tribes of the Umatilla Indian Reservation	9/28/2010
29.	Rodney B. Mruk Reverend	Hermiston Pendleton	Trinity Evangelical Lutheran Church Faith Lutheran Church	9/28/2010
30.	Beth Anderson	Molalla		9/28/2010
31.	anonymous	n/a		9/28/2010
32.	W. Lawrence Givens, Commissioner Terry K. Tallman, Judge	Pendleton Heppner	Umatilla County Morrow County	9/28/2010
33.	Terry K. Tallman, Judge	Heppner	Morrow County	9/28/2010
34.	Barry C. Beyeler, Community Development Director	Boardman	City of Boardman	9/28/2010
35.	Pamela Barrow	Portland	Northwest Food Processors Association	9/29/2010
36.	Lou Ogden, Mayor	Tualatin	City of Tualatin	9/29/2010
37.	Gary Thompson, Sherman County Judge	Moro	Sherman County	9/29/2010
38.	Janet Taylor, Mayor	Salem	City of Salem	9/29/2010
39.	Ron Fox Executive Director	Medford	SOREDI (Southern Oregon Regional Economic Development, Inc.)	9/29/2010
40.	Chet Phillips, Mayor	Boardman	City of Boardman	9/29/2010
41.	Jurgen A. Hess	Hood River		9/30/2010
42.	Jill Arens Executive Director	White Salmon, WA	Columbia River Gorge Commission	9/30/2010
43.	Marcy Putman	Portland	International Brotherhood of Electrical Workers, Local 125	9/30/2010
44.	Jeanne E. Burch Wheeler County Judge	Fossil	Wheeler County	9/30/2010
45.	Corky Collier Executive Director	Portland	Columbia Corridor Association	9/30/2010
46.	Pam Gilmer President	Portland	The Mazamas	9/30/2010
47.	Sam Adams, Mayor	Portland	City of Portland	9/30/2010
48.	John Ledger Vice President	Salem	Associated Oregon Industries	9/30/2010
49.	Brian Pasko Michael Lang Mark Riskedahl Lauren Goldberg Brian Kelly Brock Howell	Portland, other	Sierra Club, Oregon Chapter Friends of the Columbia Gorge Northwest Environmental Defense Center Columbia Riverkeeper Hells Canyon Preservation Council Environment Oregon	10/01/2010
50.	Andrea Durbin	Portland	Oregon Environmental Council	10/01/2010

	Executive Director			
51.	Eric Chung	Portland	PacifiCorp	10/01/2010
52.	Bob Jenks Executive Director	Portland	Citizens Utility Board of Oregon	10/01/2010
53.	Kevin Lynch [2] Stephanie Kodish	Boulder, CO Knoxville, TN	Environmental Defense Fund National Parks Conservation Association	10/01/2010
54.	John Bunyak [2] Acting Chief, Air Resources Division	Denver, CO	National Park Service	10/01/2010
55.	Richard Albright Director	Seattle, WA	EPA Region 10	10/01/2010
56.	Mike McArthur Executive Director	Salem	Association of Oregon Counties	10/01/2010
57.	Kathleen F. Martin	The Dalles		10/01/2010
58.	Mary J. Repar	Stevenson, WA		10/01/2010
59.	Tom Ivancie	Portland	Energy Action Northwest	10/01/2010
60.	Steven Weiss	Seattle, WA	NW Energy Coalition	10/01/2010
61.	Rachel Shimshak Executive Director	Portland	Renewable Northwest Project	10/01/2010
62.	William L. Kovacs	Washington D.C.	Chamber of Commerce of the United States of America	10/01/2010
63.	Angus Duncan, Chair	Salem	Oregon Global Warming Commission	10/01/2010
64.	Kathryn VanNatta	Mercer Island, WA	Northwest Pulp & Paper Association	10/01/2010
65.	Manuel Castaneda President	Hillsboro	Washington County Business Council	10/01/2010
66.	Terry K. Tallman, Judge Ken A. Grieb, Commissioner Leann Rea, Commissioner	Heppner	Morrow County	10/01/2010
67.	Joan Barton	Portland		10/01/2010
68.	Form Letter 1 (189) [3]	n/a	Sierra Club members	9/21/2010
69.	Form Letter 2 (36) [3]	n/a		9/27/2010
70.	Form Letter 3 (25) [3]	n/a	Sierra Club members	10/01/2010
71.	Form Letter 4 (38) [3]		Misc. local government, chambers of commerce, and businesses	10/01/2010
72.	Form Letter/postcard 1 (2396) [3]	n/a		9/01/2010 to 10/01/2010
73.	Form Letter/postcard 2 (155) [3]	n/a		9/01/2010 to 10/01/2010
	Oral Testimony Location represents the site of the public hearing. Those who provided written comments are noted with *. To avoid duplication, those who provided both oral and written comments, priority was given referencing the written comments, rather than the oral testimony. Those who testified are more than one hearing are noted with [+]. For additional information, see Attachment C "DEQ Hearing Officer's Report on Public Hearings."			
74.	Arya Behbehani * [+]	Portland	Portland General Electric Company	9/21/2010
75.	Jay Dudley * [+]	Portland	Portland General Electric Company	9/21/2010
76.	Dave Robertson * [+]	Portland	Portland General Electric Company	9/21/2010
77.	Wilda Parks	Portland	N.Clackamas Co. Chamber of Commerce	9/21/2010
78.	Nick Engelfried [+]	Portland	private citizen	9/21/2010
79.	John Maloney	Portland	private citizen	9/21/2010
80.	Margo Bryant	Portland	Portland General Electric Company	9/21/2010

81.	Larry Givens * +	Portland	Umatilla County Commissioner	9/21/2010
82.	Nancy Hatch	Portland	private citizen	9/21/2010
83.	Bernie Bottomly *	Portland	Portland Business Alliance	9/21/2010
84.	Corky Collier *	Portland	Columbia Corridor Association	9/21/2010
85.	Travis Stovall	Portland	East Metro Economic Alliance	9/21/2010
86.	Jason Brandt	Portland	Salem Chamber of Commerce	9/21/2010
87.	Joe Esmonde	Portland	IBEW Local 48	9/21/2010
88.	John Mohlis	Portland	Columbia Pacific Building Trades Council	9/21/2010
89.	Jonathon Schlueter *	Portland	Westside Economic Alliance	9/21/2010
90.	Debbie Kitchen	Portland	Inter Works	9/21/2010
91.	Mike Holcomb	Portland	small business owner	9/21/2010
92.	Denzel Scheller	Portland	Hillsboro Chamber of Commerce	9/21/2010
93.	Manuel Castaneda	Portland	small business owner	9/21/2010
94.	Tom Wood	Portland	Associated Oregon Industries	9/21/2010
95.	Wayne Lei	Portland	private citizen	9/21/2010
96.	Andree Yost	Portland	Portland General Electric Company	9/21/2010
97.	Elizabeth Kaplan *	Portland	private citizen	9/21/2010
98.	Rodger Winn	Portland	Sierra Club	9/21/2010
99.	Vern Groves	Portland	private citizen	9/21/2010
100.	Roger Cole	Portland	Sierra Club	9/21/2010
101.	Robin Everett	Portland	Sierra Club	9/21/2010
102.	Robin Fahy	Portland	student	9/21/2010
103.	Katie Kann	Portland	student	9/21/2010
104.	Tyler Gerlach	Portland	student	9/21/2010
105.	Geoff Guillory	Portland	student	9/21/2010
106.	Maye Thompson *	Portland	OR Physicians for Social Responsibility	9/21/2010
107.	Antonio Samora	Portland	private citizen	9/21/2010
108.	Erika Winters	Portland	Greenpeace	9/21/2010
109.	Alyssa Ransbury	Portland	Greenpeace	9/21/2010
110.	Christopher Froman	Portland	Greenpeace	9/21/2010
111.	Anna Sotia Gidlund	Portland	Greenpeace	9/21/2010
112.	David Pfosr	Portland	Sierra Club	9/21/2010
113.	Wesley Kempler	Portland	Sierra Club	9/21/2010
114.	Cesia Kearns	Portland	private citizen	9/21/2010
115.	Fred Heutte	Portland	Sierra Club & small business owner	9/21/2010
116.	John Steele	Eugene	Friends of Dorena Dam Habitat	9/23/2010
117.	Katie Taylor *	Eugene	OSPIRG	9/23/2010
118.	Casey Gifford *	Eugene	Climate Justice League	9/23/2010
119.	Emma Newman	Eugene	Climate Justice League	9/23/2010
120.	Dave Hauser	Eugene	Oregon State Chamber of Commerce	9/23/2010
121.	Kathy Ging	Eugene	private citizen	9/23/2010
122.	Arya Behbehani +	Eugene	Portland General Electric Company	9/23/2010
123.	Amy Krol	Eugene	student	9/23/2010
124.	Chet Phillips +	Eugene	Mayor, City of Boardman	9/23/2010
125.	Ariel McCoy	Eugene	OSPIRG	9/23/2010
126.	Sania Radcliffe	Eugene	Portland General Electric Company	9/23/2010
127.	Catherine Thomasson	Eugene	OR Physicians for Social Responsibility	9/23/2010
128.	Kylie Halloran	Eugene	Sierra Club	9/23/2010
129.	Nick Engelfried +	Eugene	private citizen	9/23/2010
130.	David Besonon	Eugene	small business owner	9/23/2010
131.	David Nelson	Hermiston	State Senator, District 29	9/28/2010
132.	Bob Jenson	Hermiston	State Representative, District 58	9/28/2010
133.	Terry Tallman * +	Hermiston	Morrow County Judge	9/28/2010

134.	Larry Givens * +	Hermiston	Umatilla County Commissioner	9/28/2010
135.	Chet Phillips * +	Hermiston	Mayor, City of Boardman	9/28/2010
136.	Karen Wolff	Hermiston	Morrow County resident	9/28/2010
137.	Arya Behbehani +	Hermiston	Portland General Electric Company	9/28/2010
138.	Bill Nicholson	Hermiston	Portland General Electric Company	9/28/2010
139.	Diane Wolfe	Hermiston	Boardman Chamber of Commerce	9/28/2010
140.	Rick Main	Hermiston	IBEW Local 125	9/28/2010
141.	Sheryll Bates	Hermiston	Heppner Chamber of Commerce	9/28/2010
142.	Karen Pettigrew	Hermiston	City of Boardman	9/28/2010
143.	Steve Eldrige	Hermiston	Umatilla Electrical Cooperative	9/28/2010
144.	Chuck Little +	Hermiston	Pendleton Building Trades	9/28/2010
145.	Randy Yates	Hermiston	private citizen	9/28/2010
146.	Rod Osgood	Hermiston	IUOE Local 701	9/28/2010
147.	John Edmundson	Hermiston	Heppner Chamber of Commerce	9/28/2010
148.	Gary Neal	Hermiston	Port of Morrow	9/28/2010
149.	Debbie Pedro	Hermiston	Hermiston Chamber of Commerce	9/28/2010
150.	Tamra Mabbott	Hermiston	Umatilla County Planning Dept.	9/28/2010
151.	Don Anderson	Hermiston	NAES Power Contractors	9/28/2010
152.	David Richards	Hermiston	Boardman resident	9/28/2010
153.	Bill Hoke	Medford	City of Medford	9/29/2010
154.	Ray Hendricks * +	Medford	Portland General Electric Company	9/29/2010
155.	Ron Fox *	Medford	SOREDI	9/29/2010
156.	Monte Mendenhall	Medford	Pacific Power	9/29/2010
157.	Deane Funk	Medford	Portland General Electric Company	9/29/2010
158.	Sarah Westover	Medford	Beyond Coal Campaign	9/29/2010
159.	Meryl Six	Medford	Cascade Climate Network/Beyond Coal	9/29/2010
160.	Steve Vincent	Medford	Avista Utilities	9/29/2010
161.	Benji Nagel	Medford	student	9/29/2010
162.	Ted Ferrioli	The Dalles	State Senator, District 30	9/30/2010
163.	John Huffman	The Dalles	State Representative, District 59	9/30/2010
164.	Terry Tallman * +	The Dalles	Morrow County Judge	9/30/2010
165.	Larry Givens * +	The Dalles	Umatilla County Commissioner	9/30/2010
166.	Ray Hendricks * +	The Dalles	Portland General Electric Company	9/30/2010
167.	Jay Dudley +	The Dalles	Portland General Electric Company	9/30/2010
168.	Dave Robertson +	The Dalles	Portland General Electric Company	9/30/2010
169.	Dale Coyle	The Dalles	Portland General Electric Company	9/30/2010
170.	John McClain	The Dalles	Portland General Electric Company	9/30/2010
171.	Chuck Little +	The Dalles	Pendleton Building Trades	9/30/2010
172.	Barry Beyeler *	The Dalles	City of Boardman	9/30/2010
173.	Daniel Spatz	The Dalles	Columbia Gorge Community College	9/30/2010
174.	Paul Woodin	The Dalles	Community Renewable Energy Assoc.	9/30/2010
175.	Peter Cornelison	The Dalles	Friends of the Columbia Gorge	9/30/2010
176.	John Wood	The Dalles	private citizen	9/30/2010
177.	Mary Repar *	The Dalles	private citizen	9/30/2010
178.	Tom Wood	The Dalles	private citizen	9/30/2010
179.	John Nelson	The Dalles	private citizen	9/30/2010
180.	Tom Ivancie *	The Dalles	Energy Action NW	9/30/2010
181.	Jurgen Hess *	The Dalles	private citizen	9/30/2010
182.	Dave Berger	The Dalles	private citizen	9/30/2010

Emails
Those who provided written testimony along with an email are listed above under letters.

183.	Aaron Douglas		9/7/2010
184.	Andy Palmer		9/21/2010
185.	Anita Morrison		9/9/2010
186.	Audie Huber		9/28/2010
187.	Bill and Lucy Kimbro		9/2/2010
188.	Bill Lonerman		9/9/2010
189.	Chris Cook		9/4/2010
190.	Chuck Little		9/3/2010
191.	Craig Smith		9/17/2010
192.	Curtis Cutsforth		9/1/2010
193.	Dan Jaffee		9/1/2010
194.	Dave Vanderzanden		9/21/2010
195.	David and Patti Lane		9/23/2010
196.	David Shapiro		9/17/2010
197.	Denis Mososwski		9/2/2010
198.	Denise Steffenhagen		9/1/2010
199.	Diane Winn		9/22/2010
200.	Don Scholter		9/3/2010
201.	E. Marlow		9/6/2010
202.	Ed Berg		9/1/2010
203.	Ellynne Kutschera		9/17/2010
204.	Garey Kurtz		9/8/2010
205.	Gerald Waters		9/1/2010
206.	Greg Debros		9/21/2010
207.	Iriana Phillips		9/22/2010
208.	Harry Shaich		9/23/2010
209.	Jim Conroy		9/18/2010
210.	Jodi Miller		9/2/2010
211.	John Denton		9/1/2010
212.	Judi L. Baker		9/2/2010
213.	Keith and Karen Harding		9/18/2010
214.	Kevin Horan		9/29/2010
215.	Linda Cate		9/30/2010
216.	Lisa Caballery		9/28/2010
217.	L J Ross		9/29/2010
218.	Lowrey Brown		9/20/2010
219.	Margaret Davies		9/21/2010
220.	Marilyn Burke		9/1/2010
221.	Mike Litt		9/2/2010
222.	Nicholas Loos		9/22/2010
223.	Nicholas Page		9/7/2010
224.	Pam Barrow		9/29/2010
225.	Randall Webb		9/8/2010
226.	Sara W. Baker		9/11/2010
227.	Shane Dugherty		9/1/2010
228.	Shirley Cereghino		9/27/2010
229.	Stuart Phillips		9/1/2010
230.	Tanya Baikow-Smith		9/27/2010
231.	W. Badrick		9/1/2010
232.	Email form letter 1 - (244) [3]		9/01/2010 to 10/01/2010
233.	Email form letter 2 - (5) [3]		9/01/2010 to 10/01/2010

234.	Email form letter 3 - (63) [3]		9/01/2010 to 10/01/2010
235.	Email form letter 4 - (140) [3]		9/01/2010 to 10/01/2010

Public Comments from second Comment Period 10/29 to 11/15

Letters
Letters includes written comments received by mail, at public hearings, and attached to emails. Does not include attachments (see footnote [2])

No.	Name	Location	Affiliation or Organization	Submit Date
236.	Nicole Forbes	Portland	Friends of the Columbia Gorge	11/8/2010
237.	Kyle Gorman	Milwaukie	Clackamas Fire District #1	11/8/2010
238.	Maye Thompson	Portland	OR Physicians for Social Responsibility	11/8/2010
239.	Stephen M. Amy	Beaverton		11/11/2010
240.	Steven Quennoz [2] Vice President, Power Supply/Generation	Portland	Portland General Electric Company	11/15/2010
241.	Brian Pasko Mark Riskedahl Michael Lang Greg Dyson Maye Thompson Bret VandenHeuvel Steve Pedery Brent Fenty Josh Laughlin Mary Preveto Lisa Arkin	Portland, and other	Sierra Club, Oregon Chapter Northwest Environmental Defense Center Friends of the Columbia Gorge Hells Canyon Preservation Council OR Physicians for Social Responsibility Columbia Riverkeeper Oregon Wild Oregon Natural Desert Association Cascadia Wildlands Project Neighbors for Clean Air Oregon Toxics Alliance	11/15/2010
242.	Rick Till	Portland	Native Plant Society of Oregon	11/15/2010
243.	John Bunyak [2] Acting Chief, Air Resources Division	Denver, CO	National Park Service	11/15/2010
244.	Arya Behbehani	Portland	Portland General Electric Company	11/15/2010
245.	Andrea Durbin Executive Director	Portland	Oregon Environmental Council	11/15/2010
246.	Keith Rose	Seattle WA	EPA Region 10	11/15/2010
247.	Terry K. Tallman, Judge Ken A. Grieb, Commissioner Leann Rea, Commissioner	Heppner	Morrow County	11/15/2010
248.	Janette K. Brimmer Aubrey Balwin		Earthjustice on behalf of Sierra Club Pacific Environmental Advocacy Center, on behalf of Sierra Club, Northwest Environmental Defense Center, Friends of the Columbia Gorge, Columbia Riverkeepers, and Hells Canyon Preservation Council	11/15/2010
249.	Lucy Roberts	n/a		11/15/2010
250.	Emily Tuchman	Portland		11/15/2010
251.	Lauren Reiterman	Portland		11/15/2010
252.	Hillary Patin	Portland		11/15/2010

253.	Miriam Coe	Portland		11/15/2010
254.	Tom Lang	Portland		11/15/2010
255.	Barbara Robinson	Mosier		11/15/2010
256.	Form Letter 1 [3] (118)	n/a		11/8/2010
257.	Form Letter/postcard 1 (238) [3]	n/a		9/01/2010 to 10/01/2010
258.	Form Letter/postcard 2 (1928) [3]	n/a		9/01/2010 to 10/01/2010
259.	Form Letter/postcard 3 (11) [3]	n/a		9/01/2010 to 10/01/2010
Oral Testimony Location represents the site of the public hearing. Those who provided written comments are noted with *. To avoid duplication, those who provided both oral and written comments, priority was given referencing the written comments, rather than the oral testimony. Those who testified are more than one hearing are noted with [+]. For additional information, see Attachment C "DEQ Hearing Officer's Report on Public Hearings."				
260.	Dave Robertson [+]	Portland	PGE	11/8/2010
261.	Wendi Eiland	Portland	Beaverton Chamber of Commerce	11/8/2010
262.	Marcy Putman	Portland	IBEW Local 125	11/8/2010
263.	Kristan Sheeran, Phd	Portland	Economics for Equity and Environment Network	11/8/2010
264.	Erika Winters-Heilman	Portland	Private citizen	11/8/2010
265.	Kaician Kitko	Portland	Private citizen	11/8/2010
266.	Kyle Gorman *	Portland	Clackamas county Fire District #1	11/8/2010
267.	Linda Moholt	Portland	Tualatin Chamber of Commerce	11/8/2010
268.	Jay Halladay	Portland	Coaxis	11/8/2010
269.	Mark Clemons	Portland	Group MacKenzie	11/8/2010
270.	Samantha Cummings	Portland	Private citizen	11/8/2010
271.	Jon Pauletto	Portland	Private citizen	11/8/2010
272.	Adam Walters	Portland	Student	11/8/2010
273.	Trevor Griffith	Portland	Private citizen	11/8/2010
274.	Robin Everett	Portland	Sierra Club	11/8/2010
275.	Sofia Gidlund	Portland	Greenpeace	11/8/2010
276.	Elizabeth Kaplan	Portland	Private citizen	11/8/2010
277.	Geoff Guillory	Portland	Private citizen	11/8/2010
278.	Roger Cole	Portland	Sierra Club	11/8/2010
279.	Liam Doherty-Nicholson	Portland	Greenpeace	11/8/2010
280.	Bob Jenks *	Portland	Citizen Utility Board	11/8/2010
281.	Jason Lehne	Portland	Foundation Life Management	11/8/2010
282.	Angi Dilkes *	Portland	Oregon Business Association	11/8/2010
283.	Caitlin Piserchia	Portland	Private citizen	11/8/2010
284.	Cesia Kearns	Portland	Private citizen	11/8/2010
285.	Duncan Reid	Portland	Private citizen	11/8/2010
286.	Nathan Jones	Portland	Private citizen	11/8/2010
287.	Alden Moss	Portland	Private citizen	11/8/2010
288.	Jenny Bedell-Stiles	Portland	Private citizen	11/8/2010
289.	NickEngelfried	Portland	Private citizen	11/8/2010
290.	Maye Thompson	Portland	OR Physicians for Social Responsibility	11/8/2010
291.	Daniel Cobb	Portland	Private citizen	11/8/2010
292.	Nancy Hatch	Portland	Private citizen	11/8/2010
293.	Antonio Zamora	Portland	Greenpeace	11/8/2010
294.	Bill Bigelow	Portland	Private citizen	11/8/2010

295.	Borden Beck	Portland	PGE customer	11/8/2010
296.	Tom Wood	Portland	Associate Oregon Industries	11/8/2010
297.	Mathilde Mouw	Portland	Student	11/8/2010
298.	Joel Durr	Portland	Private citizen	11/8/2010
299.	Natasha Hultmann	Portland	Private citizen	11/8/2010
300.	Tom Ivancie	Portland	Energy Action Northwest	11/8/2010
301.	Terry Tallman	Boardman	Morrow County Judge	11/9/2010
302.	Chet Phillips	Boardman	Mayor, City of Boardman	11/9/2010
303.	Dave Robertson	Boardman	Portland General Electric Company	11/9/2010
304.	Barry Beyeler	Boardman	City of Boardman	11/9/2010
305.	Rick Main	Boardman	IBEW Local 125	11/9/2010
306.	Marcy Putman	Boardman	IBEW Local 125	11/9/2010
307.	Sheryll Bates	Boardman	Heppner Chamber of Commerce	11/9/2010
308.	Diane Wolfe	Boardman	Boardman Chamber of Commerce	11/9/2010
309.	Steve Doherty	Boardman	Private Citizen	11/9/2010
310.	Chuck Little	Boardman	Pendleton Building Trades	11/9/2010
311.	Dave De Mayo	Boardman	City of Heppner	11/9/2010
312.	Karen Pettigrew	Boardman	City of Boardman	11/9/2010
313.	Karen Wolff	Boardman	Morrow County resident	11/9/2010
314.	Randal Curtis	Boardman	Private Citizen	11/9/2010
315.	Don Russell	Boardman	Private Citizen	11/9/2010
316.	Gary Neal	Boardman	Port of Morrow	11/9/2010
317.	Jody Marston	Boardman	Private Citizen	11/9/2010

Emails
Those who provided written testimony along with an email are listed above under letters.

318.	Alyssa Ransbury		11/15/2010
319.	Andrew		11/6/2010
320.	Brad Mattison		11/10/2010
321.	Carol Crawford		11/13/2010
322.	Charles Little		n/a
323.	Cheryl McEvoy		11/15/2010
324.	Christa Sprinkle		11/12/2010
325.	Clay Spencer		10/31/2010
326.	Curtis French		11/14/2010
327.	Dan Huntington		11/15/2010
328.	Darryl Lloyd		11/13/2010
329.	Darvel Lloyd		11/12/2010
330.	Dave Mull		11/9/2010
331.	Deb Hupcey		11/12/2010
332.	Donn Chalfant		10/30/2010
333.	Ellen Cantwell		11/14/2010
334.	Gladys Biglor		11/6/2010
335.	Ineke Deruyter		11/8/2010
336.	James Adcock		11/15/2010
337.	Jay D. McIntosh		11/13/2010
338.	John Gear		11/13/2010
339.	Kelsey Ward		11/12/2010
340.	Kipp Coddington		11/11/2010
341.	Larry Read		n/a
342.	Laura Carver		11/11/2010
343.	Marcia Turnquist		n/a

344.	Marcus Lanskeyh		10/29/2010
345.	Mona Price		11/11/2010
346.	Neal s. Walker		11/15/2010
347.	Nicole		11/13/2010
348.	Patty Sittser		n/a
349.	Pixahm Cuj		11/14/2010
350.	Ramona Crocker		11/14/2010
351.	Robert Graham		11/7/2010
352.	Robert Kimbro		n/a
353.	Ron Mink		11/7/2010
354.	Ruth Phinney		11/15/2010
355.	Scott Mara		11/12/2010
356.	Scott & Tracey		11/9/2010
357.	Sue and Pat Harford		10/29/2010
358.	Ted Ernst		11/12/2010
359.	Tyler Grimes		11/10/2010
360.	Email form letter - (1255) [3]		10/29/2010 - 11/15/2010

[2] Commenters who provided attachments (available upon request)

[3] For the list of commenters in this group, see Attachment 1 (available upon request). Numbers in **bold** reflect multiple commenters (via form letter or email).

State of Oregon
Department of Environmental Quality **Memorandum**

Date: Nov. 12, 2010

To: Environmental Quality Commission

From: Brian Finneran, DEQ Air Quality Division

Subject: Presiding Officer's Report for Rulemaking Hearings

Title of Proposal: Revisions to DEQ Regional Haze BART rules for the PGE Boardman Power Plant

1st Comment Period Hearing Dates and Time: Sept. 21, 23, 28, 29, and 30, 2010. 6 p.m.

Hearing Locations: 1. Portland OR, Metro Regional Center
2. Eugene OR, State Office Building
3. Hermiston OR, Conference Center
4. Medford OR, DEQ Regional Office
5. The Dalles OR, Columbia Gorge Community College

2nd Comment Period Hearing Dates and Time: Nov. 8, 9, 2010. 6 p.m.

Hearing Locations: 6. Portland OR, Metro Regional Center
7. Boardman OR, Port of Morrow

DEQ held seven public hearings on the proposed rulemaking at the locations, dates, and times noted above. The following is a summary of each of these hearings.

First Comment Period, Sept. 1 – Oct. 1, 2010

Public Hearing #1. Sept. 21, 2010, Metro Regional Center, 600 NE Grand Avenue, Portland. The hearing officer was Linda Hayes-Gorman from DEQ. Present from DEQ were Brian Finneran, Mark Fisher, William Knight and Marcia Danab.

One hundred forty people attended the hearing, 42 provided oral testimony, and 193 written comments were submitted.

Linda Hayes-Gorman announced that she was serving as the hearing officer to this hearing. Linda introduced Brian Finneran and Mark Fisher from DEQ, who gave a presentation summarizing the proposed rulemaking. A question and answer period followed the presentation.

Linda announced at 7:08 p.m. she would like to begin the formal hearing on the proposed rulemaking. She informed people that the hearing would be recorded and that testimony would become part of the public record for the rulemaking. Linda explained her role was to take testimony on behalf of the EQC and prepare a report summarizing the written and verbal comments. She asked that people interested in providing oral testimony fill out a witness registration form, and would call people to testify in the order they turned in the form. She added that written comments would be given the same weight as oral comments.

Linda reminded the audience that the deadline date for receipt of written comments on the proposed rules is Friday, October 1, 2010, at 5 p.m. She stated that after reviewing the comments, the department may consider revisions to the proposed rules. She added that the department's final recommendation for rule adoption will be made at the EQC meeting scheduled for December 9-10, 2010, and that the EQC can use its own discretion in deciding whether to adopt all, part or none of the proposed rules, postpone adoption, or hold additional public hearings.

- Summary of the testimony:

Forty-two persons provided oral testimony, and five written comments were submitted by persons who did not testify, with one of the five written comments being a form letter that contained 189 signatures. Table 1 lists the names of those who provided testimony and the primary position supported by each person. After this is a summary of the comments provided at the hearing.

Table 1
Portland Hearing 9/21/10

Name	***Affiliation***	***In Support of***
*Oral Testimony: (*also provided written comments) (+testified at more than one hearing)*		
1. Arya Behbehani * +	Portland General Electric Company	PGE "BART III" 2020 plan
2. Jay Dudley +	Portland General Electric Company	PGE "BART III" 2020 plan
3. Dave Robertson +	Portland General Electric Company	PGE "BART III" 2020 plan
4. Wilda Parks	N.Clackamas Co. Chamber of Commerce	PGE "BART III" 2020 plan
5. Nick Engelfried +	private citizen	2015 closure or sooner
6. John Maloney	private citizen	2020 if PGE needs time
7. Margo Bryant	Portland General Electric Company	PGE "BART III" 2020 plan
8. Larry Givens * +	Umatilla County Commissioner	PGE "BART III" 2020 plan
9. Nancy Hatch	private citizen	2015 closure
10. Bernie Bottomly *	Portland Business Alliance	PGE "BART III" 2020 plan
11. Corky Collier *	Columbia Corridor Association	PGE "BART III" 2020 plan
12. Travis Stovall	East Metro Economic Alliance	PGE "BART III" 2020 plan
13. Jason Brandt	Salem Chamber of Commerce	PGE "BART III" 2020 plan
14. Joe Esmonde	IBEW Local 48	PGE "BART III" 2020 plan
15. John Mohlis	Columbia Pacific Building Trades Council	PGE "BART III" 2020 plan
16. Jonathon Schlueter *	Westside Economic Alliance	PGE "BART III" 2020 plan
17. Debbie Kitchen	Inter Works	PGE "BART III" 2020 plan

18. Mike Holcomb	small business owner	PGE "BART III" 2020 plan
19. Denzel Scheller	Hillsboro Chamber of Commerce	PGE "BART III" 2020 plan
20. Manuel Castaneda	small business owner	PGE "BART III" 2020 plan
21. Tom Wood	Associated Oregon Industries	PGE "BART III" 2020 plan
22. Wayne Lei	private citizen	PGE "BART III" 2020 plan
23. Andree Yost	Portland General Electric Company	PGE "BART III" 2020 plan
24. Elizabeth Kaplan *	private citizen	2015 closure or sooner
25. Rodger Winn	Sierra Club	more protection of health
26. Vern Groves	private citizen	close as soon as possible
27. Roger Cole	Sierra Club	2015 closure
28. Robin Everett	Sierra Club	2015 closure or sooner
29. Robin Fahy	student	closure not addressed
30. Katie Kann	student	close as soon as possible
31. Tyler Gerlach	student	close as soon as possible
32. Geoff Guillory	student	close as soon as possible
33. Maye Thompson *	Oregon Physicians for Social Responsibility	2015 closure Option 3
34. Antonio Samora	private citizen	close as soon as possible
35. Erika Winters	Greenpeace	close as soon as possible
36. Alyssa Ransbury	Greenpeace	close as soon as possible
37. Christopher Froman	Greenpeace	close as soon as possible
38. Anna Sotia Gidlund	Greenpeace	close as soon as possible
39. David Pfosr	Sierra Club	close as soon as possible
40. Wesley Kempler	Sierra Club	early closure in general
41. Cesia Kearns	private citizen	2015 closure or sooner
42. Fred Heutte	Sierra Club & small business owner	2015 closure or sooner
Written comments received from persons who did not testify:		
1. Martin Donohoe, MD	Physician	closure by 2014
2. Borden Beck	private citizen	2015 closure
3. Caitlin Piserchia	student	2020 closure Option 1
4. Louise Waitt	private citizen	close as soon as possible
5. 189 names on form letter submitted	Sierra Club	2015 closure or sooner

Comment summary. At this hearing, the public comments were evenly divided between support of PGE's "BART III" 2020 plan, and closing the plant in 2015 or as soon as possible. Only a few comments were made in support of DEQ's proposed Option 3 (reflecting a 2015-16 closure).

Supporters of PGE's BART III proposal included not only PGE employees, but also representatives of chambers of commerce and business associations. Many of the comments focused on concerns about the economic impact of the plant closing early, and the need to provide PGE with sufficient time (10 years) to buy or build replacement power that is affordable, reliable, cost effective, and includes the potential for renewable and "greener" options. It was pointed out that the PGE Boardman plant is currently an important "base load" source of power, and that it would take time to find replacement power. Many of the commenters expressed concern that while closure of the Boardman plant would worsen the current economy and affect many jobs, PGE's BART III proposal was clearly better than DEQ's proposed three options.

Other comments in support of PGE's proposal included the following: (1) it ends reliance on coal and provides a smoother transition into other types of energy; (2) it eliminates all emissions from the plant after 2020; (3) it provides significant cost savings to DEQ's proposed options, and thus lowers the overall economic impact; (4) rather than using the highest thresholds in the nation, it represents a lower and reasonable cost effectiveness level that is more consistent with what other states have adopted for BART; (5) avoids a hasty shutdown that could lead to increased electricity rates and impacts on low-income citizens and small businesses; and (6) gives PGE the ability to verify that the proposed dry sorbent injection (DSI) controls are technically feasible by conducting a pilot test study first. Representatives of PGE stated that DEQ's proposed three options do provide PGE with some flexibility, but are unworkable and too costly. They said their BART III proposal would meet EPA approvability requirements and result in significant air quality and environmental benefits after 2020, and prior to that date, includes the installation of $75 million in pollution controls for nitrogen oxide (NOx) and sulfur dioxide (SO2) emissions, significantly reducing these emissions over the next 10 years. They stated that PGE's proposal has no legal barriers in terms of federal approvability or enforceability, and represents a unique opportunity to end coal combustion 20 years early, as an alternative to the plant continuing to operate to 2040 and beyond. They added that PGE is still moving forward to meet DEQ's mercury rules a year ahead of the required 2012 compliance date, which will reduce these emissions by 90 percent.

Supporters of an earlier closure of the PGE Boardman plant than 2020 included environmental groups, students, and private citizens. These comments supported plant closure in 2015 or as soon as possible. The reasons cited focused primarily on concerns about the health effects from the burning of coal, and the need to address global warming now. Health concerns pointed to the plant's current emissions of approximately 25,000 tons of air pollution, as well as mercury emissions, and that these emissions cause significant health problems, including asthma, lung cancer, and other respiratory issues. Global warming concerns pointed to the plant currently emitting about 4 million tons of greenhouse gas emissions, the largest in the state. There was strong support to end reliance on coal technology, to pursue cleaner and renewable energy resources. Others commented that allowing PGE to operate until 2020 was too long, would significantly harm public health and the environment, and that PGE does not need 10 years to find affordable and reliable replacement power, as cleaner forms of power generation are available now. Those who supported DEQ's Option 3 said that closure in 2015 was less expensive than the other options and would provide significant air quality benefits. Other comments included (1) from a cost standpoint, the earliest closure would avoid making unnecessary investments in expensive controls for an "outdated plant"; (2) transitioning to renewable energy could create more "green jobs"; (3) urging DEQ to repeal the existing rules for PGE Boardman which allow the plant to continue operate if PGE decides against any of the options, (4) opposition to giving PGE another 10 years to operate when the plant has avoided installing any major pollution controls since it was constructed in 1977, and (5) criticism of DEQ for not taken action during this time to require controls or close the plant.

There was no other testimony provided. The hearing was adjourned at 9 p.m.

Public Hearing #2. Sept. 23, 2010, Willamette Conference Room, Eugene State Office Building, 165 East 7th Avenue, Eugene. The hearing officer was William Knight from DEQ. Also present from DEQ were Brian Finneran and Mark Fisher.

Thirty-three people attended the hearing, and 15 provided oral testimony.

William Knight announced that he was serving as the hearing officer to this hearing. He introduced Brian Finneran and Mark Fisher from DEQ, who gave a presentation summarizing the proposed rulemaking. A question and answer period followed the presentation.

William announced at 7:14 p.m. he would like to begin the formal hearing on the proposed rulemaking. He stated that the hearing was being recorded and testimony would become part of the public record for the rulemaking. He explained his role was to take testimony on behalf of the EQC and prepare a report summarizing the written and verbal comments. He asked that people interested in providing oral testimony fill out a witness registration form, and would call people to testify in the order they turned in the form. He added that written comments would be given the same weight as oral comments.

William reminded the audience that the deadline date for receipt of written comments on the proposed rules is Friday, Oct. 1, 2010, at 5 p.m. He stated that after reviewing the comments, the department may consider revisions to the proposed rules. He added that the department's final recommendation for rule adoption will be made at the EQC meeting scheduled for December 9-10, 2010, and that the EQC can use its own discretion in deciding whether to adopt all, part or none of the proposed rules, postpone adoption, or hold additional public hearings.

- Summary of the testimony:

Fifteen persons provided oral testimony. Table 2 lists the names of those who provided testimony and the primary position supported by each person. After this is a summary of the comments provided at the hearing.

Table 2
Eugene Hearing 9/23/10

Name	***Affiliation***	***In Support of***
*Oral Testimony: (*also provided written comments) (+testified at more than one hearing)*		
1. John Steele	Friends of Dorena Dam Habitat	2015 closure or sooner
2. Katie Taylor *	OSPIRG	2015 closure
3. Casey Gifford *	Climate Justice League	2015 closure
4. Emma Newman	Climate Justice League	2015 closure
5. Dave Hauser	Oregon State Chamber of Commerce	PGE "BART III" 2020 plan
6. Kathy Ging	private citizen	2015 closure Option 3
7. Arya Behbehani * +	Portland General Electric Company	PGE "BART III" 2020 plan
8. Amy Krol	student	2015 closure Option 3
9. Chet Phillips * +	Mayor, City of Boardman	PGE "BART III" 2020 plan
10. Ariel McCoy	OSPIRG	close as soon as possible

11. Sania Radcliffe	Portland General Electric Company	PGE "BART III" 2020 plan
12. Catherine Thomasson	Oregon Physicians for Social Responsibility	2015 closure Option 3
13. Kylie Halloran	Sierra Club	2015 closure Option 3
14. Nick Engelfried [+]	private citizen	2015 closure or sooner
15. David Besonon	small business owner	close as soon as possible

Comment summary. At this hearing, the testimony reflected the majority of comments and viewpoints expressed at the Portland hearing, and the divergence between those in favor of PGE's BART III proposal and those in favor of an earlier closure. More than half of the comments were in support of a 2015 plant closure and DEQ's Option 3, with fewer advocating the close as soon as possible of the plant.

There was no other testimony provided. The hearing was adjourned at 8:05 p.m.

Public Hearing #3. Sept. 28, 2010, Hermiston Conference Center, 415 S. Hwy 395, Hermiston. The hearing officer was William Knight from DEQ. Also present was Brian Finneran, Mark Fisher, and Linda Hayes-Gorman from DEQ, and EQC Commissioner and Vice Chair, Ken Williamson.

Forty-eight people attended the hearing, and 22 provided oral testimony.

William Knight announced that he was serving as the hearing officer to this hearing. He introduced EQC Commissioner Ken Williamson who provided some introductory remarks. Ken Williamson informed the audience that the EQC was very interested to hear from the public on this proposed rulemaking. He provided some background on the 2009 rules adopted for PGE Boardman, and how DEQ's rule proposal reflects PGE's proposed 2020 plant closure, and will give PGE the choice to close early or continue operating under the 2009 rules. Next, Brian Finneran and Mark Fisher from DEQ gave a more detailed presentation summarizing the proposed rulemaking. A question and answer period followed the presentation.

William announced at 7:14 p.m. he would like to begin the formal hearing on the proposed rulemaking. He stated that the hearing was being recorded and testimony would become part of the public record for the rulemaking. He explained his role was to take testimony on behalf of the EQC and prepare a report summarizing the written and verbal comments. He asked that people interested in providing oral testimony fill out a witness registration form, and would call people to testify in the order they turned in the form. He added that written comments would be given the same weight as oral comments.

William reminded the audience that the deadline date for receipt of written comments on the proposed rules is Friday, Oct. 1, 2010, at 5 p.m. He stated that after reviewing the comments, the department may consider revisions to the proposed rules. He added that the department's final recommendation for rule adoption will be made at the EQC meeting scheduled for December 9-10, 2010, and that the EQC can use its own discretion in deciding whether to adopt all, part or none of the proposed rules, postpone adoption, or hold additional public hearings.

- Summary of the testimony:

Twenty-two persons provided oral testimony. Table 3 lists the names of those who provided testimony and the primary position supported by each person. After this is a summary of the comments provided at the hearing.

Table 3
Hermiston Hearing 9/28/10

Name	***Affiliation***	***In Support of***
*Oral Testimony: (*also provided written comments) (+testified at more than one hearing)*		
1. David Nelson	State Senator, District 29	postpone the rulemaking
2. Bob Jenson	State Representative, District 58	postpone the rulemaking
3. Terry Tallman * +	Morrow County Judge	postpone the rulemaking
4. Larry Givens * +	Umatilla County Commissioner	postpone the rulemaking
5. Chet Phillips * +	Mayor, City of Boardman	PGE "BART III" 2020 plan
6. Karen Wolff	Morrow County resident	PGE "BART III" 2020 plan
7. Arya Behbehani * +	Portland General Electric Company	PGE "BART III" 2020 plan
8. Bill Nicholson	Portland General Electric Company	PGE "BART III" 2020 plan
9. Diane Wolfe	Boardman Chamber of Commerce	PGE "BART III" 2020 plan
10. Rick Main	IBEW Local 125	PGE's "BART III" or no closure
11. Sheryll Bates	Heppner Chamber of Commerce	PGE "BART III" 2020 plan
12. Karen Pettigrew	City of Boardman	PGE "BART III" 2020 plan
13. Steve Eldrige	Umatilla Electrical Cooperative	oppose early closure
14. Chuck Little +	Pendleton Building Trades	oppose early closure
15. Randy Yates	private citizen	PGE's 2020 plan or postpone
16. Rod Osgood	IUOE Local 701	oppose early closure
17. John Edmundson	Heppner Chamber of Commerce	oppose early closure
18. Gary Neal	Port of Morrow	concerned about early closure
19. Debbie Pedro	Hermiston Chamber of Commerce	PGE "BART III" 2020 plan
20. Tamra Mabbott	Umatilla County Planning Dept.	need comprehensive planning
21. Don Anderson	NAES Power Contractors	PGE "BART III" 2020 plan
22. David Richards	Boardman resident	oppose early closure

Comment summary. At this hearing, all of the testimony was either in support of PGE's BART III proposal, or stating that PGE should not close the Boardman plant, including several comments urging postponement of the rulemaking. There was no support for any of DEQ's proposed three options, and a few comments that the $7,300 per ton cost effectiveness threshold was too high. Comments in support of PGE's BART III proposal stated that it represents a reasonable transition plan for workers and the local community to adjust to an early closure, that shutting down before 2020 would have significant economic impacts, and that PGE's plan was clearly a better alternative than DEQ's proposed 3 options from an economic standpoint. There were also many comments opposed to any closure of plant, emphasizing concerns about loss of jobs, tax revenue, and other economic impacts. Testimony from local officials with the City of Boardman and Morrow and Umatilla counties pointed out that the plant employs 110 full-time and 225 seasonal workers, and the loss of these jobs could indirectly affect up to 1000 jobs in the

area. It was also stated that property taxes from the Boardman plant funds 37 taxing districts, and generates about three-million dollars per year in revenue, or about 15 percent to local government in Umatilla and Morrow counties. These taxes pay for health services, public safety, and schools. While much of this testimony indicated a preference for the continued operation of the plant, they noted that if PGE chooses to close the plant, the best option would be PGE's BART III proposal. Several others including a state senator and representative urged DEQ to postpone the rulemaking, citing the same concerns as noted above about major economic impacts if PGE closes the plant.

There was no other testimony provided. The hearing was adjourned at 9:05 p.m.

Public Hearing #4. Sept. 29, 2010, Conference Room, Suite 201, DEQ Medford Office 221 Stewart Avenue, Medford. The hearing officer was Brian Finneran from DEQ. Also present was Mark Fisher from DEQ and EQC Commissioner Judy Uherbelau.

Twelve people attended the hearing, and nine provided oral testimony.

Brian Finneran announced he was the hearing officer, and that he and Mark Fisher would provide a presentation summarizing the proposed rulemaking. A question and answer period followed the presentation.

Brian announced at 6:55 p.m. he would like to begin the formal hearing on the proposed rulemaking. He stated that the hearing was being recorded and testimony would become part of the public record for the rulemaking. He explained his role was to take testimony on behalf of the EQC and prepare a report summarizing the written and verbal comments. He asked that people interested in providing oral testimony fill out a witness registration form, and would call people to testify in the order they turned in the form. He added that written comments would be given the same weight as oral comments.

Brian reminded the audience that the deadline date for receipt of written comments on the proposed rules is Friday, Oct. 1, 2010, 2009, at 5 p.m. He stated that after reviewing the comments, the department may consider revisions to the proposed rules. He added that the department's final recommendation for rule adoption will be made at the EQC meeting scheduled for December 9-10, 2010, and that the EQC can use its own discretion in deciding whether to adopt all, part or none of the proposed rules, postpone adoption, or hold additional public hearings.

- Summary of the testimony:

Nine persons provided oral testimony. Table 4 lists the names of those who provided testimony and the primary position supported by each person. After this is a summary of the comments provided at the hearing.

Table 4 Medford Hearing 9/29/10		
Name	***Affiliation***	***In Support of***
*Oral Testimony: (*also provided written comments) (+testified at more than one hearing)*		
1. Bill Hoke	City of Medford	PGE "BART III" 2020 plan
2. Ray Hendricks +	Portland General Electric Company	PGE "BART III" 2020 plan
3. Ron Fox *	SOREDI	PGE "BART III" 2020 plan
4. Monte Mendenhall	Pacific Power	PGE "BART III" 2020 plan
5. Deane Funk	Portland General Electric Company	PGE "BART III" 2020 plan
6. Sarah Westover	Beyond Coal Campaign	2015 closure
7. Meryl Six	Cascade Climate Network + Beyond Coal	close as soon as possible
8. Steve Vincent	Avista Utilities	PGE "BART III" 2020 plan
9. Benji Nagel	student	2015 closure or sooner

Comment summary. At this hearing, most of the testimony supported PGE's BART III proposal, citing the same reasons as noted above at the prior hearings. Two PGE representatives commented that the $7,300 per ton cost effectiveness is too high, in that unlike other states which used a high cost threshold, it does not take into account the permanent shutdown of the plant and zero emissions after 2020, as does PGE's BART III proposal. The remaining comments supported a 2015 closure or sooner, citing concerns about mostly global warming, and the need to transition to clean energy as quickly as possible.

There was no other testimony provided. The hearing was adjourned at 7:24 p.m.

Public Hearing #5. Sept. 30, 2010, Columbia Gorge Community College, Health Sciences, Building Three, Room 3.203, 400 E. Scenic Drive, The Dalles. The hearing officer was William Knight from DEQ. Brian Finneran and Mark Fisher from DEQ were also present.

Thirty-nine people attended the hearing, and 21 provided oral testimony.

William Knight announced that he was serving as the hearing officer to this hearing. He introduced Brian Finneran and Mark Fisher from DEQ, who gave a presentation summarizing the proposed rulemaking. A question and answer period followed the presentation.

William announced at 7:20 p.m. he would like to begin the formal hearing on the proposed rulemaking. He stated that the hearing was being recorded and testimony would become part of the public record for the rulemaking. He explained his role was to take testimony on behalf of the EQC and prepare a report summarizing the written and verbal comments. He asked that people interested in providing oral testimony fill out a witness registration form, and would call people to testify in the order they turned in the form. He stated that written comments would be given the same weight as oral comments.

William reminded the audience that the deadline date for receipt of written comments on the proposed rules is Friday, Oct. 1, 2010, at 5 p.m. He stated that after reviewing the comments, the department may consider revisions to the proposed rules. He added that the department's final

recommendation for rule adoption will be made at the EQC meeting scheduled for December 9-10, 2010, and that the EQC can use its own discretion in deciding whether to adopt all, part or none of the proposed rules, postpone adoption, or hold additional public hearings.

- Summary of the testimony:

Twenty-one persons provided oral testimony. Table 5 lists the names of those who provided testimony and the primary position supported by each person. After this is a summary of the comments provided at the hearing.

Table 5
The Dalles Hearing 9/30/10

Name	***Affiliation***	***In Support of***
*Oral Testimony: (*also provided written comments) (+testified at more than one hearing)*		
1. Ted Ferrioli	State Senator, District 30	concerned about early closure
2. John Huffman	State Representative, District 59	PGE "BART III" 2020 plan
3. Terry Tallman * +	Morrow County Judge	concerned about early closure
4. Larry Givens * +	Umatilla County Commissioner	concerned about early closure
5. Ray Hendricks +	Portland General Electric Company	PGE "BART III" 2020 plan
6. Jay Dudley +	Portland General Electric Company	PGE "BART III" 2020 plan
7. Dave Robertson +	Portland General Electric Company	PGE "BART III" 2020 plan
8. Dale Coyle	Portland General Electric Company	PGE "BART III" 2020 plan
9. John McClain	Portland General Electric Company	PGE "BART III" 2020 plan
10. Chuck Little +	Pendleton Building Trades	PGE "BART III" 2020 plan
11. Barry Beyeler *	City of Boardman	PGE "BART III" 2020 plan
12. Daniel Spatz	Columbia Gorge Community College	PGE "BART III" 2020 plan
13. Paul Woodin	Community Renewable Energy Association	PGE "BART III" 2020 plan
14. Peter Cornelison	Friends of the Columbia Gorge	2015 closure Option 3
15. John Wood	private citizen	close as soon as possible
16. Mary Repar *	private citizen	2015 closure or sooner
17. Tom Wood	private citizen	2015 closure or sooner
18. John Nelson	private citizen	2015 closure or sooner
19. Tom Ivancie *	Energy Action NW	PGE "BART III" 2020 plan
20. Jurgen Hess *	private citizen	2015 closure Option 3
21. Dave Berger	private citizen	2015 closure or sooner

Comment summary. At this hearing, the comments were similar to those expressed at the earlier hearings, in terms of the divergence in support between PGE's BART III proposal and those supporting an earlier closure in 2015 or sooner. Most of the comments in support of PGE's BART III proposal cited the following: (1) provides PGE with sufficient time (10 years) to develop affordable and reliable replacement power, including renewable energy; (2) a 2020 closure eliminates all emissions, provides significant air quality and visibility benefits, and represents a unique opportunity to end coal combustion 20 years early, as an alternative to the plant continuing to operate to 2040 and beyond; (3) DEQ's three options cost too much, and the $7,300 cost effectiveness level is too high, and not consistent with the cost effectiveness used by

other states; (4) avoids a hasty shutdown that could lead to increased electricity rates, affecting those on fixed incomes the most; and (5) gives PGE the ability to verify that the proposed dry sorbent injection (DSI) controls are technically feasible by conducting a pilot test study first. Most of the comments supporting a 2015 or earlier closure focused on the magnitude of the Boardman plant emissions, and the affects this has on public health and global warming. These comments included concerns about the extent of air quality impacts in the Columbia Gorge from the Boardman plant. Other comments opposed giving PGE another 10 years to operate when the plant has avoided installing any major pollution controls since it was constructed in 1977, and criticized DEQ for not taken action during this time to require controls or close the plant. A few comments were made that not enough focus has been give to energy efficiency and conservation, and that this would allow PGE to close in 2015 or even sooner.

There was no other testimony provided. The hearing was adjourned at 9:05 p.m.

Second comment period, Oct. 29 – Nov. 15, 2010

Public Hearing #6. Nov. 8, 2010, Metro Regional Center, 600 NE Grand Avenue, Portland. The hearing officer was Pat Vernon from DEQ. Present from DEQ were Brian Finneran, Mark Fisher, Joanie Stevens-Schwenger and David Collier.

Fifty-five people attended the hearing, 41 provided oral testimony, and four written comments were submitted.

Pat Vernon announced that she was serving as the hearing officer to this hearing. She introduced Mark Fisher from DEQ, who gave a presentation summarizing the proposed rulemaking. A question and answer period followed the presentation.

Pat announced at 6:35 p.m. that she would like to begin the formal hearing on the proposed rulemaking. She informed people that the hearing would be recorded and that testimony would become part of the public record for the rulemaking. Pat explained her role was to take testimony on behalf of the EQC and prepare a report summarizing the written and verbal comments. She asked that people interested in providing oral testimony fill out a witness registration form, and would call people to testify in the order they turned in the form. She added that written comments would be given the same weight as oral comments.

Pat reminded the audience that the deadline date for receipt of written comments on the proposed rules is Monday, Nov. 15, 2010, at 5 p.m. She stated that after reviewing the comments, the department may consider revisions to the proposed rules. She added that the department's final recommendation for rule adoption will be made at the EQC meeting scheduled for December 9-10, 2010, and that the EQC can use its own discretion in deciding whether to adopt all, part or none of the proposed rules, postpone adoption, or hold additional public hearings.

- Summary of the testimony:

Forty-one persons provided oral testimony, and four written comments were submitted, one by a person who did not testify. Table 6 lists the names of those who provided testimony and the primary position supported by each person. After this is a summary of the comments provided at the hearing.

Table 6
Portland Hearing 11/8/10

Name	***Affiliation***	***In Support of***
*Oral Testimony: (*also provided written comments) (+testified at more than one hearing)*		
1. Dave Robertson +	PGE	revised PGE 2020 proposal
2. Wendi Eiland	Beaverton Chamber of Commerce	revised PGE 2020 proposal
3. Marcy Putman	IBEW Local 125	revised PGE 2020 proposal
4. Kristan Sheeran, Phd	Economics for Equity and Environment Network	support closure before 2020
5. Erika Winters-Heilman	Private citizen	close by summer 2011
6. Kaician Kitko	Private citizen	support closure before 2020
7. Kyle Gorman *	Clackamas county Fire District #1	revised PGE 2020 proposal
8. Linda Moholt	Tualatin Chamber of Commerce	revised PGE 2020 proposal
9. Jay Halladay	Coaxis	revised PGE 2020 proposal
10. Mark Clemons	Group MacKenzie	revised PGE 2020 proposal
11. Samantha Cummings	Private citizen	close in 2011
12. Jon Pauletto	Private citizen	close by July 2011
13. Adam Walters	Student	close by July 2011
14. Trevor Griffith	Private citizen	close by July 2011
15. Robin Everett	Sierra Club	support early closure
16. Sofia Gidlund	Greenpeace	close in 2011
17. Elizabeth Kaplan	Private citizen	2015 closure or sooner
18. Geoff Guillory	Private citizen	close as soon as possible
19. Roger Cole	Sierra Club	close as soon as possible
20. Liam Doherty-Nicholson	Greenpeace	close by July 2011
21. Bob Jenks *	Citizen Utility Board	close no later than 2020
22. Jason Lehne	Foundation Life Management	revised PGE 2020 proposal
23. Angi Dilkes *	Oregon Business Association	revised PGE 2020 proposal
24. Caitlin Piserchia	Private citizen	support early closure option
25. Cesia Kearns	Private citizen	support early closure options
26. Duncan Reid	Private citizen	collaboration, early closure
27. Nathan Jones	Private citizen	collaboration, early closure
28. Alden Moss	Private citizen	2014 or 2015 closure
29. Jenny Bedell-Stiles	Private citizen	support DEQ 3 options
30. NickEngelfried	Private citizen	2015 closure or sooner
31. Maye Thompson	Oregon Physicians for Social Responsibility	2015 closure Option 3
32. Daniel Cobb	Private citizen	close as soon as possible

33. Nancy Hatch	Private citizen	close by 2016 at latest
34. Antonio Zamora	Greenpeace	close as soon as possible
35. Bill Bigelow	Private citizen	close as soon as possible
36. Borden Beck	PGE customer	2015 closure
37. Tom Wood	Associate Oregon Industries	close as soon as possible
38. Mathilde Mouw	Student	2015 closure
39. Joel Durr	Private citizen	close as soon as possible
40. Natasha Hultmann	Private citizen	close as soon as possible
41. Tom Ivancie	Energy Action Northwest	close as soon as possible
Written comments received from persons who did not testify:		
1. Nicole Forbes	Friends of the Columbia Gorge	comments from 5 members

Comment summary. At this hearing, the public comments were evenly divided between support of PGE's revised 2020 proposal, and closing the plant in 2015 or as soon as possible. Supporters of PGE's revised 2020 proposal commented that it represented a good compromise between DEQ's Option 2 with a 2018 closure date, and PGE's BART III proposal with a 2020 closure date. They also restated their original support for PGE's BART III proposal, noting that a 2020 closure would provide PGE with sufficient time (10 years) to buy or build replacement power that is affordable, reliable, and cost effective, and allows time for workers at the Boardman plant to transition to new jobs after the closure of the plant. They also pointed out that PGE's proposal represents a significant cost savings to DEQ's proposed options, and thus lowers the overall economic impact, and that a hasty shutdown could lead to increased electricity rates and impacts on low-income citizens and small businesses.

Supporters of an earlier closure of the PGE Boardman plant cited the need to close the plant in 2015 or as soon as possible. They expressed concerns about the health effects from the plant's emissions, and the need to address global warming now. The health problems mentioned included asthma, lung cancer, and other respiratory issues. Global warming concerns focused on the plant being the largest source of greenhouse gas emissions in the state. There was strong support to end reliance on coal technology, to pursue cleaner and renewable energy resources. Other comments included (1) from a cost standpoint, the earliest closure would avoid making unnecessary investments in expensive controls for an "outdated plant"; (2) transitioning to renewable energy could create more "green jobs"; (3) opposition to giving PGE another 10 years to operate when the plant has avoided installing any major pollution controls since it was constructed in 1977, and (4) criticism of DEQ for not taken action related to a Notice of Violation recently issued recently against the PGE Boardman plant by EPA for allegedly violating New Source Performance Standards.

There was no other testimony provided. The hearing was adjourned at 8:26 p.m.

Public Hearing #7. Nov. 9, 2010, Port of Morrow, River Front Room, Boardman. The hearing officer was Larry Calkins from DEQ. Present from DEQ were Mark Fisher and Joanie Stevens-Schwenger.

Thirty-two people attended the hearing, and 17 provided oral testimony.

Larry announced that he was serving as the hearing officer to this hearing. He introduced Mark Fisher from DEQ, who gave a presentation summarizing the proposed rulemaking. A question and answer period followed the presentation.

Larry announced at 6:35 p.m. he would like to begin the formal hearing on the proposed rulemaking. He informed people that the hearing would be recorded and that testimony would become part of the public record for the rulemaking. Larry explained his role was to take testimony on behalf of the EQC and prepare a report summarizing the written and verbal comments. He asked that people interested in providing oral testimony fill out a witness registration form, and would call people to testify in the order they turned in the form. He added that written comments would be given the same weight as oral comments.

Larry reminded the audience that the deadline date for receipt of written comments on the proposed rules is Monday, Nov. 15, 2010, at 5 p.m. He stated that after reviewing the comments, the department may consider revisions to the proposed rules. He added that the department's final recommendation for rule adoption will be made at the EQC meeting scheduled for December 9-10, 2010, and that the EQC can use its own discretion in deciding whether to adopt all, part or none of the proposed rules, postpone adoption, or hold additional public hearings.

- Summary of the testimony:

Seventeen persons provided oral testimony. Table 7 lists the names of those who provided testimony and the primary position supported by each person. After this is a summary of the comments provided at the hearing.

Table 7
Boardman Hearing 11/8/10

Name	***Affiliation***	***In Support of***
*Oral Testimony: (*also provided written comments) (†testified at more than one hearing)*		
1. Terry Tallman	Morrow County Judge	concerned about early closure
2. Chet Phillips	Mayor, City of Boardman	revised PGE 2020 proposal
3. Dave Robertson	Portland General Electric Company	revised PGE 2020 proposal
4. Barry Beyeler	City of Boardman	revised PGE 2020 proposal
5. Rick Main	IBEW Local 125	revised PGE 2020 proposal
6. Marcy Putman	IBEW Local 125	revised PGE 2020 proposal
7. Sheryll Bates	Heppner Chamber of Commerce	revised PGE 2020 proposal
8. Diane Wolfe	Boardman Chamber of Commerce	revised PGE 2020 proposal
9. Steve Doherty	Private Citizen	opposed to any closure
10. Chuck Little	Pendleton Building Trades	revised PGE 2020 proposal
11. Dave De Mayo	City of Heppner	continued use of coal
12. Karen Pettigrew	City of Boardman	revised PGE 2020 proposal
13. Karen Wolff	Morrow County resident	revised PGE 2020 proposal
14. Randal Curtis	Private Citizen	revised PGE 2020 proposal
15. Don Russell	Private Citizen	opposed to any closure

16. Gary Neal	Port of Morrow	revised PGE 2020 proposal
17. Jody Marston	Private Citizen	revised PGE 2020 proposal

Comment summary. At this hearing, most of the testimony was in support of PGE's revised 2020 proposal, which would set one closure date (2020) and eliminate the current rules adopted in 2009. Some of the testimony expressed a preference for continued operation of the plant until 2040, but recognized that since PGE has proposed a 2020 closure, the new proposal was the best alternative. There was also testimony that in adopting PGE's new 2020 proposal, there should be no earlier closure options added to the rules, such as DEQ's Option 2 and 3, which had 2018 and 2015-16 closure dates, respectively. The comments stressed the importance of one closure date in 2020, and nothing else. A few comments were made opposing any closure of the Boardman plant, citing the importance of continuing to use coal for energy, and that the regional haze regulations are not valid reasons for requiring expensive pollution controls for the plant.

There was no other testimony provided. The hearing was adjourned at 7:37 p.m.

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY

Relationship to Federal Requirements

Proposed Revisions to DEQ Regional Haze BART rules for the PGE Boardman Power Plant

Answers to the following questions identify how the proposed rulemaking relates to federal requirements and potential justification for differing from, or adding to, federal requirements. This statement is required by OAR 340-011-0029(1).

1. Is the proposed rulemaking different from, or in addition to, applicable federal requirements? If so, what are the differences or additions?

The proposed rulemaking is different from, or in addition to, applicable federal requirements because it is more specific than the federal requirements. Oregon is required by the federal Clean Air Act to establish Best Available Retrofit Technology (BART) pollution controls for the PGE Boardman plant, pursuant to rules and guidelines established by the United States Environmental Protection Agency (EPA). However, while Oregon follows EPA rules and guidelines in establishing BART, the determination of what controls satisfy BART is made by Oregon. Also, applicable federal requirements do not require Oregon to establish multiple options for BART based upon potential early closure dates that PGE may choose, but because PGE has requested early closure options, DEQ is proposing options that are different from and are in addition to the minimum federal requirement to establish BART for the remaining useful life of the facility.

The federal regional haze rule requires BART for certain older industrial facilities built before 1977, if they are found to cause significant visibility impacts in Class I areas, and if installing new pollution controls is technologically feasible and cost effective.

The original BART rules for the Boardman plant that were adopted in 2009, as well as the additional options proposed in this rulemaking, were developed consistent with EPA guidance. For sources that are subject to BART, states are required to establish BART based on five factors:

1. Costs of compliance;
2. Energy and non-air environmental impacts
3. Existing controls at source
4. Remaining useful life of source
5. Visibility improvement reasonably expected from the technology

The proposed rulemaking responds mainly to the fourth factor, the remaining useful life of the source. Under EPA guidance, the capital costs of control measures are annualized over the remaining useful life of the plant. This rulemaking establishes BART requirements for

three options where the remaining useful life is shortened by a federally-enforceable shutdown provision.

EPA has not established national criteria for evaluating the five criteria, so states have some latitude in the metrics they use to establish the stringency of BART.

The adopted BART rules must be submitted to EPA for review and approval as a revision to the Oregon State Implementation Plan under OAR 340-200-0040.

2. If the proposal differs from, or is in addition to, applicable federal requirements, explain the reasons for the difference or addition (including as appropriate, the public health, environmental, scientific, economic, technological, administrative or other reasons).

DEQ had to establish criteria for evaluating the five factors required by federal law. DEQ used two cost-effectiveness criteria to evaluate the factors - the annualized cost per ton of emissions reduced and the annualized cost per unit of visibility improvement.

In determining the level of emission controls for each option, DEQ used a cost effectiveness threshold of up to $7,300 per ton of emissions reduced. This threshold is on the high end of thresholds used or considered by other states (a higher threshold results in more stringent emission control requirements). The reason that DEQ used a high threshold is that emissions from the plant have a significant impact on visibility in 14 Class I areas in Oregon and Washington.

As a result, even with a high cost per ton of emissions reduced, the proposal has a relatively low cost per unit of visibility improvement. DEQ used a cost effectiveness threshold of up to $10,000,000 per total deciview improvement, consistent with the threshold used for BART determinations in other states. The visibility improvement for each option is under this threshold level.

3. If the proposal differs from, or is in addition to, applicable federal requirements, did the Department consider alternatives to the difference or addition? If so, describe the alternatives and the reason(s) they were not pursued.

DEQ considered using a lower cost-effectiveness threshold, which would have resulted in less stringent emission control requirements for any given shutdown date. For example, some states have adopted BART requirements in the $3,000 to $5,000 per ton range. The Department did not pursue this alternative because the Boardman plant has a significant impact on visibility in 14 Class I areas in Oregon and Washington.

DEQ considered establishing alternative closure dates for one of the options in the proposal. Option 3 establishes a closure date for the plant that is five years after the date that EPA approves Oregon's Regional Haze plan. Depending on the final approval date, this could mean late 2015 or early 2016 under this option. DEQ considered an earlier closure date of July, 2014, which is the date that significant emission controls are required under the current rules. DEQ rejected this option because federal law does not require BART to be installed earlier than five years after plan approval.

DEQ considered a more stringent emission limit in one of the options in the proposal. Option 2 calls for an SO_2 emission limit of 0.4 lb/MMBTU based on use of dry sorbent injection (DSI). DEQ considered a lower emission limit since DSI systems have achieved levels as low as 0.2 lb/MMBTU. DEQ rejected a lower limit for two reasons. First, while DSI has been commercially demonstrated, it has never been used on a plant as large as Boardman. As a result, the ability of DSI to achieve a lower limit at Boardman is uncertain. Second, a lower SO_2 limit would result in increased particulate emissions from the DSI system itself. If the particulate emissions are high enough, this could trigger additional emission control requirement, which could raise the cost of the DSI system so that it does not meet the cost-effectiveness threshold.

DEQ did not consider any alternatives with closure dates later than 2020. This is because PGE requested that the Department adopt BART requirements for a 2020 closure, indicating that a later closure date is no longer being considered.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Chapter 340
Proposed Rulemaking
STATEMENT OF NEED AND FISCAL AND ECONOMIC IMPACT

This form accompanies a Notice of Proposed Rulemaking

Title of Proposed Rulemaking	**Revisions to DEQ Regional Haze BART rules for the PGE Boardman Power Plant** Adopt: OAR 340-223-0060, 340-223-0070, 340-223-0080, 340-223-0090 Amend: 340-200-0040, OAR 340-223-0010, 340-223-0020, 340-223-0030, 340-223-0040, 340-223-0050
Statutory Authority or other Legal Authority	ORS 468.020 & 468A.310
Statutes Implemented	ORS 468A.025
Purpose and Scope of Fiscal Analysis	**DEQ Rulemaking** The purpose of this fiscal and economic impact statement is to describe the estimated costs, or range of estimated costs, associated with the rule proposal of the Department of Environmental Quality (DEQ). The discussion below reflects the best information available to DEQ at the time of this writing, including information obtained from DEQ's fiscal advisory committee. There are two main types of costs discussed in this document. The **first** type of costs are those that result from proposed rule requirements to install pollution control technology known as Best Available Retrofit Technology (BART). The costs of these pollution controls would be borne by the owners of the Boardman coal plant. The owners of the Boardman coal plant are Portland General Electric (PGE), San Diego Gas and Electric (SDG&E)/General Electric Capital Corporation (GECC), Idacorp, Inc., and Power Resources Cooperative (PRC). (Note: as used in this document, PGE and the other owners of the plant will be referred to as simply "PGE". See Table 7 on page 11 for the respective share of ownership). As noted below, it is likely these costs would be passed on to plant customers through increased electric rates. PGE has stated a desire for an option to close the Boardman coal plant in December 2020. Pursuant to federal law, the level of pollution control that is needed to satisfy BART can vary, depending on the remaining useful life of the Boardman power plant (which is a direct result of any closure date). DEQ does not have the regulatory authority to mandate a specific closure date for the Boardman power plant. That decision rests with the owners of the Boardman plant. DEQ's rulemaking proposes three pollution control technology options for meeting federal BART requirements. Each option reflects the type and stringency of pollution control required to meet BART given three possible closure scenarios: 2020, 2018, or 2015/2016. DEQ has used the direct capital and operating costs associated with installing and maintaining pollution controls at the Boardman plant - in combination with the remaining useful life of the plant, the amount of air pollution reduced, the degree of visibility improvement and other factors - to determine BART for each of the three closure options. The owners of the Boardman plant will presumably attempt to pass on the costs of these controls to customers of the Boardman facility, and these costs will likely translate into increased electricity rates (although any proposed increase in electricity rates in Oregon is subject to approval by the Oregon Public Utility Commission). As a result, the **second** type of costs discussed in this document are the costs to those who may be economically affected by early closure of the Boardman plant. These costs include, for example, increased electricity rates, loss of employment and loss of tax revenue. These costs are not required to comply with the proposed rules, but rather may result if the owners of the Boardman plant decide to close the plant.

	These costs and broader affects are acknowledged and discussed here to provide the public with a comprehensive review of the estimated fiscal and economic impacts that may arise from the owners' decision to close the Boardman plant. It is important to note that the proposed rules would not require early closure of the Boardman plant, and in fact, the proposed rules would provide the option of running the plant indefinitely. The purpose of the proposed rules is to establish the regional haze pollution control requirements that would be applicable if the owners of the Boardman plant independently decided to close the plant early. Only the owners of the Boardman plant have authority to close the plant early. **Impact Groups Covered in this Document** This document describes potential costs to seven key groups: the general public, small business, large business, local government, state agencies, including DEQ, and tribal nations. For each of the groups discussed below, DEQ describes the capital and operating costs of DEQ's BART options, as well as DEQ's best estimate of likely rate increases that could be attributed to the BART control technology costs. DEQ has included a section on page 15 that provides information provided by PGE on the likely rate impacts that could result if PGE decides to close the Boardman facility. These costs include a wider range of activities including decommissioning the coal plant, and the potential cost of replacing the power generated by Boardman. DEQ also included information about the potential effects on employment and local government tax revenues that could result if PGE decides to close the Boardman facility early. In addition, DEQ recognizes the potential health benefits resulting from a Boardman plant closure.
Need for the Rule(s)	**Oregon Regional Haze Plan and PGE Boardman rules** To meet federal Clean Air Act requirements, DEQ must develop a series of regional haze plans to reduce haze pollution and improve visibility in Oregon wilderness areas and national parks, as required under the federal regional haze rule. The Oregon Environmental Quality Commission (EQC) adopted the state's first regional haze plan in 2009. DEQ's regional haze analysis shows that the PGE Boardman coal-fired power plant is the largest individual source of haze pollution in Oregon, causing significant visibility degradation and acid deposition in 14 national parks and wilderness areas in Oregon and Washington and the Columbia River Gorge National Scenic Area. Oregon's 2009 Regional Haze Plan can be found at DEQ's website at www.deq.state.or.us/aq/haze/index.htm. The 2009 Regional Haze Plan included emission control rules for the PGE Boardman plant. These rules are currently in effect, and must be implemented unless revised by the EQC and approved by the Environmental Protection Agency. The 2009 Boardman rules require an initial phase of controls for sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) pollution that would reduce these emissions by about 66 percent by 2014, at a cost of about $306 million, and a second phase of more advanced NO_x controls that would provide a total reduction of 80 percent by 2018, at an additional cost of $192 million.[1] On April 2nd, 2010, PGE submitted a petition to the EQC to revise the existing air pollution control rules for the Boardman plant. In the petition, PGE proposed an alternative approach for meeting federal regional haze requirements to install Best Available Retrofit Technology (BART), by using low sulfur coal to meet BART, and eliminating other pollution control requirements, in conjunction with early closure of the plant by December 31, 2020. On June 17, 2010 the EQC denied PGE's petition and directed DEQ to begin rulemaking to provide a broader range of control options consistent with an early closure. DEQ developed

[1] Cost estimates are in 2010 dollars.

	three draft control options for the Boardman power plant, which meet federal BART requirements. These options are discussed in the "Overview" section below. (See also DEQ's 2010 BART Report for the PGE Boardman Plant for more information.) DEQ solicited initial public input on its three draft control options during the month of July 2010. The public was encouraged to send comments to DEQ's website, and these were considered by DEQ in developing this rule proposal. As noted above, DEQ also consulted with a fiscal advisory committee, which met on August 4, 2010 to provide additional input on the likely costs associated with DEQ's control options. A formal public comment period will be held during the month of September 2010. DEQ intends to present its final rule recommendation to the EQC in December 2010.
Documents Relied Upon for Rulemaking	DEQ relied on the following documents in considering the need for and in preparing this rule, and for estimating the fiscal and economic effects related to this rulemaking: 1. EPA guidance for Best Available Control Technology www.deq.state.or.us/aq/haze/docs/bartcontrol.pdf 2. DEQ's 2010 report on BART recommendations for PGE Boardman www.deq.state.or.us/aq/haze/docs/pge/attachAreport.pdf Copies of these documents and the complete list of documents DEQ used in its analysis can be reviewed at the DEQ office at 811 S.W. 6th Avenue, Portland, Oregon. Please contact Brian Finneran at (503) 229-6278 for times when the documents and the complete list are available for review.
Requests for Other Options	Pursuant to ORS 183.335(2(b)(G), DEQ requests public comment on whether other options should be considered for achieving the rule's substantive goals while reducing negative economic impact of the rule on small business.
Fiscal and Economic Impact, Statement of Cost Compliance	The following estimates of fiscal and economic impacts are based on DEQ's best available information, experience with the 2009 PGE Boardman regional haze rules and information provided by PGE to estimate possible electricity rate increases. It should be noted that any future rate increases in Oregon are contingent on approval by the Oregon Public Utility Commission (PUC). DEQ also relied upon a fiscal advisory committee which met on August 4, 2010, to assist the agency in evaluating the financial consequences (scope and effect) of DEQ's proposed options. The fiscal advisory committee members represented a cross section of interests likely to be affected by DEQ's proposed rules, and who had expertise in assessing fiscal and economic impacts such as those associated with the controls proposed for PGE Boardman, and the likely rate increases that could affect the customers served by owners of the Boardman plant, including small businesses. The committee reviewed a draft of this Fiscal Impact Statement to determine if DEQ had reasonably characterized the costs and impacts of the proposed options, with special emphasis on potential impacts to small business. A summary of the fiscal advisory committee August 4th meeting can be found at www.deq.state.or.us/aq/haze/shutdown.htm. Retrofitting pollution controls on the PGE Boardman power plant is a major construction project, and will require a very complex engineering and construction effort. There are many variables that affect the cost of such a project, including future labor and material costs and the market pricing for pollution control equipment. Given the large and complex nature of this type of project, DEQ is providing an estimate of the capital and annual operating costs of the required emission controls. This assessment does not estimate the benefit of reducing air pollutants associated with a Boardman early closure, such as greenhouse gas emissions, because DEQ lacks information needed to make an accurate estimate.

The three options in DEQ's proposed rule are based on the closure of the Boardman plant at various dates. DEQ's proposed rule options would not require the owners to close the plant; rather it would give the owners the choice to select one of the three options or to implement the existing 2009 rule requirements. DEQ is proposing to include all of these options because the owners have not yet made a final decision about whether and when to close the plant. In addition to the cost of BART controls, this decision will be affected by many factors outside the control of DEQ, including the potential costs of future federal legislation to reduce greenhouse gas emissions, the potential costs of future federal regulations to reduce hazardous air pollutants, the potential costs of litigation regarding previous modifications at the plant, the supply and cost of alternate sources of power, future demand for electricity, and the ability of the owners to recover costs from ratepayers. The proposed rules require the owners to select an option no later than June 30, 2014, by which time they will have more information about these factors.

PGE's decision to close the Boardman power plant would result in a variety of costs, but also should involve significant cost savings. These would include the avoided costs of more stringent regional haze pollution controls, the avoided costs of greenhouse gas regulation, and the avoided costs of future federal air quality regulation. DEQ lacks information to make accurate estimates of these cost savings.

Overview

Summary of DEQ's Proposed Three BART Options in this rulemaking:

DEQ's options below would meet federal requirements for BART, and are consistent with an early closure approach. If adopted, these options would be added to the existing regional haze rules adopted in 2009 for the Boardman plant. **DEQ is proposing to adopt all three options and allow PGE to select the option that matches the closure date the owners select for the plant**. If PGE selects none of these options, the existing 2009 rules would apply. The existing 2009 rules would allow PGE to run the plant indefinitely and do not contain any closure deadline.

Each option below weighs factors such as the scope and magnitude of the air quality degradation caused by Boardman's' air pollution, the stringency necessary for required BART controls in light of different closure dates, the technical feasibility of retrofitting controls, and the cost effectiveness of those controls given different closure dates. Cost effectiveness is influenced by the remaining useful life of the facility (i.e. the closure date). In the following options, DEQ has identified the emission control package that would be approvable as BART for each closure date. Conceptually, the more expensive the emission control package, the longer the Boardman facility needs to operate to avoid exceeding the BART cost effectiveness threshold. Less costly emission control packages would only meet BART with an earlier shutdown. For example, DEQ would consider an SO_2 scrubber necessary to meet the BART requirements if the plant operates beyond the end of 2018, but DEQ would consider a dry sorbent injection system to be sufficient to meet BART if the plant closes earlier.

Option 1- 2020 shutdown: This option would set the same NO_x limit (based on low-NO_x burners) in 2011 and the same SO_2 limit (based on scrubbers) as the 2009 rules. Given an early shutdown in 2020, the additional NO_x limit in 2017 (based on SCR) would be replaced with a NO_x limit in 2014 based on Selective Non-catalytic Reduction (SNCR). SNCR is much less expensive than SCR, and can reduce NO_x by 9 percent more than the limit based on the low-NO_x burners alone.[2] This option would achieve the same 46 percent reduction in NO_x in 2011

[2] SNCR was not required as part of the 2009 rules. It was not considered cost-effective when combined with the SCR controls required in 2017. Subsequently, DEQ has learned that SNCR can achieve a lower emission rate, and cost slightly less, than previously determined. Adding SNCR to the low NOx burners provides additional visibility benefit, and without SCR, is now considered cost-effective under Options 1 and 2, but not Option 3.

and 50 percent reduction in SO_2 in 2014, an additional 9 percent reduction in NO_x in 2014, none of the additional NO_x reductions in 2017, and eliminate all emissions from the coal plant after 2020. The estimated cost of this option is approximately $320 million, or $177 million less than the 2009 controls.

Option 2 - 2018 shutdown: This option includes the same NO_x limit (based on low-NO_x burners) in 2011 as the 2009 rules. Given an early shutdown in 2018, the 2014 SO_2 limit based on scrubbers would be replaced with an SO_2 limit based on Dry Sorbent Injection (DSI), at significantly less cost. Like option 1, the more stringent NO_x limit in 2017 based on SCR would be replaced by a NO_x limit in 2014 based on SNCR. This option would achieve the same reduction in NO_x in 2011, but only half of the reduction in SO_2 in 2014, an additional 9 percent reduction in NO_x in 2014, none of the additional NO_x reduction in 2017, and eliminate all emissions from the coal plant after 2018. The estimated cost of this option is approximately $103 million, or $394 million less than 2009 controls.

Option 3 - 2015/2016 shutdown: This option would set a NO_x limit based on low NO_x burners in 2011, and no other emission limits. The shutdown date in this option is based on the requirement to install BART controls within five years of federal approval of a state regional haze plan. Since Oregon's 2009 Regional Haze Plan is expected to be approved by the EPA in late 2010 or early 2011, this option establishes a shutdown date in five years, or by 2015 or 2016. This option would achieve the same reduction in NO_x in 2011, and eliminate all emissions from the coal plant after 2015/2016. The estimated cost of this option is approximately $36 million, or $462 million less than 2009 controls.

Note: All three options would still require the Boardman plant to comply with DEQ's existing mercury rules in 2012.

Table 1 summarizes the three control options, compared to the 2009 rules.

Table 1: Summary of 2009 Rules and DEQ proposed three options

Option	Controls/Installation Date			Capital Cost (million $)	Cost savings from 2009 rules (million $)	Emission reduction (tons/year + percent)	Additional Emission reduction after close date (tpy)
	2011 (NO_x)	2014 (SO_2)	2017 (NO_x)				
2009 Rules	LNB/MOFA	Semi-dry Scrubber	SCR	$497.6	-	20,800 (81%)	n/a
Option 1 (2020)	LNB/MOFA /SNCR	Semi-dry Scrubber	-	$320.6	$177	17,800 (69%)	7,700
Option 2 (2018)	LNB/MOFA /SNCR	DSI	-	$102.6	$395	10,600 (41%)	14,900
Option 3 (2015-16)	LNB/MOFA	-	-	$35.7	$462	4,800 (19%)	20,900

Key to Table:
LNB/MOFA = Low NO_x burners with modified overfire air system.
SNCR = Selective Non-Catalytic Reduction system.
Semi-dry Scrubber, also known as semi-dry flue gas desulfurization system.
DSI = Dry Sorbent Injection
SCR = Selective Catalytic Reduction.

Triggering of PSD from Option 2 DSI System

As noted above in the description of DEQ's Option 2, the SO_2 controls would consist of a dry sorbent injection system. Permitting rules for PM2.5 may result in the DSI system triggering DEQ's Prevention of Significant Deterioration (PSD) rules, under OAR 340-224-0070. A DSI system installed at the PGE Boardman plant could cause an increase in PM2.5 emissions greater than the significant emission rate (10 tons/yr). If that occurred, PGE would be required

available control technology and conduct an air quality impact analysis to ensure the increase does not exceed the PSD increment or ambient air quality standards for PM2.5. DEQ cannot determine what will be required until accurate emission estimates are available. However, it is possible that the existing electrostatic precipitator at the Boardman plant may satisfy the best available control technology requirement. In addition, the emission increase may not be great enough to cause a significant impact on the PSD increment or ambient air quality standard for PM2.5.

However, if the emissions do cause an adverse impact, PGE may be required to install a fabric filter to reduce the PM2.5 emissions, which would increase the cost of the DSI system considerably. DEQ estimates that DSI with a fabric filter could achieve 0.305 lb/MMBtu heat input (50% overall collection efficiency). Using this as the basis for the emission reduction, the cost effectiveness of the system is estimated at $6,700/ton, which DEQ still considers to be cost effective for Option 2 under federal BART rules. The details of this analysis are provided in Attachment A of DEQ's 2010 report on BART recommendations for PGE Boardman www.deq.state.or.us/aq/haze/docs/pge/attachAreport.pdf. Adding the fabric filter to the DSI system will also reduce the visibility impacts, and could also increase the estimated rate increases in Table 4 and Table 12.

Due to the uncertainty at this time regarding the PM2.5 emissions increase and the air quality impact, this fiscal analysis does not include the fabric filter costs as part of Option 2. As noted above, DEQ has included cost estimates for the fabric filter based on currently available information on the possible triggering of PSD under Option 2. Any further analysis of whether a fabric filter will be required is too speculative and not addressed in this document.

PGE's Recommended Alternative to Options 1 or 2

At the August 4, 2010 fiscal advisory committee meeting, PGE requested that DEQ consider a change to DEQ's options for meeting BART, where PGE would commit to installing DSI, but based on a 2020 shutdown date, rather than 2018, and only after conducting a pilot study to determine the technical feasibility of DSI controls, and if the SO_2 emission limit identified by DEQ can be met. This alternative would increase visibility impacts, but could reduce the estimated rate increases in Table 4 and Table 12. For additional information on PGE's recommendation, see PGE's July 30, 2010 letter "PGE Comments on DEQ's Proposed Revisions to its Regional Haze Rules", at DEQ's PGE Boardman website or go to www.deq.state.or.us/aq/haze/shutdown.htm#moreInfo.

Upcoming Federal Hazardous Air Pollutant Emission Standard

In March 2011 the Environmental Protection Agency is expected to propose new rules to address hazardous air pollutants from power plants like the PGE Boardman plant. Final adoption of these rules is expected in November 2011. It is anticipated that the rules will address acid gases (HCl and HF), as well as mercury. The same types of controls considered for the BART rules, or perhaps even more stringent controls, could be required by EPA under these new rules. If EPA requires the same or more stringent controls, then the fiscal and economic impact of DEQ's proposed rules would be less, because the costs of the controls proposed by DEQ would already be required by federal law. Since these rules have not been proposed, however, it would be too speculative at this time to assess their potential effect on the fiscal and economic impact of DEQ's proposed rules.

Public Health and Environmental Benefits

Closure of the Boardman coal-fired boiler would permanently eliminate approximately 25,500 tons of air pollution per year, including visibility impairing pollutants of sulfur dioxide and nitrogen oxide, and well as fine particulate, and mercury (an air toxic). DEQ expects this reduction would have a significant heath benefit for the public; however, DEQ cannot at this

time estimate these benefits in term of health costs or dollars saved because it lacks the necessary and complicated data to estimate those types of benefits. However, DEQ does recognize that these health benefits do exist.

The three BART options would reduce emissions from the Boardman plant in the range of 4,800 to 17,800 tons/year prior to the proposed closure date, and an additional 7,700 to 20,900 tons/year after closure. This would significantly improve visibility in 14 federal wilderness areas in Oregon and Washington, as well as the Columbia River Gorge National Scenic Area. See DEQ's 2010 BART Report for the PGE Boardman Plant for more information on the visibility benefits from the emission reductions under the three options. In addition to visibility benefits, the emission reductions would reduce the plant's contribution to acid deposition in areas such as the Columbia Gorge, which poses risk to sensitive ecosystems and valued cultural resources, such as Native American rock images. In addition, closure of the Boardman plant would eliminate approximately 4,000,000 tons of greenhouse gas emissions in Oregon. DEQ cannot estimate the benefits from this reduction in dollar terms, because it lacks information that would help it accurately estimate those benefits, but these benefits should be recognized.

Types of Costs

The fiscal and economic impacts of these three options can be summarized as follows. First, there will be costs to the owners of the Boardman power plant for installing and operating new pollution control technology. Second, costs to the owners of the Boardman power plant will likely be passed on to customers served by the plant through increased electric rates. DEQ's estimated rate increases associated with each option are summarized in the sections below. Any potential rate increase will be contingent on future actions taken by the PUC. Third, closing Boardman could result higher rate increases and elimination of jobs associated with running the power plant, and have impacts on the local tax base and economy. Fourth, closing the Boardman power plant would also result in decreased revenue to DEQ from permit and emission fees paid by Boardman under the Title V permit program, which is a significant portion of the total fees DEQ receives under this program.

Table 2 below summarizes the estimated total capital costs and annual costs for the control options, compared to the 2009 rules. The total annual cost would increase for Option 1 (2020 closure) and decrease significantly for Option 2 (2018 closure) and Option 3 (2015-2016 closure).

Table 2: Cost comparison - 2009 rules vs. DEQ three options

Option	Capital Costs (Million $)	Indirect Annual Cost* (Million $)	Direct Annual Cost** (Million $)	Total Estimated Annual Cost*** (Million $)
Current 2009 rules	497.6	47	20	67
Option 1 (2020 closure)	320.6	60.6	16.1	76.7
Option 2 (2018 closure)	102.6	24	4.9	28.9
Option 3 (2015-16 closure)	35.7	9.7	0.7	10.4

* The indirect annual cost is determined by amortizing the capital costs over the remaining useful life of the plant.
** The direct annual costs are the costs associated with operation and maintenance of the controls.
*** The total estimated annual cost is the sum of the indirect and direct annual costs.

Table 3 shows the annualized emission reductions and cost for the control options compared to the current 2009 BART rules, based on the capital costs annualized out to 2040 and additional emission reductions from closure of the plant. This information is included as a means of comparing the cost of the three options to the total emission reductions from the BART controls and the closure of the plant. This was not part of DEQ's BART determination, as the federal BART criteria requires the remaining life of the equipment be considered (or in this case, the early shutdown dates.) However, Table 3 does give a sense of cost/benefit of the

three options when compared to the current BART rules for PGE Boardman.

For example, under the current 2009 rules, it is assumed the plant will operate until at least 2040. Even after the required controls are installed, the plant would continue to have emissions, whereas under the three options, all emissions would be eliminated. Table 3 below shows that for the current 2009 rules, over the 30 year period the average annual cost per ton is $2,520. If compared to Option 3, the table shows that the BART controls would reduce Boardman emissions until 2016, after which the emissions would be zero. Over a 30-year period the average annual cost per ton would $74. This low cost reflects the cost of the controls in Option 3, divided by the average emissions from 2010 to 2016, and no emissions from 2017 to 2040. Again, this table is included here to provide additional information on the cost/benefit of the three options, but is not one of the criteria for evaluating BART controls.

Table 3: Annualized emission reduction and cost - 2009 rules vs. DEQ three options*

Option	Average Annual emission reduction through 2040 (tons/year)	Average Annual cost per ton through 2040
Current 2009 rules	18,410	$2,520
Option 1 (2020 closure)	21,453	$837
Option 2 (2018 closure)	20,888	$249
Option 3 (2015-16 closure)	22,103	$74

* This table does not include the emissions or cost of replacement power that may be required under early closure options.

Estimated Rate Increases by Class

Table 4 summarizes the estimated rate increases for different rate classes, comparing the 2009 rules for the PGE Boardman plant to the three proposed control options, based on the cost of BART controls. To estimate potential rate increases, DEQ used the methodology used by PGE in their 2010 rate increase request to the PUC. See the section on "Assumptions" on page 16 for additional information on rate increase estimation. See also Attachment A for a detailed breakdown of possible rate increases.

Table 4: Estimated rate increases - 2009 rules vs. DEQ proposed three options*

Estimated Rate Increases from DEQ Proposed Rule Options				
Rate Class	**Current 2009 PGE BART Rule**	**Option-1 Estimated Rate Increase**	**Option-2 Estimated Rate Increase**	**Option-3 Estimated Rate Increase**
Residential/ Commercial	**2.56%**	2.93%	1.11%	0.37%
Irrigation & Drainage	**1.58%**	1.80%	0.68%	0.23%
Small non-residential	**2.57%**	2.93%	1.11%	0.37%
Large non-residential	**3.31%**	3.78%	1.43%	0.48%
Traffic Signs	**3.06%**	3.50%	1.32%	0.44%
Lighting	**1.39%**	1.59%	0.60%	0.20%
Average	**2.84%**	**3.24%**	**1.22%**	**0.41%**

* This table only includes potential rate increases caused by the cost of pollution controls under DEQ's proposed rules. See Table 12 for PGE's estimates of potential rate increases due to costs of early closure, including plant decommissioning and potential replacement power costs.

Rate increases are subject to approval by the PUC. DEQ anticipates that PGE would request a rate increase to recover the cost of complying with DEQ's rule. DEQ anticipates that the other owners of the Boardman plant would make similar requests to the boards that govern electricity rates in their jurisdictions.

Impacts on the General Public

BART Costs associated with DEQ Rule

DEQ estimates that its proposed rule options could impact the general public by increasing electricity rates for customers of the four utility companies that own the Boardman plant, listed in Table 7 on page 11. Some of these customers may reside outside of Oregon. For Oregon residents, these impacts are contingent on the Oregon PUC approving any rate increase request from PGE. DEQ has estimated the potential range of rate increase to the general public due to the BART emission control technology as follows.

Table 5: Estimated rate increases – General Public*

Estimated Rate Increases from DEQ Proposed Rule Options				
Rate Class	Current 2009 PGE BART Rule	Option-1 Estimated Rate Increase	Option-2 Estimated Rate Increase	Option-3 Estimated Rate Increase
Residential/ Commercial	**2.56%**	2.93%	1.11%	0.37%

* This table only includes potential rate increases caused by the cost of pollution controls under DEQ's proposed rules. See Table 12 for PGE's estimates of potential rate increases due to costs of early closure, including plant decommissioning and potential replacement power costs.

In addition to rate increases, a decision to close the Boardman plant would affect the current employees of the plant. The plant currently employs 110 full-time workers, 30 contractors, and 225 seasonal workers. Another economic impact would be to secondary jobs, estimated to be 3-4 times the primary jobs. This means a potential impact of up to 1000 primary and secondary jobs in the region, if the plant were closed.

PGE has indicated it would seek to replace the power generated by the Boardman plant if the plant closes, and some of the employment impacts could be offset if PGE builds a natural gas plant at or near the current Boardman plant, or other form of electrical generation plant that provides new employment opportunities. Based on PGE estimates, and assuming PGE received regulatory approval to build a 600 megawatt natural gas plant, such as plant would employ about 25 full-time staff. PGE is currently in the permitting process for a new but smaller facility at the Boardman plant location, and it's possible the coal-fired boiler could be replaced in the future with a new boiler burning another type of fuel. Whether current employees at the coal plant would work at any new facilities is a decision for PGE. This assessment does not estimate the benefit of replacement power on employment because DEQ does not know if replacement power generating capacity will be added at the Boardman location, exactly how many individuals might be employed at a replacement plant, and other information needed to make an accurate estimate. See also the sections below on impacts to small businesses and local governments.

Impacts to Small Business (50 or fewer employees – ORS183.310(10))

BART Costs associated with DEQ Rule

Based on discussions with its fiscal advisory committee, DEQ finds that DEQ's proposed rule options could have a significant adverse impact on small businesses by increasing electricity rates. This impact would be limited to those businesses that are customers of the four utility companies that own the Boardman plant, and are also contingent on the Oregon PUC approving any rate increase request from PGE. A summary of the fiscal advisory committee August 4th

meeting can be found at www.deq.state.or.us/aq/haze/shutdown.htm.

Table 6 below summarizes the potential range of rate increases to small businesses due to the BART emission control technology.

Table 6: Estimated rate increases – Small Businesses*

Rate Class	Current 2009 PGE BART Rule	DEQ Option-1 Estimated Rate Increase	DEQ Option-2 Estimated Rate Increase	DEQ Option-3 Estimated Rate Increase
Residential/ Commercial	**2.56%**	2.93%	1.11%	0.37%
Large non-residential	**3.31%**	3.78%	1.43%	0.48%
Average	**2.93%**	**3.24%**	**1.22%**	**0.41%**

* This table only includes potential rate increases caused by the cost of pollution controls under DEQ's proposed rules. See Table 12 for PGE's estimates of potential rate increases due to costs of early closure, including plant decommissioning and potential replacement power costs.

Small business customers within other rate classes would likely experience lower rate increases. See also Table 4 for other applicable rate classes.

DEQ and its fiscal advisory committee discussed whether there were any options for mitigating the cost to small businesses without undermining the environmental goal of the rule. One committee member pointed out that any impacts on small businesses would be even more significant due to the current poor economic conditions in Oregon and the nation. Another comment was made that PGE's new proposal recommending an alternative to Options 1 or 2 also represents a lower cost, and could mitigate the cost to small businesses, providing the alternative is determined to meet BART.

DEQ also recognizes that if PGE decides to close the Boardman coal plant, any resulting job losses may have a ripple effect to some small businesses within the community through loss of sales. This could include impacts on secondary jobs, estimated to be 3-4 times the primary jobs at the plant, as noted in the prior section on impacts to the general public. DEQ does not have any information with which to estimate the possible dollar impacts involved.

In addition, reducing air pollution at the Boardman facility will affect DEQ revenue generated through emission fees, and potentially require a change in the fee structure of the Title V air quality permitting program. This could affect small and large businesses and government agencies holding Title V permits. See the section below (Impacts to DEQ), and the subsection titled: Associated potential impacts to businesses and agencies holding Title V air quality permits.

The next section illustrates that DEQ's rule proposal does not impose any regulatory or reporting requirements on small businesses.

Cost of Compliance on Small Business (50 or fewer employees – ORS183.310(10))	a) The estimated number of small businesses subject to DEQ's proposed rule.	None.
	b) The types of businesses and industries with small businesses subject to DEQ's proposed rule.	None.

	c) The reporting, recordkeeping and other administrative activities required by small businesses for compliance with DEQ's proposed rule.	None.
	d) The equipment, supplies, labor, and increased administration required by small businesses for compliance with DEQ's proposed rule.	None.
	e) A description of the manner in which DEQ involved small businesses in the development of this rulemaking.	DEQ's Fiscal Advisory Committee included representatives from Associated Oregon Industries, Port of Morrow, and DEQ's small business Compliance Assistance Program (CAP). The public, including small business, was also invited to provide initial comments to DEQ prior to DEQ initiating formal rulemaking in September 2010.

Impacts on Large Business
(all businesses that are not "small businesses" under ORS183.310(10))

BART Costs associated with DEQ Rule

DEQ's proposed rule options will directly impact the owners of the Boardman plant which are large businesses, because DEQ's proposed rule options apply only to that plant. DEQ understands the owners to be Portland General Electric (PGE), San Diego Gas and Electric (SDG&E)/General Electric Capital Corporation (GECC), Idacorp, Inc., and Power Resources Cooperative (PRC). Table 7 below summarizes the proportional annualized costs of the BART emission control technology requirements for each of the four plant owners under each DEQ option.

Table 7: Proportional costs by owner - 2009 rules vs. DEQ proposed three options

Plant Owner	Share of Ownership	2009 Rule Proportional Cost	Option-1 Proportional Cost	Option-2 Proportional Cost	Option-3 Proportional Cost
PGE	65%	$43,529,200	$49,890,866	$18,769,661	$6,768,344
SDG&E/ GECC	15%	$10,045,200	$11,513,277	$4,331,460	$1,561,926
PRC	10%	$6,696,800	$7,675,518	$2,887,640	$1,041,284
Idacorp	10%	$6,696,800	$7,675,518	$2,887,640	$1,041,284
Total	*100%*	$66,968,000	$76,755,179	$28,876,401	$10,412,838

Note: the relative percent ownership in the Boardman facility may change over time as lease agreements between PGE and other companies expire or are renegotiated.

DEQ estimates that its proposed rule options could have a negative impact on other large businesses by increasing electricity rates. This impact would be limited to those businesses that are customers of the four utility companies that own the Boardman plant, and are contingent on the Oregon PUC approving any rate increase request from PGE. DEQ has estimated the potential range of rate increases to large businesses due to the BART emission control technology as follows:

Table 8 below summarizes the potential range of rate increases to large businesses due to the BART emission control technology.

Table 8: Estimated rate increases – Large Business*

Estimated Rate Increases from DEQ Proposed Rule Options				
Rate Class	Current 2009 PGE BART Rule	Option-1 Estimated Rate Increase	Option-2 Estimated Rate Increase	Option-3 Estimated Rate Increase
Large non-residential	**3.31%**	3.78%	1.43%	0.48%

* This table only includes potential rate increases caused by the cost of pollution controls under DEQ's proposed rules. See Table 12 for PGE's estimates of potential rate increases due to costs of early closure, including plant decommissioning and potential replacement power costs.

Large business customers within other rate classes would likely experience lower rate increases. See also Table 4 for other applicable rate classes.

In addition, reducing air pollution at the Boardman facility will affect DEQ revenue generated through emission fees, and potentially require a change in the fee structure of the Title V air quality permitting program. This could increases fees for businesses and agencies holding Title V permits. Since most Title V sources are large businesses, this potential increase in fees could more directly affect large businesses. See the section below on Impacts to DEQ and the subsection titled "Associated potential impacts to businesses and agencies holding Title V air quality permits".

Impacts on Local Government

BART Costs associated with DEQ Rule

DEQ estimates that its proposed rule options could impact local government in two ways. One is the potentially significant economic impacts on the local economy, such as the City of Boardman, Morrow County, and local service districts if PGE chooses to close the Boardman coal plant. The plant currently employs 110 full-time workers, 30 contractors, and 225 seasonal workers. Based on information from the Port of Morrow, these jobs provide an estimated payroll of $20-25 million annually to citizens that reside in Morrow and Umatilla Counties. Another economic impact would be to secondary jobs, estimated to be 3-4 times the primary jobs. This means a potential impact of up to 1000 primary and secondary jobs in the region, if the plant were closed. The net impact could potentially exceed $50 million to the local economy.

The property taxes from the PGE Boardman plant generate approximately $2.8 million per year in revenue to local government, which represents 15 to 18 percent of the revenue to each government entity in Morrow county. These taxes pay for health services and public safety, which could be significantly impacted if the plant were to close. These adverse impacts could extend beyond the city and county level, and potentially to the region as a whole. There is also potential lost revenue from state income taxes, should the plant close. DEQ lacks adequate information to estimate the extent of these economic impacts to the region and the state.

PGE is planning construction of a new natural gas power plant at approximately the same location as the Boardman coal plant, and may choose to construct other similar power plants, or convert the existing Boardman plant to a different fuel type. These actions could help offset any economic impact to local governments of closing the coal plant but DEQ lacks information to accurately estimate these potential offsets.

The second impact to local government could be an increase in electricity rates for units of local government who are customers of the four utility companies that own the Boardman plant. These impacts are contingent on the Oregon PUC approving any rate increase request from PGE. DEQ has estimated the potential range of rate increase to local government due to the BART emission control technology as follows. These rate impacts assume local governments

	are charged according to the "large nonresidential" rate class. Local government customers within other rate classes would likely experience lower rate increases. See also Table 4 for other applicable rate classes. **Table 9: Estimated rate increases – Local Governments*** **Estimated Rate Increases from DEQ Proposed Rule Options** **Rate Class** / **Current 2009 PGE BART Rule** / **Option-1 Estimated Rate Increase** / **Option-2 Estimated Rate Increase** / **Option-3 Estimated Rate Increase** Large non-residential / **3.31%** / 3.78% / 1.43% / 0.48% * This table only includes potential rate increases caused by the cost of pollution controls under DEQ's proposed rules. See Table 12 for PGE's estimates of potential rate increases due to costs of early closure, including plant decommissioning and potential replacement power costs. It should be noted that the above estimated rate increases could affect county community action programs that administer state and federal low-income heating assistance programs. Increases in utility rates often increase the demand for these programs, requiring counties to handle more information requests, applications, one-on-one client support and advocacy, and referrals. In addition, reducing air pollution at the Boardman facility will affect DEQ revenue generated through emission fees, and potentially require a change in the fee structure of the Title V air quality permitting program. This could affect small and large businesses and government agencies holding Title V permits. See the section below on impacts to DEQ, and the subsection "Associated potential impacts to businesses and agencies holding Title V air quality permits."
Impacts on State Agencies other than DEQ	**BART Costs associated with DEQ Rule** DEQ estimates that its proposed rule options could impact other state agencies by increasing electricity rates for units of state government who are customers of the four utility companies that own the Boardman plant. These impacts are contingent on the Oregon PUC approving any rate increase request from PGE. DEQ has estimated the potential range of rate increase to state government due to the BART emission control technology as follows. These rate impacts assume state governments are charged according to the "large nonresidential" rate class. State government customers within other rate classes would likely experience lower rate increases. See also Table 4 for other applicable rate classes. **Table 10: Estimated rate increases – State Agencies*** **Estimated Rate Increases from DEQ Proposed Rule Options** **Rate Class** / **Current 2009 PGE BART Rule** / **Option-1 Estimated Rate Increase** / **Option-2 Estimated Rate Increase** / **Option-3 Estimated Rate Increase** Large non-residential / **3.31%** / 3.78% / 1.43% / 0.48% * This table only includes potential rate increases caused by the cost of pollution controls under DEQ's proposed rules. See Table 12 for PGE's estimates of potential rate increases due to costs of early closure, including plant decommissioning and potential replacement power costs.
Impacts on DEQ	**BART Costs associated with DEQ Rule** DEQ estimates that its proposed rule options could impact its operations in two ways. Any increase in electricity rates for units of state government would also affect DEQ operations that

the four utility companies that own the Boardman plant listed earlier. These impacts are contingent on the Oregon PUC approving any rate increase request from PGE. DEQ has estimated the potential range of rate increase due to the BART emission control technology as follows. These rate impacts assume that DEQ operations which are customers of Boardman are charged according to the "large nonresidential" rate class. DEQ operations (that are customers of Boardman) within other rate classes would likely experience lower rate increases. See also Table 4 for other applicable rate classes.

Table 11: Estimated rate increases – DEQ*

Estimated Rate Increases from DEQ Proposed Rule Options				
Rate Class	Current 2009 PGE BART Rule	Option-1 Estimated Rate Increase	Option-2 Estimated Rate Increase	Option-3 Estimated Rate Increase
Large non-residential	**3.31%**	3.78%	1.43%	0.48%

* This table only includes potential rate increases caused by the cost of pollution controls under DEQ's proposed rules. See Table 12 for PGE's estimates of potential rate increases due to costs of early closure, including plant decommissioning and potential replacement power costs.

In addition, under each BART option DEQ would experience a loss in revenue from the installation of pollution control technology. DEQ charges all Title V sources fees based on emissions. If emissions are reduced, DEQ's fees and revenue necessary to fund the Tile V permitting program are reduced. DEQ would experience an additional loss of revenue if PGE elects to close the Boardman coal plant (i.e. eliminating all permit and emissions fees from that operation).

Under the 2009 Boardman rules, annual emission fee revenue from the Boardman plant drops to approximately $225,000 after installing the Phase-2 NO_x controls in 2017. Under the various closure options, DEQ's Title V revenue from the Boardman facility (permit and emission fees) will be significantly reduced to various degrees in the 2015-2020 timeframe depending on which option is selected by PGE. Revenue losses for DEQ could be as high as approximately $380,000 a year. DEQ would completely lose this revenue if PGE closes the coal fired boiler. DEQ could regain some revenue (permit and emission fees) if PGE constructs a replacement power facility, however DEQ cannot accurately estimate this revenue because it depends on future actions by PGE.

Since Option 1 and 2 do not include Phase-2 NO_x controls, the emissions are higher after 2017 and the fees would be $360,000 and $380,000 respectively, until the 2020 and 2018 closure dates. Therefore, some fee revenue would continue for 1 to 3 years, after which DEQ would lose this funding. This is not the case under Option 3 due to the earlier closure in 2015-16.

Associated potential impacts to businesses and agencies holding Title V air quality permits.

By statute, DEQ must charge fees to holders of Title V air quality permits in an amount sufficient to support DEQ's operation of the Title V permitting program. A significant loss in revenue from any of the BART options for PGE Boardman would require DEQ to adjust the fee structure of the Title V program in order to ensure adequate DEQ permitting resources and customer service to Title V permittees. This could result in a DEQ request to the Oregon legislature for a fee increase that would affect all businesses and agencies holding Title V air quality operating permits. DEQ cannot calculate the likely fee increase at this time, as it depends on which BART option PGE selects in the future.

	BART Costs associated with DEQ Rule DEQ estimates that its proposed rule options could impact tribal nations, including the Confederated Tribes and Bands of the Yakima Nation, and Confederated Tribes of the Umatilla Indian Reservation, by increasing electricity rates. This could affect tribal members, businesses, and government, who are customers of the four utility companies that own the Boardman plant. The rate classes listed in Table 4 on page 9 show these potential rate increases. In addition to rate increases, there are other potential economic impacts under the proposed rule options that could affect tribal nations. As noted above in the sections on the general public and local government, a decision to close the Boardman plant would result in job loss, and would be expected to have an economic impact in Morrow and Umatilla counties, and potentially the region as a whole. DEQ lacks adequate information to estimate if these job losses will occur; and if so, the extent of these economic impacts. DEQ does, however, recognize these potential negative economic impacts on tribal nations, should PGE choose to close the Boardman coal plant. Also, as noted above in the local government section, where there are currently state and federal low-income heating assistance programs, increases in utility rates would be expected to increase the demand for these programs.
PGE Closure Cost Estimates – Rate Impacts	**PGE Closure Costs – Rate Impacts** If PGE chooses to close the Boardman coal plant, PGE will need to address a variety of costs, including decommissioning the coal plant, capital recovery on investments, replacement power, revenue requirements, salvage costs, property taxes, and others. These costs and potential rate impacts would be described in PGE's Integrated Resource Plan and reviewed by the PUC. Again, DEQ does not have the regulatory authority to mandate a specific closure date for the Boardman power plant. That decision rests with the owners of the Boardman facility. The costs of closure are not attributable to DEQ's rule and will not be included in the calculation of BART cost effectiveness. However, PGE's decision to close the Boardman facility (whenever that occurs) will likely have an effect on electricity rates for customers of the Boardman facility, as well as other affects. These costs and broader affects are acknowledged and discussed here to provide the public with a more comprehensive review of costs and affects. Table 12 shows PGE's estimated rate increase for each BART option including the cost of BART, as well as estimates on the cost of replacement power, decommissioning the plant, the future cost of carbon controls, and other costs associated with a PGE decision to close the facility. This information was provided by PGE during the August 4, 2010 fiscal advisory committee meeting. The table shows PGE's estimate of the average rate increase and the selected highest one year rate spike that could occur in connection with the three closure dates in DEQ's options. The rate analysis provided by PGE did not include expected rate impacts by rate class, but just an average rate increase. PGE's estimated rate increases assume that the Boardman plant will be replaced by the construction of a new natural gas power plant. PGE has not provided DEQ an analysis of the technical and economic feasibility of other alternatives for replacement power, and one member of the fiscal advisory committee questioned whether other alternatives might be cheaper, and whether the natural gas price forecasts and load growth forecasts underlying PGE's estimates were too high and resulted in inflated estimates of rate increases. PGE's estimated rate increases also include changes to the estimated costs for emission control equipment needed to comply with some of the options. DEQ does not have adequate information to evaluate the accuracy of these revised costs at the time of this writing.

For these reasons, DEQ welcomes additional information on replacement power costs and other aspects of PGE's cost estimates during the public comment period.[3]

Table 12: PGE Estimated rate increases*

PGE Rate Increase Comparison			
	DEQ Option 1 2020 Closure	**DEQ Option 2 2018 Closure**	**DEQ Option 3 2015/16 Closure**
Average Increase 2011-2021	4.6%	3.2%	3.9%
Single Highest Year/% increase	2017/6.7%	2019/6.8%	2016/7.4%
Cumulative Nominal Impact by 2021 ($/Millions)	$958	$677	$824

* This table includes PGE's estimate of potential rate increases caused by compliance with the proposed rules, as well other costs of closing, including decommissioning the plant, and potential replacement power costs.

The rate analysis provided by PGE, and included in this document, is based on higher estimated costs for SO2 controls (i.e. semi-dry flue gas desulfurization control technology) than were used by DEQ in its analysis. DEQ's assumed costs are based on an estimate of $270 million that was provided by PGE on April 2, 2010. On August 10, 2010, PGE submitted to DEQ a draft revised SO2 control cost estimate of $352 million. DEQ will evaluate this new cost information during the public comment period.

Assumptions

DEQ has accurately estimated the range of costs associated with its proposed rule options for the Boardman plant, given all the complexities of estimating costs for projects of this scale and the information available to DEQ at the time of this writing.

"Cost of Compliance" refers to costs to comply with the proposed rules borne by the entities directly regulated under the proposed rules (i.e. the owners of the Boardman facility). There are other associated costs that could include impacts to Boardman's customers, employees, and the local governments involved.

"Fiscal impact" and "economic impact" are used interchangeably throughout the document.

To estimate potential rate increases, DEQ used the methodology used by PGE in their 2010 rate increase request to the PUC. In the rate increase request, PGE listed costs associated with several activities, including power generation, transmission, distribution, etc. It is assumed that costs associated with BART compliance will be included in the power generation cost category.

DEQ's estimates of rate increases are based on best available information. DEQ has used its past experience with its recent PGE Boardman rules to estimate the range of possible electricity rate increases associated with this proposal, and relied upon information provided by PGE as well as input from the Fiscal Advisory Committee. Actual future rate increases will also be subject to the rate setting process governed by the PUC.

The affect of any potential pollution control tax credits are not included in these cost estimates.

[3] It is important to note that, based upon available information, this fiscal impact statement estimates fiscal and economic impacts with sufficient accuracy to notify the public, businesses and government that their interests may be affected by the proposed rules.

	DEQ estimates that the proposed rule options may have a small negative impact due to the possible increased cost of the electricity used to construct a house. The possible impact appears to be minimal because DEQ has estimated the maximum possible increased cost of electricity at 2.56 percent for residential customers. However, DEQ cannot fully quantify this impact for the development of a 6,000 square foot parcel and the construction of a 1,200 square foot detached single family dwelling on that parcel because the information available to DEQ for the amount of electricity used for the development is not adequate to form a reasonable estimate, and any such estimate would be speculation. A minimal amount of electricity is needed to construct a house and DEQ did not find information on the cost of electricity to develop a parcel.
Administrative Rule Advisory Committee	DEQ formed a fiscal impact advisory committee in accordance with the Oregon Administrative Procedures Act, ORS 183.310 et seq. (APA) and to meet the requirements in ORS 183.333. The committee helped evaluate the fiscal and economic impacts of this rulemaking and provided recommendations to DEQ. A summary of the fiscal advisory committee meeting on August 4, 2010 can be found at www.deq.state.or.us/aq/haze/shutdown.htm.

Brian Finneran	Brian Finneran	8/13/2010
Prepared by	Printed name	Date
	James Roys	8/13/10
Approved by DEQ Budget Office	Printed name	Date

Attachment A

Supplemental cost information

1. Costs related to 2009 PGE Boardman rules:

Annualized Cost of Controls	$ 66,968,750
Return on Investment/Taxes (1.18)	$ 12,054,375
Total Revenue Requirement	$ 79,023,125
PGE Share (65%)	$ 51,365,031

Rate Class	Production Cost Allocation by Rate Class		Revenue Requirement by Rate Class	Revenue by Rate Class	Revenue + Revenue Requirement	Rate Impact
Residential/Commercial	$ 526,330,000	44%	$ 22,731,536	$ 887,004,000	$ 909,735,536	2.56%
Irrigation & Drainage	$ 6,643,000	1%	$ 286,903	$ 18,181,000	$ 18,467,903	1.58%
Small Nonresidential	$ 95,131,000	8%	$ 4,108,589	$ 160,044,000	$ 164,152,589	2.57%
Large Nonresidential	$ 553,538,000	47%	$ 23,906,616	$ 722,095,000	$ 746,001,616	3.31%
Traffic Signs	$ 268,000	0%	$ 11,575	$ 378,000	$ 389,575	3.06%
Lighting	$ 7,405,000	1%	$ 319,813	$ 22,991,000	$ 23,310,813	1.39%
	$ 1,189,315,000		$ 51,365,031	$ 1,810,693,000	$ 1,862,058,031	2.84%

2. Costs related to 2020 Control option:

Annualized Cost of Controls	$ 76,555,179
Return on Investment/Taxes (1.18)	$ 13,779,932
Total Revenue Requirement	$ 90,335,111
PGE Share (65%)	$ 58,717,822

Rate Class	Production Cost Allocation by Rate Class		Revenue Requirement by Rate Class	Revenue by Rate Class	Revenue + Revenue Requirement	Rate Impact
Residential/Commercial	$ 526,330,000	44%	$ 25,985,505	$ 887,004,000	$ 912,989,505	2.93%
Irrigation & Drainage	$ 6,643,000	1%	$ 327,972	$ 18,181,000	$ 18,508,972	1.80%
Small Nonresidential	$ 95,131,000	8%	$ 4,696,725	$ 160,044,000	$ 164,740,725	2.93%
Large Nonresidential	$ 553,538,000	47%	$ 27,328,795	$ 722,095,000	$ 749,423,795	3.78%
Traffic Signs	$ 268,000	0%	$ 13,231	$ 378,000	$ 391,231	3.50%
Lighting	$ 7,405,000	1%	$ 365,593	$ 22,991,000	$ 23,356,593	1.59%
	$ 1,189,315,000		$ 58,717,822	$ 1,810,693,000	$ 1,869,410,822	3.24%

3. Costs related to 2018 Control option:

Annualized Cost of Controls			$ 28,876,401			
Return on Investment/Taxes (1.18)			$ 5,197,752			
Total Revenue Requirement			$ 34,074,153			
PGE Share (65%)			$ 22,148,200			
Rate Class	Production Cost Allocation by Rate Class		Revenue Requirement by Rate Class	Revenue by Rate Class	Revenue + Revenue Requirement	Rate Impact
Residential/Commercial	$ 526,330,000	44%	$ 9,801,661	$ 887,004,000	$ 896,805,661	1.11%
Irrigation & Drainage	$ 6,643,000	1%	$ 123,710	$ 18,181,000	$ 18,304,710	0.68%
Small Nonresidential	$ 95,131,000	8%	$ 1,771,592	$ 160,044,000	$ 161,815,592	1.11%
Large Nonresidential	$ 553,538,000	47%	$ 10,308,346	$ 722,095,000	$ 732,403,346	1.43%
Traffic Signs	$ 268,000	0%	$ 4,991	$ 378,000	$ 382,991	1.32%
Lighting	$ 7,405,000	1%	$ 137,901	$ 22,991,000	$ 23,128,901	0.60%
	$ 1,189,315,000		$ 22,148,200	$ 1,810,693,000	$ 1,832,841,200	1.22%

4. Costs related to 2015-16 Control option:

Annualized Cost of Controls			$ 9,717,837			
Return on Investment/Taxes (1.18)			$ 1,749,211			
Total Revenue Requirement			$ 11,467,048			
PGE Share (65%)			$ 7,453,581			
Rate Class	Production Cost Allocation by Rate Class		Revenue Requirement by Rate Class	Revenue by Rate Class	Revenue + Revenue Requirement	Rate Impact
Residential/Commercial	$ 526,330,000	44%	$ 3,298,574	$ 887,004,000	$ 890,302,574	0.37%
Irrigation & Drainage	$ 6,643,000	1%	$ 41,632	$ 18,181,000	$ 18,222,632	0.23%
Small Nonresidential	$ 95,131,000	8%	$ 596,197	$ 160,044,000	$ 160,640,197	0.37%
Large Nonresidential	$ 553,538,000	47%	$ 3,469,090	$ 722,095,000	$ 725,564,090	0.48%
Traffic Signs	$ 268,000	0%	$ 1,680	$ 378,000	$ 379,680	0.44%
Lighting	$ 7,405,000	1%	$ 46,408	$ 22,991,000	$ 23,037,408	0.20%
	$ 1,189,315,000		$ 7,453,581	$ 1,810,693,000	$ 1,818,146,581	0.41%

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY

Land Use Evaluation Statement

Rulemaking Proposal
for
Proposed Revisions to DEQ Regional Haze BART rules
for the PGE Boardman Power Plant

RULE CAPTION

This rulemaking will revise DEQ's regional haze rules adopted for the PGE Boardman coal-fired power plant in 2009.

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1. Explain the purpose of the proposed rules.

This rulemaking will amend DEQ's 2009 regional haze rules adopted for the PGE Boardman coal-fired power plant, as part of a regional haze plan to improve visibility and reduce air pollution in Oregon's Class I wilderness areas and national parks. On June 17, the Environmental Quality Commission voted to deny a petition submitted by PGE to reduce the stringency of these rules, based on a proposal for an early closure of the plant in 2020, and directed DEQ to begin rulemaking and examine a wider range of pollution control options, consistent with an early shutdown of the plant.

DEQ has developed three control options for an early shutdown of the plant that meet federal requirements for Best Available Control Technology (BART). If adopted, these options would be added to the existing 2009 rules adopted for the Boardman plant. DEQ is proposing to adopt all three options and allow PGE to select the most cost-effective approach. If PGE selects none of these options, the current 2009 rule requirements would apply. The 2009 rules would allow PGE to run the plant indefinitely and do not contain any closure deadline. DEQ is also seeking comment on an alternative to these options that has been proposed by PGE.

This proposed rulemaking includes amending parts of the 2009 Oregon Regional Haze Plan that pertain to the PGE Boardman plant, and then submitting all rule and plan changes to the Environmental Protection Agency as a revision to the Oregon State Implementation Plan under OAR 340-200-0040.

2. Do the proposed rules affect existing rules, programs or activities that are considered land use programs in the DEQ State Agency Coordination (SAC) Program?

Yes X No

a. If yes, identify existing program/rule/activity:

The issuance of air permits is an action determined to have effects on land use. DEQ will implement the proposed BART rule changes for the PGE Boardman plant through the Title V Operating Permit Program and DEQ's Air Contaminant Discharge Permit (ACDP) Program.

b. If yes, do the existing statewide goal compliance and local plan compatibility procedures adequately cover the proposed rules?

Yes X No ___ (if no, explain):

c. If no, apply the following criteria to the proposed rules.

Not applicable.

In the space below, state if the proposed rules are considered programs affecting land use. State the criteria and reasons for the determination.

Not applicable.

3. If the proposed rules have been determined a land use program under 2. above, but are not subject to existing land use compliance and compatibility procedures, explain the new procedures the Department will use to ensure compliance and compatibility.

Not applicable.