

ENGINEERING EVALUATION
ConocoPhillips Company
Application Number 14857; Plant Number 16

BACKGROUND

ConocoPhillips Company has applied for an Alternative Compliance Plan (ACP) to use Interchangeable Emission Reduction Credits (IERC's) for compliance with BAAQMD Regulation 9, Rule 10 (Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries). Under the proposed ACP, ConocoPhillips will use IERC's from one or more of the banking certificates (Application # 14856) generated by the operation of U110 H-1 Heater (S-438) to compensate for any excess emissions from the 29 heaters subject to Regulation 9-10. Specifically, Regulation 9-10-301 limits refinery-wide NOx emissions from these 29 heaters to 0.033 lb/MMBTU on an operating-day average. Essentially, this application will result in a Change of Conditions to incorporate conditions of the ACP to show daily compliance with Regulation 9-10.

ACP CALCULATION PROCEDURES

On a daily basis, ConocoPhillips currently performs the following calculations to show compliance with Regulation 9, Rule 10:

Actual Emissions for Sources with NOx CEMS:

For the sources listed in ConocoPhillips Permit Condition # 21235 (attached) Part 1 as having a NOx CEM, the following calculations are performed:

1. Measure the daily average NOx ppm concentration (C_{NOx}) using CEMs.
2. Measure the daily average percent oxygen ($\%O_2$) using CEMs.
3. Measure the higher heating value (HHV) of the fuel gas combusted in the heaters.
4. Calculate the emission rate (E) using the following formula from 40 CFR 75 Appendix F:
$$E = 1.194 \times 10^{-7} \times C_{NOx} \times HHV \times [20.9 / (20.9 - \%O_2)] \text{ lb/MMBTU}$$
5. Measure the daily fuel usage and convert to heat (H) in MMBTU.
6. Multiply the heat (H) by the emission rate (E) to obtain the emissions (EM) in pounds.

Actual Emissions for Sources without NOx CEMS:

For the sources listed in ConocoPhillips Permit Condition # 21235 (attached) Part 1 as NOT having a NOx CEM, the following calculations are performed:

7. Measure the daily average percent oxygen ($\%O_2$) using CEMs.
8. Measure the higher heating value (HHV) of the fuel gas combusted in the heaters.
9. Measure the daily fuel usage and convert to heat (H) in MMBTU.
10. Following Permit Condition # 21235 guidance, use the appropriate emission rate (E) for the given $\%O_2$ and heat rate (H).
11. Multiply the heat (H) by the emission rate (E) to obtain the emissions (EM) in pounds.

Total Emissions and Refinery Wide Emission Rate:

12. Sum the emissions (EM) from each individual source (all sources, calculated in Steps 6 and 11), where the subscripts 1 through 29 represent the individual sources subject to Regulation 9, Rule 10: $EM_{Total} = EM_1 + EM_2 + \dots + EM_{29}$
13. Sum the heat release from each individual heater (all sources, calculated in Steps 5 and 9): $H_{Total} = H_1 + H_2 + \dots + H_{29}$

14. Divide the total emissions by the total heat release to obtain the refinery-wide emission rate (E_{refinery}): $E_{\text{refinery}} = EM_{\text{Total}}/H_{\text{Total}}$ (lb/MMBTU)
15. For any given day, if E_{refinery} is less than or equal to the Regulation 9-10-301 refinery-wide emission limit of 0.033 lb/MMBTU, the refinery is in compliance and no IERC's are required. If E_{refinery} is greater than the Regulation 9-10-301 refinery-wide emission limit of 0.033 lb/MMBTU, then IERC's are required to comply with Regulation 9-10.
16. Calculate the allowable emissions (EM_{allow}) by multiplying the total heat input (H_{Total} from Step 13) by the Regulation 9-10-301 limit, 0.033 lb/MMBTU. Subtract the allowable emissions from the total emissions (EM_{Total} from Step 12) to obtain the excess emissions (EM_{Excess}): $EM_{\text{Excess}} = EM_{\text{Total}} - EM_{\text{allow}}$ (pounds)
17. Per Regulation 2-9-306, the amount of IERC's used for compliance includes a 10% Environmental Benefit Surcharge. The total IERC's to be surrendered is equal to 10% more than the excess emissions (EM_{Excess}) calculated in Step 6: $IERC = EM_{\text{Excess}} \times 1.10$ (pounds)

CUMULATIVE INCREASE

There is no resulting increase or change of emissions from this application for ACP to use IERC's.

STATEMENT OF COMPLIANCE

An ACP must satisfy the requirements of Regulation 2-9-303 in order to comply with the NOx rule in Regulation 9-10. ConocoPhillips' proposed ACP will comply with the requirements of Regulation 2-9-303 (Alternative Compliance Plan using IERC's):

- 303.1 The IERC's that will be used under this ACP will only include those generated, approved and banked in accordance with the provisions of Regulation 2-9.
- 303.2 The ACP will track actual and allowable emissions on a daily basis. If the actual emissions exceed the allowable, ConocoPhillips will be required to provide IERC's for the amount of the difference, plus a 10% environmental benefit surcharge. Because the IERC's provided are equal to the amount of the excess, the NOx emissions will not exceed the BARCT requirements of Regulation 9.
- 303.3 This application is the initial review of the ACP. Part 14 of the proposed permit conditions (see Permit Conditions Section) shall include a requirement for annual renewal submittals.
- 303.4 The procedures used by the facility currently (and described in the ACP Calculation Procedures section) illustrate that the facility has provided methods for demonstrating compliance on a daily basis.

Best Available Control Technology review, offsets, Toxics Risk Screen Analysis, Prevention of Significant Deterioration, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants requirements are not triggered for this application for ACP to use IERC's.

This application for ACP to use IERC's is not ministerial. In addition, this application is not exempt from the California Environmental Quality Act and no other agency will be conducting a Negative Declaration or Environmental Impact Report for this project. An Appendix H form and Initial Study questionnaire was completed by the facility. The District has prepared and certified a Negative Declaration for this application.

Per Regulation 2-9-405, this application is subject to the Publication, Public Comment, and Inspection requirements of Regulation 2-9-405.

PERMIT CONDITIONS

Permit Condition ID # 21235 currently regulates compliance with Regulation 9-10 for all sources subject to that regulation:

COND# 21235 -----

Regulation 9-10 Refinery-Wide Compliance

1. The following sources are subject to the refinery-wide NOx emission rate and CO concentration limits in Regulation 9-10: [Regulation 9-10-301 and 305]

S#	Description	NOx CEM
2	U229, B-301 Heater	No
3	U230, B-201 Heater	No
4	U231, B-101 Heater	No
5	U231, B-102 Heater	No
7	U231, B-103 Heater	No
8	U240, B-1 Boiler	Yes
9	U240, B-2 Boiler	No
10	U240, B-101 Heater	Yes
11	U240, B-201 Heater	No
12	U240, B-202 Heater	No
13	U240, B-301 Heater	Yes
14	U240, B-401 Heater	Yes
15	U244, B-501 Heater	Yes
16	U244, B-502 Heater	Yes
17	U244, B-503 Heater	Yes
18	U244, B-504 Heater	Yes
19	U244, B-505 Heater	Yes
20	U244, B-506 Heater	No
22	U248, B-606 Heater	No
29	U200, B-5 Heater	No
30	U200, B-101 Heater	No
31	U200, B-501 Heater	No
43	U200, B-202 Heater	Yes
44	U200, B-201 PCT Reboil Furnace	Yes
336	U231 B-104 Heater	No
337	U231 B-105 Heater	No
351	U267 B-601/602 Tower Pre-Heaters	Yes
371	U228 B-520 (Adsorber Feed) Furnace	Yes
372	U228 B-521 (Hydrogen Plant) Furnace	Yes

2. The owner/operator of each source listed in Part 1 shall properly install, properly maintain, and properly operate an O2 monitor and recorder. This Part shall be effective September 1, 2004. [Regulation 9-10-502]

3. The owner/operator shall operate each source listed in Part 1, which does not have a NOx CEM, within specified ranges of operating conditions (firing rate

and oxygen content) as detailed in Part 5. The ranges shall be established by utilizing data from district-approved source tests. [Regulation 9-10-502]

4. The owner/operator shall establish the initial NOx box for each source subject to Part 3 by June 1, 2004. The NOx Box may consist of two operating ranges in order to allow for operating flexibility and to encourage emission minimization during standard operation. The procedure for establishing the NOx box is as follows:

- a. Conduct district approved source tests for NOx and CO, while varying the oxygen concentration and firing rate over the desired operating ranges for the furnace;
- b. Determine the minimum and maximum oxygen concentrations and firing rates for the desired operating ranges (Note that the minimum O2 at low-fire may be different than the minimum O2 at high-fire. The same is true for the maximum O2). The owner/operator shall also verify the accuracy of the O2 monitor on an annual basis.
- c. Determine the highest NOx emission factor (lb/Mmbtu) over the preferred operating ranges while maintaining CO concentration below 200 ppm; the owner/operator may choose to use a higher NOx emission factor than tested.
- d. Plot the points representing the desired operating ranges on a graph. The resulting polygon(s) are the NOx Box, which represents the allowable operating range(s) for the furnace under which the NOx emission factor from part 5a is deemed to be valid.
 - i. The NOx Box can represent/utilize either one or two emission factors.
 - ii. The NOx Box for each emission factor can be represented either as a 4 or 5-sided polygon. The NOx box is the area within the 4- or 5-sided polygon formed by connecting the source test parameters that lie about the perimeter of successful approved source tests. The source test parameters forming the corners of the NOx box are listed in Part 5.
- e. Upon establishment of each NOx Box, the owner/operator shall prepare a graphical representation of the box. The representation shall be made available on-site for APCO review upon request. The box shall also be submitted to the BAAQMD with permit amendments.

5. Except as provided in Part 5b and 5c, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source which has a properly operated and properly installed NOx CEM.

- a. NOx Box ranges

[To Be Determined]

The limits listed above are based on a calendar day averaging period for both firing rate and O₂%.

b. Part 5a does not apply to low firing rate conditions (i.e., firing rate less than or equal to 20% of the unit's rated capacity) during startup or shutdown periods or periods of curtailed operation (ex. during heater idling, refractory dryout, etc.) lasting 5 days or less. During these conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in 9-10-301.2 (i.e. units out of service and 30-day averaging data).

c. Part 5a does not apply during any source test required or permitted by this condition. (Reg. 9-10-502). See Part 7 for the consequences of source test results that exceed the emission factors in Part 5.

6a. The owner/operator may deviate from the NO_x Box (either the firing rate or oxygen limit) provided that the owner/operator conducts a district approved source test which replicates the past operation outside of the established ranges. The source test representing the new conditions shall be conducted no later than the next regularly scheduled source test period, or within eight months, whichever is sooner. The source test results will establish whether the source was operating outside of the emission factor utilized for the source. The source test results shall be submitted to the district source test manager within 45 days of the test. As necessary, a permit amendment shall be submitted.

i. Source Test \leq Emission Factor

If the results of this source test do not exceed the higher NO_x emission factor in Part 5, or the CO limit in Part 9, the unit will not be considered to be in violation during this period for operating out of the "box." The facility may submit an accelerated permit program permit application to request an administrative change of the permit condition to adjust the NO_x Box operating range(s), based on the new test data.

ii. Source Test $>$ Emission Factor

If the results of this source test exceed the permitted emission concentrations or emission rates then, utilizing measured emission concentration or rate, the owner/operator shall perform an assessment, retroactive to the date of the previous source test, of compliance

with Section 9-10-301. The unit will be considered to have been in violation of 9-10-301 for each day the facility was operated in excess of the refinery wide limit. The facility may submit a permit application to request an alteration of the permit condition to change the NOx emission factor and/or adjust the operating range, based on the new test data.

6b. The owner/operator must report conditions outside of box within 96 hours of occurrence.

7. For each source subject to Part 3, the owner/operator shall conduct source tests at the schedule listed below. The source tests are performed in order to measure NOx, CO, and O2 at the as-found firing rate, or at conditions reasonably specified by the APCO. The source test results shall be submitted to the District Source Test Manager within 45 days of the test. [Regulation 9-10-502]

a. Source Testing Schedule

- i. Heater < 25 MMBtu/hr: One source test per consecutive 12 month period. The time interval between source tests shall not exceed 16 months.
- ii. Heaters = 25 MMBtu/hr: Two source tests per consecutive 12 month period. The time interval between source tests shall not exceed 8 months and not be less than 5 months apart. The source test results shall be submitted to the district source test manager within 45 days of the test. [Regulation 9-10-502]

b. If the results of any source test under this part exceed the permitted concentrations or emission rates the owner/operator shall follow the requirements of Part 6a(ii). If the owner/operator chooses not to submit an application to revise the emission factor, the owner/operator shall conduct another Part 7 source test, at the same conditions, within 90 days of the initial test.

8. For each source listed in Part 1 with a NOx CEM installed, the owner/operator shall conduct semi-annual district approved CO source tests at as-found conditions. The time interval between source tests shall not exceed 8 months. District conducted CO emission tests associated with District-conducted NOx CEM field accuracy tests may be substituted for the CO semi-annual source tests.

9. For any source listed in Part 1 for which any two source test results over any consecutive five year period are greater than or equal to 200 ppmv CO at 3% O2, the owner/operator shall properly install, properly

maintain, and properly operate a CEM to continuously measure CO and O2. The owner/operator shall install the CEM within the time period allowed in the District's Manual of Procedures. [Regulation 9-10-502, 1-522]

10. In addition to records required by 9-10-504, the facility must maintain records of all source tests conducted to demonstrate compliance with Parts 1 and 5. These records shall be kept on site for at least five years from the date of entry in a District approved log and be made available to District staff upon request. [Recordkeeping, Regulation 9-10-504]

I recommend that the following permit conditions be added to Condition # 21235 as Parts 11 through 15:

11. The sources listed in Part 1 of this condition make up the group of sources that are operating under an Alternative Compliance Plan (ACP). The owner/operator shall demonstrate compliance with their ACP and with Regulation 9-10-301 by keeping a spreadsheet of the ACP calculations in a District approved format. [basis: Regulation 2-9-303, 9-10-301]
12. The owner/operator shall submit quarterly reports to the APCO, within 30 days following the end of each calendar quarter, or other 3-month interval established in the plan. Each quarterly report shall include:
 - a. Summary of the amount of IERC's used during the previous quarter;
 - b. Sum of all IERC's used during the current ACP period;
 - c. A projection of the IERC's that are needed for the entire ACP period based on the IERC usage rates calculated in Parts 12a and 12b of this condition, including the Environmental Benefit Surcharge, per Regulation 2-9-309; and
 - d. Certification that the facility possesses IERC's equal to the amount projected in Part 12c of this condition or a description of how the facility will adjust its operation so that the amount of IERC's does not exceed the amount of IERC's possessed by the facility.[basis: Regulation 2-9-502.3]
13. The owner/operator shall submit an annual reconciliation report to the APCO within 30 days of following the end of the ACP period, and surrender the banking certificate(s) for all IERC's used during the ACP period, including the environmental benefit surcharge, per Regulation 2-9-309. [basis: Regulation 2-9-502.4]
14. With any request to renew the ACP annually, the owner/operator shall submit all necessary documents for the APCO to review and approve (or deny). [basis: Regulation 2-9-303]
15. The owner/operator shall retain records for five years from the date the record was made, and shall submit such information as required by the APCO to determine compliance with the ACP. [basis: Regulation 2-9-502.2]

RECOMMENDATION

I recommend that the ACP be approved, and the Change of Conditions to accepted to allow ConocoPhillips to use their ACP to use IERC's.

MCL:mcl

BY:

M.K. Carol Lee
Senior Air Quality Engineer

Date