



DEPARTMENT OF
ECOLOGY
State of Washington

**TECHNICAL SUPPORT DOCUMENT
FOR PREVENTION OF SIGNIFICANT
DETERIORATION**

PSD 07-01, AMENDMENT 2

**Boiler Replacement Project
BP Cherry Point Refinery
Blaine, Washington**

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EXECUTIVE SUMMARY

The BP Cherry Point Refinery is requesting an amendment to the existing Prevention of Significant Deterioration (PSD) permit for Steam Boilers 6 and 7 to do the following:

- Correct an error made in the original boiler permit by increasing the short-term particulate matter less than 10 microns (PM₁₀) emission limit from the current 3.4 lb/hr to 5.0 lb/hr.
- Add a new annual limit to assure that annual PM₁₀ emissions do not exceed the annual emissions allowed under the current permit.
- Authorize use of a more sensitive particulate reference method option that is designed to measure low particulate levels in stack gasses.

BP proposes no physical or operational changes to the boilers.

The BP Cherry Point Refinery commissioned the two new boilers (6 and 7) in 2009. Each boiler is rated at 363 MMBtu/hour, and each may be fired with refinery fuel gas and/or natural gas.

Construction and operation of these boilers were authorized in November 2007 by PSD permit 07-01 issued by the Washington State Department of Ecology (Ecology) and Order of Approval to Construct 1001 issued by the Northwest Clean Air Agency (NWCAA). After the successful commissioning of Boilers 6 and 7, BP permanently shut down Boilers 1 and 3.

Ecology finds that BP has satisfied all requirements for approval of the proposed PSD permit amendment for the Boiler Replacement Project and now sends the proposed amended permit for public comment.

1. INTRODUCTION

1.1. The PSD Process

The Prevention of Significant Deterioration (PSD) procedure is implemented under Washington Administrative Code (WAC) 173-400-700 to 750. These rules require PSD review of all new or modified air pollution sources that meet certain overall size and pollution rate criteria. The objective of the PSD program is to prevent serious adverse environmental impact from emissions into the atmosphere by a proposed new or modified source. PSD rules require that an applicant use the most effective air pollution control equipment and procedures after considering environmental, economic, and energy factors. The program sets up a mechanism for evaluating and controlling air emissions from a proposed source to minimize the impacts on air quality, visibility, soils, and vegetation.

Washington State implements its PSD program under Washington regulations 173-400 700 to 750 as a SIP approved program. This SIP approved program became effective May 29, 2015.¹

1.2. The Project

1.2.1. The site

BP operates a refinery at Cherry Point in Whatcom County, Washington. The refinery is located in a rural setting near Blaine and Birch Bay, Washington. The surrounding land use is zoned heavy impact industrial and is mostly vacant. Historical uses were agricultural (dairy farming). Immediately to the west is the Puget Sound Energy's Whitehorn gas-turbine power generating station. About two miles west northwest of the refinery is Birch Bay State Park. UTM coordinates are 10 519600E and 5414800N.

1.2.2. The proposal

Amendment 2 proposes to:

1. Modify the current 3.4 pounds per hour (lb/hr) short-term PM₁₀ emission limit.
2. Add a new annual limit to assure that annual PM₁₀ emissions do not exceed the annual emissions allowed under the current permit.
3. Authorize use of a more sensitive particulate reference method option that is designed to measure low particulate levels in stack gasses.

Approval Condition 1 of the current PSD permit limits the fuels combusted in Boilers 6 and 7 to Refinery Fuel Gas (RFG) and natural gas. Approval Condition 4 limits short-term PM₁₀ emissions from each of the boilers to 3.4 lb/hr on a calendar day, 24-hour average. The permit

¹ 80 FR 23721, April 29, 2015.

does not specify an annual PM₁₀ limit, but if the boilers were operated at maximum capacity throughout the year (8,760 hours), annual emissions based on the short-term emission limit would be 14.8 tons per year (tpy). Approval Condition 8.3 requires BP to demonstrate initial and continuous compliance with the emission limit in Approval Condition 4 through stack tests conducted by an independent testing vendor using United States Environmental Protection Agency (EPA) Methods 5 and 202, or an equivalent test method approved by Ecology.

Data from source tests conducted in 2006 on the #1 Reformer heater and Boiler 5, both fired with RFG, were used to develop a PM₁₀ emission factor for the initial Boiler Replacement Project permit application. Data from five source tests were averaged, resulting in an emission factor of 12.7 pounds per million standard cubic foot (lb/MMscf). That emission factor was used to develop the current short-term PM₁₀ emission limit (3.4 lb/hr).

After start-up of the new boilers and several years of measuring the resulting particulate emissions levels, BP came to realize that the limit should be based on an upper confidence level of the source tests, not their average.

BP has met and continues to meet all permit requirements but from December 2013 to December 2014, BP had to limit boiler operating rates to 80 percent of capacity to assure compliance with the current permit's limits. BP's proposed solution is to revise the short-term PM₁₀ emission limit to better allow for short-term variability, as it should have been originally. The current PM₁₀ emission limit for Boilers 6 and 7 is appropriate for annual average PM₁₀ emissions from those emission units, and this project requests that the currently allowed annual PM₁₀ emission level remain unchanged. BP has proposed that the short-term PM₁₀ emission limit for Boilers 6 and 7 be based on the results of the source tests conducted to date on those boilers and that a new short-term PM₁₀ emission limit of 5.0 lb/hr for each boiler be established. This emission rate is based on an emission factor of 0.014 lb/MMBtu, which is approximately equivalent to the average of the emission factors calculated from all the source tests conducted to date on Boilers 6 and 7,² plus 2.5 standard deviations.

BP has also proposed that Approval Condition 8.3 be amended to allow use of 40 CFR 60 Appendix A Method 5i as a "front half" test method in addition to Method 5. Method 5i is designed for improved accuracy when measuring the low particulate levels that are in stack gasses resulting from combustion of natural gas and refinery fuel gas. It also may help eliminate sample contamination issues that may have affected previous test results.

² Except Run 2 of the October 2010 test on Boiler 6 and Run 2 of the September 2013 test on Boiler 7; because of the magnitude of the measured particulate matter, these runs are considered outliers.

1.3. PSD Applicability and Air Pollutant Emissions

The BP Cherry Point Refinery is an existing major source³ of a regulated pollutant.⁴ The facility has several existing PSD permits for refinery processes and equipment. It has minor new source review permits and a Title V air permit issued by the Northwest Clean Air Agency (NWCAA).

Additions and modifications to the refinery that increase emissions above prescribed PSD Significant Emission Rates (SERs) are considered “major modifications” subject to the PSD permitting process.

A change in emission limits that does not cause a significant increase in annual emissions but does allow increased short-term emissions triggers PSD permitting requirements for minor modifications to an existing PSD permit. Modeling and evaluation of the short-term emission impact increases are the primary permitting requirements. A new BACT review for PM₁₀ is not triggered because no physical change or change in the method of operation is proposed, and there is no increase in annual emissions of any pollutant, including PM₁₀.

1.4. Determination of PSD Applicable Pollutants

Pollutants to be regulated under PSD for the boilers were determined in the original permitting action to be carbon monoxide (CO), sulfur dioxide (SO₂), particulates less than 10 microns in diameter (PM₁₀), and particulates of any diameter (PM). PM_{2.5} was analyzed as PM₁₀ using the surrogate policy in place at that time. Only changes to PM₁₀ emission limits are proposed in Amendment 2, so emissions of CO and SO₂ are not affected.

Initial testing of Boilers 6 and 7 was completed in September 2009, with both boilers demonstrating compliance with the short-term PM₁₀ emission limit. To demonstrate ongoing compliance with the limit, annual emission testing is required.⁵ Several of the tests conducted since initial testing have produced results that approach the emission limit; the results of valid source tests conducted to date on Boilers 6 and 7 are summarized in Table 1.

³ Petroleum Refineries are a major source under PSD regulations if they, in total, have the potential to emit more than 100 tpy of a pollutant regulated by the PSD permitting program. WAC 173-400-720(4)(a)(v) and 40 CFR 52.21(b)(1)(i)(a).

⁴ The PSD program directly regulates a list of specific pollutants listed in 40 CFR 52.21(b)(23). These are referred to as “regulated pollutants.” PSD regulates other pollutants indirectly through the broad categories of “regulated” pollutants such as VOC and particulates. In Washington State, the local air authority issues its own permit that complements the PSD permit and includes all emissions regulated by state and local regulations. WAC 173-400-113.

⁵ Approval Condition 11.1 of PSD 07-01, Amendment 1 allows for testing to be reduced to once every five years after three consecutive years of annual tests that demonstrate compliance. BP is not requesting a change to this approval condition.

Table 1. Boilers 6 and 7 Total PM₁₀ Source Test Results				
Boiler	Test	Firing Rate (MMBtu/hr)	Emission Factor (lb/MMBtu)	Emission Rate (lb/hr)
6	2009	334	0.0064	2.13
	Oct. 2010 ¹	306	0.0072	2.21
	Dec. 2010	329	0.0043	1.42
	2011	332	0.0093	3.09
	2012	312	0.0043	1.35
	2013	275	0.0108	2.97
7	2009	335	0.0082	2.74
	2010	306	0.0031	0.95
	2011	330	0.0059	1.95
	2012	313	0.0035	1.09
	Sep. 2013 [†]	306	0.0082	2.23
	Dec. 2013	234	0.0117	2.75
<p>* Does not include the results of Run 2, which is considered an outlier because of the magnitude of the measured filterable particulate (15.07 lb/hr).</p> <p>† Does not include the results of Run 2, which is considered an outlier because of the magnitude of the measured condensable particulate (6.64 lb/hr).</p>				

Tests conducted on Boilers 6 and 7 show compliance with emission limits, and every indication is that the boilers operate properly. Despite this, according to the test data, there appears to be a high degree of inherent variability in the EPA 5/202 method. This is due, in part, to extremely small quantities of filterable and condensable filterable matter collected during each test. A seemingly insignificant mishandling of equipment or a slight deviation from test procedure can introduce error and produce a test result that appears to be out of compliance.

1.5. New Source Performance Standards

New Source Performance Standards (NSPS) are nationally uniform standards applied to specific categories of stationary sources that are constructed, modified, or reconstructed after the standard was proposed. NSPS are found in Title 40, Part 60 of the Code of Federal Regulations (CFR). NSPS usually represent a minimum level of control that is required on a new source. NSPS that are applicable include Subpart A – General Provisions (40 CFR Part 60.1-60.19) and the following NSPS:

Subpart Db – Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units (40 CFR Part 60.40b-49b)

NSPS Subpart Db addresses emissions from boilers that have a heat input greater than 100 MMBtu/hr and were constructed, modified, or reconstructed after June 19, 1984. Boilers 6 and 7

meet these criteria and are subject to Subpart Db. The new boilers are also subject to Subpart Ja as well (see next subsection). As stated in 40 CFR 60.40b(c), units subject to both Subpart Db and Ja are subject to the particulate matter and NO_x emission limits of Subpart Db and the SO₂ limits in Subpart Ja.

The new boilers will combust gaseous fuel (i.e., natural gas and refinery fuel gas). Subpart Db only includes particulate matter limits for boilers that burn coal, oil, wood, or solid waste. Therefore, the new boilers are only subject to the Subpart Db NO_x emission limitation of 0.10 lb/MMBtu. The NO_x emission rate for the new boilers is 0.0108 lb/MMBtu, which is less than the Subpart Db limit. Other substantive requirements stemming from applicability of Subpart Db relate to monitoring and reporting.

Subpart Ja – Standards of Performance for Petroleum Refineries (40 CFR Parts 60.100a – 60.109a)

In petroleum refineries, Subpart Ja applies to fluid catalytic cracking units (FCCU), fluid coking units (FCU), delayed coking units, fuel gas combustion devices (including flares and process heaters), and sulfur recovery plants.

Subpart Ja applies to fuel gas combustion devices constructed after May 14, 2007. This includes Boilers 6 and 7. The emissions limitations in 40 CFR 60.102a(g) allow two basic regulatory options to estimate sulfur emissions for boilers and heaters: either monitor SO₂ from the boiler stack, or monitor sulfur content of the unit's fuel. The stack gas monitoring option requires short-term limits of less than 20 parts per million by volume (ppmv) SO₂ in the boiler exhaust with a 3-hour averaging period and less than 8 ppmv SO₂ limit with a 365-day rolling averaging period.

The fuel monitoring option requires a fuel content limit of 162 ppmv H₂S with a 3-hour averaging time and a 60 ppmv H₂S fuel content limit with a 365-day rolling average SO₂ limit.

BP has chosen to use the fuel monitoring option.

Subpart Ja does not have any requirements for particulates.

Subpart GGG – Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries (40 CFR Parts 60.590 – 60.593).

Subpart GGG applies to all equipment (i.e., valves, pumps, pressure relief devices, open-ended valves or lines, flanges, and any other connectors in VOC service) within a process unit and compressors at a petroleum refinery installed after May 30, 1984. A process unit is one that produces intermediate or final products from petroleum, unfinished petroleum derivatives, or other intermediates. Because the boilers are not directly involved with the processing of petroleum, the associated fugitive components are not subject to Subpart GGG. Nevertheless,

BP included the proposed boilers in a leak detection and repair (LDAR) program based on NWCAA OAC 1001c Condition 8.

1.6. Consent Decree

On January 18, 2001, BP entered into a Consent Decree (entered August 29, 2001) that requires reductions of NO_x emissions from the refinery heaters and boilers at the Cherry Point Refinery. The Boiler Replacement Project helps fulfill part of the NO_x reduction requirements. The Consent Order assures that all refinery heaters and fuel gas combustion units are subject to Subpart J and it requires the reduction of sulfur and particulate emissions from certain refinery units. The Boiler Replacement Project did not include any units covered under the Consent Decree, so the Consent Decree is also not applicable to Amendment 2.

1.7. State Regulations

BP is subject to Notice of Construction (NOC) permitting requirements under state of Washington regulations Chapters 173-400 and 173-460. NWCAA is the permitting authority for all air emission regulatory requirements not included in PSD permitting. This includes the NSR permitting of air toxics issues under federal MACT and state 173-460 WAC and Title V permitting requirements.

NWCAA is also responsible for enforcement of all provisions of the PSD program.

2. DETERMINATION OF BEST AVAILABLE CONTROL TECHNOLOGY

All new and significantly modified sources are required to use Best Available Control Technology (BACT), which is defined in 40 CFR 52.21(b)(12) as an emissions limitation based on the maximum degree of reduction for each pollutant subject to regulation and emitted from any proposed major stationary source or major modification and that takes into account, on a case-by-case basis, cost-effectiveness, economic, energy, environmental, and other impacts.

The “top down” BACT process starts by considering the most stringent form of emissions reduction technology possible, then determines if that technology is technically feasible and economically justifiable. If the technology is proven infeasible or unjustifiable, then the next less stringent level of reduction is considered. When an emission reduction technology meets the stringency and technical and economic feasibility criteria, it is determined to be BACT.

As demonstrated in Section 1.3, only the PM₁₀ emission limit for Boilers 6 and 7 are subject to PSD permitting in Amendment 2. There has been no physical change or change in the method of operation of Boilers 6 and 7 and no annual emissions increase for PM₁₀. The emission limit change proposed in Amendment 2 is considered a correction of an error in the initial permit. The error was that the short-term limit was based on an average of the emissions data used to determine the appropriate limit, not the average plus several standard deviations as should have been done to create a good limit for a properly operating boiler. A new BACT review for PM₁₀

was not required. Modeling of the impacts of the adjusted short-term limit on air quality was required. Conditions were required to limit short-term and annual emissions to within the emission rates evaluated to be acceptable through modeling of their impacts. A long-term limit was added to assure that the modeled long-term limit continued to be met.

Based on the analysis presented in Amendment 2, BP proposes and Ecology agrees that the short-term limit for PM₁₀ emissions from each boiler be changed from 3.4 lb/hr to 5.0 lb/hr based on a calendar day, 24-hour average. A new permit condition limits annual PM₁₀ emissions to 14.8 tpy based on a monthly rolling average. This is consistent with the existing PM₁₀ emission BACT determination from the original permit, which was based on the 3.4 lb/hr emission rate for 8,760 hr/yr.

BP will continue the currently required annual testing of Boilers 6 and 7 with the additional option of using Reference Method 5i in place of Reference Method 5 to measure the filterable portion (“front half”) of the boiler stack gas particulate emissions. Method 5i is a version of Method 5 that is optimized to best accommodate measurement problems encountered due to the low particulate levels in stack gasses from the combustion of natural gas and refinery fuel gas.

3. AIR QUALITY IMPACTS ANALYSIS

The PSD permitting program requires that an Ambient Air Quality Impacts Analysis (AQIA) be made for pollutants emitted in significant quantities. The AQIA determines if emissions of any pollutant will cause or contribute to an exceedance of a National Ambient Air Quality Standards (NAAQS). It also determines if the change in air quality since the applicable baseline dates is greater than the Class I and Class II PSD Increment Levels.

An air quality analysis can include up to three parts: Significant Impact analysis, NAAQS analysis, and PSD Increment analysis. The first step in the air quality analysis is to determine if emissions from the proposed project result in impacts greater than the modeling significant impact levels (SILs). Then, for those pollutants and averaging periods that have impacts greater than their SIL, a cumulative full impacts analysis is used to determine if the proposed project will cause or contribute to an exceedance of a NAAQS. A PSD Increment analysis for those pollutants is also used to determine if the change in the air quality since the applicable baseline dates is greater than the Class I and Class II PSD Increment Levels.

This section will discuss the AQIA of the nearby Class II area. The AQIA for the Class I areas will be discussed along with the Air Quality Related Values (AQRVs) in Section 4.

3.1. Model Selection and Procedures

The terrain in the immediate vicinity of the BP facility is rolling land historically used as farmland. For the purposes of regulatory dispersion modeling, intermediate terrain and complex terrain are defined as elevations above stack height and plume height, respectively. For the proposed project, intermediate terrain starts at an elevation of 165 feet (50.3 m) above the

highest stack base and complex terrain would range upwards from an elevation of about 380 feet (116 m) above the stack base for stable conditions. Such terrain features exist within the vicinity of the refinery. The dispersion model selected for the analysis needs to consider both complex terrain and building downwash effects.

BP applied AERMOD (Version 14134) to evaluate local (within 50 kilometers (km)) impacts of criteria pollutants using the same methods discussed in the 2007 application, except that the latest 5-year on-site meteorological data set (2009–2013) was used.

3.2. SILs Analysis

The proposed short-term PM₁₀ emission limit increase for Boilers 6 and 7 requires a re-evaluation of compliance with the PSD increments and the NAAQS and Washington Ambient Air Quality Standards (WAAQS). Only the 24-hour average PM₁₀ standard and increment were evaluated because no change in the maximum potential annual PM₁₀ emission rate was proposed.

Air quality dispersion modeling was conducted for two scenarios:

1. A “base” scenario that used all emission units and the current permitted PM₁₀ emission rate (3.4 lb/hr per boiler with a 24-hour averaging period) from the modeling analysis submitted in support of the original PSD permit application in 2007, but using the current version of AERMOD (Version 14134) and the most recent five years of meteorological data to predict the maximum ambient PM₁₀ impacts for comparison to regulatory thresholds. Source parameters (stack temperature and velocity only) were also updated to comply with current source tests.
2. A “new proposed emission limit” scenario that was identical to the base scenario, except that the proposed new PM₁₀ permitted emission limit (5.0 lb/hr per boiler with a 24-hour averaging period) was used as the emission rate for both Boiler 6 and 7.

Table 2. Modeling Results				
Pollutant	Averaging Period	Maximum Concentration (µg/m³)		SIL (µg/m³)
		At Current 3.4 lb/hr per boiler Emission Rate	At Proposed 5.0 lb/hr per boiler Emission Rate	
PM ₁₀	24-hour	1.26	1.59	5.0

As shown in Table 2, the results of the two modeling scenarios demonstrate that:

1. The maximum PM₁₀ impacts predicted for the base scenario were less than the SIL for 24-hour PM₁₀, which is consistent with the conclusions drawn from the original PM₁₀ modeling.
2. The maximum PM₁₀ impacts predicted for the new proposed emission limit scenario were less than the SIL for 24-hour PM₁₀.

A predicted concentration less than the SIL indicates that at the proposed PM₁₀ emission limit, emissions from Boilers 6 and 7 will not cause or contribute to exceedances of the WAAQS or NAAQS, and no further analysis of PM₁₀ NAAQS and Increment is required.

3.3. NAAQS/WAAQS Analysis

As shown in Table 2, the modeled concentration of PM₁₀ is less than its SIL. This indicates that at the proposed PM₁₀ emission limit, emissions from Boilers 6 and 7 will not cause or contribute to exceedances of the WAAQS or NAAQS. It also demonstrates that under PSD regulations, no further analysis of PM₁₀ NAAQS or Increment is required.

3.4. Increment Analysis

Similarly to the NAAQS/WAAQS analysis, the modeled concentration of PM₁₀ is less than its SIL. This indicates that at the proposed PM₁₀ emission limit, emissions from Boilers 6 and 7 will not cause or contribute to exceedances of the WAAQS or NAAQS. It also demonstrates that under PSD regulations, no further analysis of PM₁₀ NAAQS or Increment is required.

3.5. Low Operating Rates and Start-up Considerations

In the original permit, the possibility of operating Boilers 6 and 7 at lower operating rates and at idle was discussed. This would affect CO and NO_x emissions from the boilers, but Amendment 2 only changes short-term PM₁₀ emission rates. Since PM₁₀ emissions are generally accepted to be proportional to operating rates, at low operating rates PM₁₀ emissions should be lower than emissions analyzed at full operating rates.

3.6. Toxic Air Pollutants

PSD rules require the applicant to consider emissions of toxic air pollutants (TAPs). Washington State regulations (Chapter 173-460 WAC) require an ambient air quality analysis of TAP emissions, which usually serves the purpose of PSD toxics review in Washington State. The NOC issued by the NWCAA in conjunction with this PSD permit fulfills all requirements of WAC Chapter 173-460.

4. CLASS I AREA IMPACT ANALYSIS

Washington State PSD regulations⁶ require the impact of a proposed facility on federal Class I areas be analyzed. Class I areas are areas of special national or regional value from a natural, scenic, recreational, or historic perspective and are afforded the highest level of protection under the PSD rules. They include certain national parks, national wilderness areas, and national memorial parks. The AQRVs of concern include visibility and deposition.

⁶ WAC 173-400-720(4)(a) and WAC 173-400-117.

Air pollutant impacts to Class I areas were evaluated extensively in the 2007 application. Because PM₁₀ is one of the pollutants examined in Class I assessments, BP's proposal to increase short-term PM₁₀ emissions requires reconsideration of potential impacts. Rather than repeat the entire analysis, however, BP completed two abbreviated evaluations that confirmed the increase in short-term PM₁₀ emissions would not have a significant adverse effect on Class I areas.

4.1. Screening Method

Federal Land Managers (FLMs) use a screening method to determine whether a given project has the potential to impact AQRVs in nearby Class I areas. The screening method is total project emissions (Q),⁷ in tpy, divided by the distance between the facility and each Class I area (D), in km. If the metric, often referred to as "Q over D" (Q/D) is less than 10, an AQRV analysis is typically not required.

For the analysis associated with the SO₂ permit limit increase in Amendment 1, the total project emission rate (Q) was 255.5 tpy. Following recalculation using the proposed PM₁₀ emission limit for Amendment 2 (5.0 lb/hr each for Boilers 6 and 7), the updated total project emission rate (Q) is 269.5 tpy. The closest Class I area is the North Cascades National Park, which is approximately 78 km from the refinery (D). The Mt. Baker Wilderness Area is approximately 56 km from the refinery (D), and, while it is not a Class I area, the FLMs typically request that it be included in Class I analyses. The Q/D metric, updated to reflect the proposed PM₁₀ permit limit, is 3.5 for the North Cascades National Park and 4.8 for the Mt. Baker Wilderness area. Based on these results, no AQRV analysis is required.

4.2. Scaling 2007 Application Results for Higher PM₁₀ Emissions

While the FLMs typically accept the results of the Q/D screening analysis to determine whether or not a Class I AQRV analysis is required, Ecology and the EPA do not accept the results of a Q/D analysis as a screening tool for criteria pollutant impacts at Class I area receptors. Because revising the Class I analysis would be an extremely time- and resource-intensive process, the ratio of the proposed 24-hour average single-boiler PM₁₀ permit limit (5.0 lb/hr) and the 24-hour average single-boiler PM₁₀ emission rate from the 2007 Application (2.7 lb/hr) were used to scale the PM₁₀ Class I area modeling results presented in the 2007 Application. The results of the scaling operation are presented in Table 3. Based on these results, the proposed change in permit limits does not have the potential to cause or contribute to the exceedance of the associated ambient standard or increment in nearby Class I areas, and no further analysis is required.

⁷ The total project emission rate (Q) is the sum of the 24-hour average emission rates of NO_x, SO₂, PM₁₀, and H₂SO₄, extrapolated to year-round operation (8,760 hr/yr).

Table 3. Class I Area PM₁₀ Modeling Results Scaled to Reflect Proposed Permit Limit		
Class I Area	Distance (km)	Maximum 24-Hr Average Concentration
Alpine Lakes Wilderness	156	0.036
Glacier Peak Wilderness	106	0.028
Goat Rocks Wilderness	253	0.025
Mount Adams Wilderness	291	0.019
Mount Baker Wilderness*	56	0.060
Mount Rainier National Park	211	0.046
N Cascades National Park	78	0.036
Olympic National Park	98	0.091
Pasayten Wilderness	123	0.026
Maximum Class I Area/Mt. Baker		0.060/0.091
EPA SIL†		0.3
FLM Recommended SIL†		0.27
Class I Area PSD Increment‡		8
* Mount Baker Wilderness Area is not a Class I area. It is included in the analysis because FLMs have requested its inclusion in previous permit applications. † SIL; EPA proposed and FLM recommended from the Federal Register, Vol. 61, No. 142, p. 38292, July 23, 1996. ‡ PSD; from 40 CFR 52.21(c), adopted by reference in WAC 173-400-720(4)(a)(v).		

This methodology is conservative (overestimates the impacts) because the results reflect the contribution of PM₁₀ emissions from not only Boilers 6 and 7, but all the other contemporaneous emission increases (and decreases) that were included in the original permit's modeling. When the results are scaled for the current PM₁₀ impacts analysis, the contemporaneous increases (and decreases) are similarly scaled. Because the contemporaneous emission increases are significantly greater than the decreases (by a factor of more than 20), there is no risk that scaling the decreases along with the increases will significantly diminish the conservatism of the analysis. The annual average concentration results were not included because the proposed permit limit change will not increase annual PM₁₀ emissions.

4.3. Conclusion Concerning AQRVs

Ecology determines that increased emissions from the project are not expected to significantly impact AQRVs in the North Cascades National Park, the Olympic National Park, or any other Class I area or areas for which the FLM requested that emission impacts be evaluated.

5. ADDITIONAL IMPACTS ANALYSIS

PSD applications must provide: “an analysis of the impairment to visibility, soils, and vegetation that would occur as a result of the source or modification and general commercial, residential, industrial and other growth associated with the source or modification.” In accordance with these requirements, the following analysis of additional impacts from the originally proposed project has been prepared.

Growth Analysis: BP produces fuels that are shipped by water, truck, and pipeline to meet regional energy requirements. As such, the originally permitted Boiler Replacement Project did not change the shipping methods or volumes of raw materials or products that would spur secondary growth in the Cherry Point area.

During construction, the demand for skilled crafts people in the area increases. This demand was temporary (18 months or less). Once operational, the facility has resulted in no additional permanent jobs and caused no significant growth in the Cherry Point area. Since Amendment 2 does not authorize any further construction or change operations, it will not further affect growth.

Soils and Vegetation Analysis: Based on the results of the dispersion modeling analyses, the original project’s emissions were expected to have a negligible effect on soils and vegetation. The new boilers (and the other refinery sources) would combust only low-sulfur natural gas or refinery fuel gas, thus minimizing the emission of sulfur compounds. For emissions of NO_x (assuming full conversion to NO₂), potential plant damage could begin to occur with 24-hour NO₂ concentrations of 15 to 50 parts per billion (ppb).⁸ From the modeling results, the maximum annual concentration of NO₂ is below 0.3 µg/m³ (about 0.2 ppb). The potential impact on local agriculture would be expected to be negligible. There will be no increase in PM₁₀ concentrations and impacts from the refinery due to Amendment 2 because refinery operations including the volume of refinery fuel gas produced and combusted by the refinery will not change. Only the PM₁₀ limit will change. Additional fuel usage (natural gas) actually went down after the new boilers were installed as part of the Boiler Replacement Project because Boilers 6 and 7 produced steam more efficiently than the two older boilers they replaced.

Visibility Impairment Analysis: On a local scale, “visibility” is usually evaluated by considering the perceptibility of a plume from a stack or cooling tower. State and local regulations restrict visible emissions to 20 percent opacity; however, emissions from the fuel gas-fired boilers are typically less than five percent and are rarely visible. No cooling towers are impacted by this project. As such, the potential impact of the Boiler Replacement Project on Class II visibility was negligible. Amendment 2 will not affect the operation of the boilers, so it will not change this analysis. The long-range visibility impacts on the Class I areas and are discussed in Section 4.

⁸ USDA Forest Service, Guidelines for Evaluating Air Pollution Impacts on Class I Wilderness Areas in the Pacific Northwest, PNW-GTR-299, May 1992.

6. CONCLUSION

The proposed Amendment 2 will have no significant adverse impact on air quality or air quality-related values. The Washington State Department of Ecology finds the applicant, the BP Cherry Point Refinery, has satisfied all requirements for approval of its application for a PSD permit amendment for the proposed Boiler Replacement Project.

For additional information, please contact:

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