

**WASHINGTON STATE DEPARTMENT OF ECOLOGY
POST OFFICE BOX 47600
OLYMPIA, WASHINGTON 98504-7600**

IN THE MATTER OF:]	
]	NO. PSD-00-02, Amendment 7
Phillips 66]	
Ferndale Refinery]	FINAL APPROVAL
P.O. Box 8]	OF PSD APPLICATION
Ferndale, Washington 98248-0008]	

Pursuant to the United States Environmental Protection Agency (EPA) regulations for the Prevention of Significant Deterioration (PSD) set forth in Title 40, Code of Federal Regulations, Part 52 and regulations set forth in the Washington Administrative Code 173-400-141 and based upon the Notice of Construction Application (NOC) for PSD-00-02, Amendment 7 dated August 14, 2014, submitted by Phillips 66 the Washington State Department of Ecology (Ecology), now finds the following:

FINDINGS

1. Amendment 7 is an administrative amendment that accomplishes the following three changes: reflects the facility owner's name change from the ConocoPhillips Company to Phillips 66; expands Condition 2 for the Fluidized Catalytic Cracking Unit (FCCU) and carbon monoxide (CO) boiler (and shall apply as described therein) to include a consent decree short-term nitrogen oxides (NO_x) limit of 123.2 ppmvd at 0 percent O₂ (7-day rolling average); and also expands Condition 2 (applied as described therein) to include consent decree long term NO_x limit of 96.1 ppmvd at 0 percent O₂ (365-day rolling average).
2. Amendment 6 was an administrative amendment that corrects a mistake in the wording that defines the flexibility of the time period between the annual tests required by existing Approval Conditions 13 and 14. The existing time period wording is incompatible with annual testing periods. There are no changes to the required testing interval or required test methods. ConocoPhillips (now Phillips 66) requested this change in a letter dated May 18, 2011, as a part of their Title V permit renewal process.
3. Amendment 5 was an administrative amendment. Approval Condition 14 was changed from semi-annual to annual testing, and Approval Condition 21b was changed to submit testing reports within 30 days of the end of the month. ConocoPhillips (now Phillips 66) requested this amendment because they identified a discrepancy between this approval and the EPA Consent Decree.
4. Amendment 4 was an administrative amendment, extending the compliance date for Approval Condition 7 from December 31, 2006, until June 30, 2007. This compliance

date is based upon an EPA Consent Decree. ConocoPhillips (now Phillips 66) requested this amendment because they had difficulty scheduling the on-site construction of this project.

5. Amendment 3 was based upon an increase in throughput from the FCCU from a nominal 30,000 barrels per day (bpd) to a nominal 35,000 bpd and an increase of FCCU coke burn rate to 29,000 lb/hr. Although the permit application states that particulate matter (PM) will not exceed the PSD Significant Emission Rate (SER), the facility has not been able to demonstrate compliance with the PM and particulate matter smaller than 10 microns in diameter (PM₁₀) emission limits for the FCCU established in Northwest Clean Air Agency's (NWCAA's) Order of Approval to Construct (OAC #733a). Including PM in the permit modification is intended to restrict emissions from the project to below the significance levels for PM and PM₁₀, thereby avoiding the requirements of the PSD program for PM and PM₁₀. In addition, it was discovered that CO was incorrectly removed from the permit as part of Amendment 1. CO will be added back into the permit as a result of this action.
6. Amendment 2 was an administrative amendment that changes the company name and simplifies the performance testing requirements in Approval Condition 2. On April 21, 2003, Ecology was informed that the performance test method specified in Approval Condition 2 limited the source test to one specific testing procedure. Ecology agreed to change the reference; thus allowing more flexibility in performance testing.
7. Amendment 1 was based upon the application received on January 28, 2002, and determined to be complete on March 14, 2002. The amendment proposes the S Zorb process (licensed by ConocoPhillips; now Phillips 66) as a replacement for the recently permitted hydrodesulfurizer. In addition to the S Zorb replacement, two heaters (heavy HCC gasoline stripper reboiler and the heavy FCC gasoline HDS feed heater) were combined into one heater (cat gasoline desulfurizer feed heater). Removing the two heaters resulted in emissions of CO below the PSD significance rates. CO emissions are no longer contained in this PSD permit. No emission increases were associated with this amendment.
8. The original permit was based upon an application received on April 26, 2000, and determined to be complete on August 8, 2000. Below is a description of the project.
9. Amendment 3 added new Approval Conditions 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, and 16.
10. Phillips 66 operates an oil refinery in Ferndale, Washington.
11. The original project consisted of two smaller projects. The Ferndale Upgrade Project and the Clean Fuels Project.

12. The Ferndale Upgrade Project consisted of installing a new nominally 30,000 bpd FCCU (now estimated at 35,000 bpd), CO boiler, and alkylation unit feed treater. The gas plant was modified to accommodate the new flow from the FCCU.
13. The Clean Fuels Project involved revamping the existing No. 2 hydrofiner to treat the light straight-run gasoline. Additionally, a new nominally 17,500 bpd cat gasoline desulfurizer was constructed to treat fluidized catalytic cracked naphtha, and a new Merox contactor to treat the light fluidized catalytic cracked naphtha.
14. These projects are subject to the following New Source Performance Standards (NSPS): Subpart Db (Standards of Performance or Industrial – Commercial – Institutional Steam Generating Units) and Subpart J (Standards of Performance for Petroleum Refineries).
15. Phillips 66 (FNA: ConocoPhillips) is one of the 28 source categories subject to PSD permitting if potential emissions of a criteria pollutant exceed 100 tons per year (tpy).
16. Phillips 66 (FNA: ConocoPhillips) is a major stationary source that emits more than 100 tons of pollutants per year.
17. Amendment 3 qualified as a major modification because NO_x, CO, and PM₁₀ have a “significant” emissions increase greater than 40, 100, and 15 tpy, respectively.
18. Even though the emission increase of PM is below the PSD significant emission rate of 25 tpy, PM emission limits are included in this permit.
19. The emissions of all other air pollutants from the proposed modification are subject to review under Chapter 173-400 WAC and Chapter 173-460 WAC by the NWCAA.
20. In the original permit, ConocoPhillips (now Phillips 66) elected to take a federally enforceable limit on the natural gas fired in the CO boiler limiting the boiler to an annual capacity factor of 10 percent for natural gas. This annual capacity factor exempts the boiler from the standards for NO_x emissions under 40 CFR 60.44b(a) and 60.44b(e).
21. Several of the heaters are not able to reach their full capabilities due to undersized burners. Emissions from those units have been calculated below the units rated potential. The limitations are listed in Appendix A to this permit.
22. The project in Amendment 3 resulted in an increase of up to 499.63 tpy of NO_x.
23. An ultralow low NO_x burner has been determined to be Best Available Control Technology (BACT) for the control of NO_x from the cat gasoline desulfurizer feed heater.

24. Proper operation has been determined to be BACT for the control of NO_x from the FCCU.
25. Selective Non-Catalytic Reduction has been determined to be BACT for the control of NO_x from auxiliary firing from the CO boiler.
26. Good operating practices have been selected as BACT for the control of NO_x from the sulfur recovery unit.
27. The project in Amendment 3 resulted in a net emissions increase of up to 332.4 tpy of CO.
28. A thermal oxidizer (CO boiler) has been selected to be BACT for control of CO emissions from the FCCU.
29. Good Combustion Practices has been determined to be BACT for the control of CO from the CO boiler.
30. Good Combustion Practices has been selected to be BACT for the control of CO emissions from the SRU.
31. The project in Amendment 3 resulted in a net emissions increase of up to 29.54 tpy of PM₁₀.
32. The project in Amendment 3 resulted in a net emissions increase of up to 10.14 tpy of PM.
33. A wet gas scrubber has been selected to be BACT for controlling PM/PM₁₀ emissions from the FCCU.
34. The project is located in an area that has been designated Class II for the purposes of PSD evaluation and is located approximately 75 km from the North Cascades National Park and 100 km from the Glacier Peak Wilderness Area, the nearest Class I areas.
35. The project is located in an area that is currently designated in attainment for all national air quality standards and all state air quality standards.
36. The ambient impacts of the proposed increase in emissions associated with Amendment 3 were determined with the EPA's Industrial Source Complex Prime Model and CALPUFF Model in screening mode.
37. Modeling results show that there was an increase of NO_x of approximately 0.09 micrograms per cubic meter (µg/m³) (annual average) in the North Cascade National

Park due to the original project. There is no change in the increase associated with Amendment 1 or with administrative Amendments 2, 4, 5, 6, and 7.

38. Amendment 3 had no significant impact on ambient air quality.
39. The project will not have a noticeable effect on industrial, commercial, or residential growth in the Ferndale area.
40. Visibility will not be impaired in any Class 1 area due to the project.
41. Based upon the Technical Support Document originally dated April 11, 2005, for PSD-00-02, Amendment 3 (updated September 2014 to reflect administrative Amendments 4, 5, 6, and 7), Ecology finds that all requirements for PSD have been satisfied. Approval of the PSD application is granted subject to the following conditions.

APPROVAL CONDITIONS

1. Emissions of NO_x from the cat gasoline desulfurizer feed heater shall not exceed 17 ppmdv at seven percent O₂ over a 1-hour averaging period and 5.1 tpy over a 12-month rolling total. Initial compliance shall be determined in accordance with EPA Reference Method 7E.
2. Combined NO_x emissions from the FCCU and CO boiler, shall not exceed 127 ppmdv at seven percent O₂ over a 30-day rolling averaging period and 308.10 tpy over a 12-month rolling total. If Phillips 66 is unable to meet the emission limits for NO_x listed above within 90 days of start-up, they must install a selective non-catalytic reduction unit and retest within 150 days of start-up. Phillips is also required to comply with the following June 3, 2014, EPA determination¹ which includes long- and short-term NO_x limits and requirements:
 - a) The long-term limit shall be 96.1 ppmvd NO_x at zero percent O₂ on a 365-day rolling average basis. The long-term limit shall apply at all times (including during start-up, shutdown, and malfunction) that the FCCU and/or CO boiler are operating.
 - b) The short-term limit shall be 123.2 ppmvd NO_x at zero percent O₂ on a 7-day rolling average basis. The short-term limit shall exclude periods of start-up, shutdown, and malfunction, but shall apply at all other times that the FCCU and/or CO boiler are operating.

¹ From: Phillip Brooks, Director Air Enforcement Division, EPA to: Tim Goedeker, Program Manager, US Consent Decrees, Phillips 66 Company. Re: United States et al. v. ConocoPhillips Co., NO. H-05-258 (S.D. Tex) - Final FCCU NO_x Limits for the Phillips 66 Ferndale Refinery.

- c) For days in which both the FCCU and CO boiler are not operating, no NO_x values shall be used in the averages, and those periods shall be skipped in determining the 7-day and 365-day averages.
3. Emissions of NO_x from the sulfur recovery unit shall not exceed 42.2 ppm_{dv} at seven percent O₂ over a 1-hour averaging period and 9.88 tpy. Initial compliance shall be determined by EPA Reference Method 7E.
 4. Emissions of CO from the cat gasoline desulfurizer feed heater shall not exceed 0.0824 lb/MMBtu over a 1-hour averaging period and 14.4 tpy over a 12-month rolling total. Initial compliance shall be determined in accordance with EPA Reference Method 10, 10A, or 10B.
 5. Combined CO emissions from the FCCU and CO boiler shall not exceed 500 ppm_{dv} at zero percent O₂ over a 1-hour averaging period and 100 ppm_{dv} at zero percent O₂ over a 365-day rolling average. Initial compliance shall be determined in accordance EPA Reference Method 10, 10A, or 10B.
 6. Emissions of CO from the Sulfur Recovery Unit shall not exceed 57.1 ppm_{dv} at seven percent O₂ over a 1-hour averaging period and 8.30 tpy over a 12-month rolling total. Initial compliance shall be determined in accordance with EPA Reference Method 10.
 7. By no later than June 30, 2007, combined PM/PM₁₀ emissions from the FCCU and CO boiler shall not exceed 0.50 lb/1000 lb coke burn-off over a rolling 3-hour average and 0.020 grains per dry standard cubic foot corrected to seven percent O₂ over a rolling 3-hour average. Initial compliance shall be determined in accordance with EPA Reference Method 5B.
 8. For the period between the time this permit becomes final and the date that ConocoPhillips (now Phillips 66) demonstrates compliance with the emission limits in Approval Condition 7, combined PM/PM₁₀ emissions from the FCCU and CO boiler shall not exceed 0.80 lb/1000 lb coke burn-off over a rolling 3-hour average when operating three scrubber water recirculation pumps and 0.020 grains per dry standard cubic foot corrected to seven percent O₂ over a 3-hour rolling average. Initial compliance shall be determined in accordance with EPA Reference Method 5B.
 9. For the period between the time this permit becomes final and the date that Phillips 66 demonstrates compliance with the emission limits in Approval Condition 7, Phillips 66 will operate all three scrubber water recirculation pumps to the maximum extent practicable, except during pump malfunction or periods of scheduled maintenance of a pump. Phillips 66 will optimize the operation of the pumps in order to minimize the periods of scheduled maintenance. Phillips 66 will not schedule maintenance on more than one pump at any given time and scheduled maintenance will not exceed one week. During pump malfunction, Phillips 66 will use best efforts to take all steps necessary

- (including pump replacement) to minimize the amount of time the FCCU wet gas scrubber operates with fewer than three pumps.
10. Compliance with Approval Conditions 1 and 3 will be monitored by yearly source testing in accordance with EPA Reference Method 7E as found in 40 CFR Part 60, Appendix A, or an alternative approved method. Source testing shall be performed no sooner than 10 months after the previous test and no later than 13 months after the previous test.
 11. Compliance with Approval Condition 2 will be monitored by a continuous emission monitor for NO_x meeting the performance specifications of 40 CFR Part 60, Appendix B, and quality control/quality assurance requirements of 40 CFR Part 60, Appendix F. The continuous emission monitor must be installed and certified within 180 days after start-up.
 12. Compliance with Approval Condition 5 will be demonstrated by a Continuous Emission Monitor for CO meeting the performance specifications of 40 CFR Part 60, Appendix B, and quality control/quality assurance requirements of 40 CFR Part 60, Appendix F.
 13. Compliance with Approval Conditions 4 and 6 will be demonstrated by yearly source testing in accordance with EPA Reference Method 10, as found in 40 CFR Part 60, Appendix A, or an alternative approved method. Phillips 66 will identify a surrogate parameter (such as fuel usage) and multiply it by the emission factor derived during the previous source test. Source testing shall be performed no sooner than 10 months after the previous test and no later than 13 months after the previous test.
 14. Compliance with Approval Condition 7 will be demonstrated by annual source testing in accordance with EPA Reference Method 5B, as found in 40 CFR Part 60, Appendix A, or an alternative approved method. Source testing shall be performed no sooner than 10 months after the previous test and no later than 13 months after the previous test. Source testing shall be performed at maximum normal FCCU feed rates.
 15. Compliance with Approval Condition 8 will be determined by semi-annual source testing in accordance with 40 CFR 60 Appendix A Method 5B. Source testing shall be performed no sooner than four months after the previous test and no later than eight months after the previous test. Source testing shall be performed at maximum normal FCCU feed rates.
 16. Compliance with Approval Condition 9 will be met by recordkeeping.
 17. Within 90 days of start-up, Phillips 66 shall conduct performance test for NO_x emissions from the cat gasoline desulfurizer feed heater, combined emissions from the FCCU and CO boiler and the sulfur recovery unit, conducted by an independent testing firm. A test plan shall be submitted to Ecology for approval at least 30 days prior to testing. The term start-up is defined by 40 CFR 60.2.

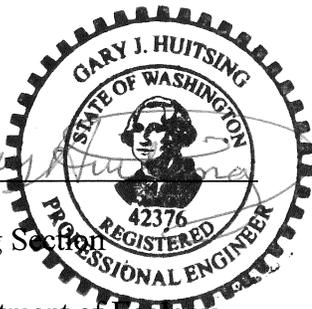
18. Use of natural gas shall be limited to 10 percent of fuel combusted in the CO boiler or 111,252 MMBtu/yr, over a calendar year averaging period.
19. The maximum firing rate of the cat gasoline desulfurizer feed heater, FCC combustion air heater, cat gasoline desulfurizer feed heater, CO boiler, and sulfur recover unit shall be limited to the values listed in Appendix A.
20. Within 90 days of initial start-up of the boiler, Phillips 66 shall identify boiler operational parameters and practices that have been described as “good combustion practice.” These operational parameters and practices shall be included in an operation and maintenance (O&M) manual for the boiler. The O&M manual shall also include a description of records that will be maintained to insure the continuous application of “good combustion practice.” The O&M manual shall be maintained by Phillips 66 and be available for review by state, federal, and local agencies. Emissions that result from a failure to follow the requirements of the O&M manual may be considered credible evidence that emission violations have occurred.
21. Phillips 66 shall report the following monitoring data to the NWCAA and Ecology. It will no longer be necessary to report to Ecology when PSD compliance and enforcement delegated NWCAA or once the NWCAA has issued a Title V permit.
 - a) Submit the performance test data from the initial performance test and the performance evaluation of the continuous emission monitor’s using the applicable performance specifications in 40 CFR Appendix B.
 - b) Submit a report within 30 days of the end of each calendar month, or on another approved reporting schedule, and in the format approved by Ecology, including the following:
 - 1) Calendar date.
 - 2) Average NO_x, CO, and PM/PM₁₀ emission rates from the FCC/CO boiler wet gas scrubber.
 - 3) Identification of any steam generating days for which NO_x data were not obtained, including reasons for not obtaining sufficient data and description of corrective actions taken.
 - 4) Identification of times emission data are excluded from the calculated average emission rate and the reasons for excluding the data.
 - 5) Wet scrubber pump operation and maintenance records pursuant to Approval Condition 9 until Phillips 66 demonstrates compliance with the limits in Approval Condition 7.

- c) Submittal of monthly reports satisfies the quarterly reporting requirements of 40 CFR 60.49b, except that Phillips 66 shall submit a quarterly report, within 30 days after the end of each calendar quarter, including the following continuous emission monitor test data:
 - 1) Days for which data were not collected.
 - 2) Reasons for which data were not collected.
 - 3) Identification of times when the pollutant concentration exceeds span of the continuous emission monitor.
 - 4) Description of any modifications to the continuous emission monitor system that could affect the ability of the system to comply with performance specifications 2 or 3.
 - 5) Results of any continuous emission monitor drift tests.
- d) In addition, Phillips 66 shall maintain monitoring records on-site for at least five years and shall submit:
 - 1) Excess emission reports to Ecology and the NWCAA, as appropriate.
 - 2) Results of any compliance source tests.
22. Any activity, which is undertaken by the company or others, in a manner, which is inconsistent with the application and this determination, shall be subject to enforcement under the applicable regulations.
23. Access to the source by the EPA, state, and local regulatory personnel shall be permitted upon request for the purposes of compliance assurance inspections. Failure to allow such access is grounds for an enforcement action.
24. This approval shall become invalid if construction of the project is not commenced within eighteen (18) months after receipt of the final approval, or if construction of the facility is discontinued for a period of eighteen (18) months, unless Ecology extends the 18-month period upon satisfactorily showing that an extension is justified, pursuant to 40 C.F.R. 52.21(r)(2) and applicable EPA guidance.
25. Final approval of this permit shall not be earlier than the date upon which the EPA notified Ecology that the EPA has satisfied its obligations, if any, under Section 7 of the Endangered Species Act 16 U.S.C. § 1531 et seq., 50 CFR Part 402, Subpart B (Consultation Procedures) and Section 305(b)(2) of the Magnuson-Stevens Fishery and Conservation Act 16 U.S.C. § 1801 et seq., 50 CFR Part 600 Subpart K (EFH Coordination, Consultation, and Recommendations).

Reviewed by:



Gary J. Huitsing, P.E.
Science and Engineering Section
Air Quality Program
Washington State Department of Ecology



9/22/2014
Date

Approved by:



Stuart A. Clark
Air Quality Program Manager
Washington State Department of Ecology

9/24/14
Date

APPENDIX A

Unit	WEDS ID#	Maximum Firing Rate (MMBtu/hr) Unless Otherwise Noted
Sulfur Recovery Unit	17	23
Cat Gasoline Desulfurizer Feed Heater	A	40
FCC Combustion Air Heater	C	70
CO Boiler	E	109*
* Applies when auxiliary firing fuel gas.		

APPENDIX B

Emission limits:

Emissions	Cat Gas Desulfurizer Feed Heater	FCCU & CO Boiler	SRU
NO _x	17 ppmdv & 5.1 tpy	<ul style="list-style-type: none"> • 123.2 ppmvd NO_x at 0% O₂ on a 7-day rolling average; • 127 ppmdv at 7% O₂ over a 30-day rolling average; • 96.1 ppmvd at 0% O₂ on a 365-day rolling average; • 308.10 tpy (12-month rolling total); 	42.2 ppmdv & 9.88 tpy
CO	0.0842 lb/MMBtu & 14.4 tpy	500 ppmdv (1-hr) 100 ppmdv (365-day)	57.1 ppmdv & 8.3 tpy
PM ₁₀	---	0.50 lb/1000 lb coke burned**	---

**As per Consent Decree, 0.8 lb/1000 lb will be the emission standard between January 27, 2005, and the date that demonstrates compliance with the 0.50 lb/1000 lb coke burned, but no later than June 30, 2007.