

## BAAQMD OFFICE MEMORANDUM

June 23, 2000

**TO:** REFINERY ENGINEERS  
**FROM:** BILL DE BOISBLANC *WdeB 6/26*  
**SUBJECT:** NO<sub>x</sub>, CO, AND O<sub>2</sub> MONITORING COMPLIANCE WITH REGULATION 9, RULE 10

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This is a policy recommendation for emission monitoring requirements for those petroleum refinery heaters, furnaces, and boilers that are subject to the refinery NO<sub>x</sub> rule, Regulation 9, Rule 10. All Phase I combustion units (including modified and unmodified units) are subject to the Section 9-10-502 monitoring requirements.

Rule 9-10 is the Best Available Retrofit Control Technology (BARCT) rule that limits the emissions of NO<sub>x</sub> and CO from boilers, steam generators, and process heaters in petroleum refineries. Section 9-10-502 requires NO<sub>x</sub>, CO, and O<sub>2</sub> CEMs or "equivalent" verification on affected combustion units. Regulation 9-10 was not intended to obtain CO emission reductions. The 400 ppmv CO limit in the rule was included only to prevent sources from emitting higher CO emissions as a result of implementing NO<sub>x</sub> controls. Thus, the CO CEM equivalence verification standard does not need to be as stringent as that for NO<sub>x</sub> monitoring equivalency.

### **I. Affected Combustion Units Abated by SCR or SNCR:**

For combustion units abated by "add-on control" equipment, such as SCR or SNCR, the following guidelines are minimum acceptance criteria for Section 9-10-502 monitoring plans.

- 1 Abated combustion unit emissions shall be monitored continuously by a CEM that measures NO<sub>x</sub> and O<sub>2</sub>. Compliance with Rule 9-10 will be determined using measured emissions.
- 2 Abated combustion units with expected emissions  $\geq 200$  ppmv CO at 3% O<sub>2</sub> shall be monitored continuously by a CEM that measures CO. Compliance with Rule 9-10 will be determined using measured emissions.
- 3 For abated combustion units with demonstrated emissions  $< 200$  ppmv CO at 3% O<sub>2</sub>, the owner/operator of the units must have District-approved CO source tests done on a semi-annual basis with at least one of the source tests deemed by the District to be representative of normal operation. The time interval between source tests shall not exceed 8 months. District conducted CO emission tests associated with District-conducted NO<sub>x</sub> CEM field accuracy tests may be substituted for the CO semi-annual source tests.
  - a) If two or more of the CO source test results, over any consecutive five year period, are  $\geq 200$  ppmv CO at 3% O<sub>2</sub>, the owner/operator is required to install and operate a CEM to continuously measure CO. Otherwise, a CO CEM shall not be required. The owner/operator shall be given the time period allowed in the District's Manual of Procedures to have the CO CEM installed and properly operating.

**Other Monitoring Requirements:**

4. Each fuel line of each affected unit shall be equipped with a fuel-flow meter as required by section 9-10-502.2.
5. Records shall be kept as required by section 9-10-504, except the records shall be retained for a period of five years from date of entry.

**II. Affected Combustion Units not abated by SCR or SNCR and Unmodified Combustion Units without NO<sub>x</sub> control:**

For combustion units, which are controlled by low-NO<sub>x</sub> burners and/or flue gas recirculation and not abated by add-on NO<sub>x</sub> control equipment and unmodified combustion units without NO<sub>x</sub> control, the following guidelines are minimum acceptance criteria for section 9-10-502 monitoring plans. For units which are vented to a common stack, the maximum rated heat input shall be the combined sum of the maximum rated heat inputs of each of the units for the purposes of determining which of the below monitoring requirements apply. However, if the District Source Test Manager and Permit Evaluation Manager approve that the ducting configuration and testing ports/platforms allow for accurate source testing of each individual unit vented to the common stack, then the maximum rated heat input of each individual unit shall be used for the purposes of determining which of the monitoring requirements apply.

**A. Large-Sized Units ( $\geq$  200 million Btu/hour):**

The guidelines for combustion units with maximum rated heat capacity  $\geq$  200 million Btu/hour shall be the same as those shown above for Affected Combustion Units Abated by SCR or SNCR.

**B. Medium-Sized Units with NO<sub>x</sub> and O<sub>2</sub> CEMs ( $\geq$  25 million Btu/hour and  $<$  200 million Btu/hour)**

The guidelines for medium-sized units with NO<sub>x</sub> and O<sub>2</sub> CEMs shall be the same as those shown above for Affected The Combustion Units Abated by SCR or SNCR.

**C. Medium-Sized Units without NO<sub>x</sub> and O<sub>2</sub> CEMs ( $\geq$  25 million Btu/hour and  $<$  200 million Btu/hour):**

- 1 For combustion units without NO<sub>x</sub> and O<sub>2</sub> CEMs with a maximum rated heat capacity  $\geq$  25 million Btu/hour and  $<$  200 million Btu/hour:

To comply with section 9-10-502, the owner/operator of these units shall install a CEM or an "equivalent" verification system. In lieu of a CEM, the owner/operator of these units must have District-approved NO<sub>x</sub>, CO, and O<sub>2</sub> source tests done on a semi-annual basis. This equivalent verification system must include all of the following:

- **INITIAL SOURCE TEST REQUIREMENT:** The initial source tests, which may consist of a single source test, shall be conducted as follows:
  - a) The test will establish the "box" with these four conditions as the corners: (1) low fire/low O<sub>2</sub>, (2) low fire/high O<sub>2</sub>, (3) high fire/low O<sub>2</sub>, and (4) high fire/high O<sub>2</sub>, to demonstrate the emissions over the full-range of operation of the units.

- b) By July 15, 2000, the initial source tests shall be completed on all affected combustion units that have been modified to meet Rule 9-10.
- c) By September 1, 2000, the initial source tests shall be completed on all affected combustion units that have not been modified to meet Rule 9-10.

**SUBSEQUENT SOURCE TEST REQUIREMENTS:** Subsequent to the initial source test, semi-annual source tests shall be conducted as follows:

- a) Two NO<sub>x</sub>, CO, and O<sub>2</sub> source tests per year shall be conducted at the as-found firing rate, within 20% of the permitted O<sub>2</sub> conditions likely to maximize NO<sub>x</sub> emissions.
- b) Two additional semi-annual NO<sub>x</sub>, CO, and O<sub>2</sub> source tests are required at conditions likely to maximize CO at the as-found firing rate, for those units for which any of the initial test results or any semi-annual test result of the unit during the past five consecutive year period, are  $\geq$  200 ppmv CO at 3% O<sub>2</sub>.

Those sources with FGR must also bracket the range of FGR rates as part of the test matrix.

**PERMIT CONDITIONS:** The District will impose the following permit conditions:

- a) Conditions establishing the daily average operating range within which units may be operated without additional testing. The daily average operating range will be defined as plus or minus 20% of the demonstrated firing rates, O<sub>2</sub> concentrations, (and FGR rates, if applicable), as demonstrated during the initial and subsequent source tests.
- b) A condition requiring a source test, using District-approved methods, to be conducted within 45 days, if a unit is operated outside of the established daily average operating range. This requirement shall not apply to low firing rate conditions during startup or shutdown periods less than 3 days. These source test results shall be submitted to the District Source Test Manager within 30 days of the test date.
  - (1) If the results of this source test exceed the permitted emission concentrations or emission rates, the unit will be considered to have been in violation for each day it operated outside of the defined operating range. In this situation, the facility may submit a permit application and a new Regulation 9, Rule 10 control plan, to request a modification of the permit condition to change the NO<sub>x</sub> emission concentration or emission rate and/or an adjustment of the operating range, based on the new test data.
  - (2) If the results of this source test do not exceed emission concentrations or rates, the allowable operating range will be adjusted as stated above, based on the new test data. In this situation, the unit will not be considered to be in violation during this period for operating out of the "box" if the unit is operated within the alternate operating conditions approved by the APCO.
- c) A condition limiting unit emissions to the NO<sub>x</sub> concentrations or rates in the Regulation 9, Rule 10 control plan. The permit conditions will be used for demonstrating compliance with Rule 9-10. Any revision of the Regulation 9, Rule 10 control plan that affects any of these units will be considered an administrative permit condition modification and will require the refinery to submit a permit application to the District for the affected units.

- **CO CEM REQUIREMENT:**

If any two source test results, over any consecutive five year period, are  $\geq 200$  ppmv CO at 3% O<sub>2</sub>, the owner/operator is required to install and operate a CEM to continuously measure CO and O<sub>2</sub>. Otherwise, a CO and O<sub>2</sub> CEM shall not be required. The owner/operator shall be given the time period allowed in the District's Manual of Procedures to have the CEM installed and properly operating.

**D. Small-Sized Units (< 25 million Btu/hour):**

1. The owner/operator of these small-sized units must have District-approved NO<sub>x</sub>, CO, and O<sub>2</sub> source testing done on an annual basis. This annual source testing must meet all the following:
  - Deemed by the District to be representative of normal operation.
  - The District will impose permit conditions, limiting unit emissions to the NO<sub>x</sub> concentrations reported in the refinery plan for the unit and limiting unit firing rates to less than 25 million Btu/hour. The permit conditions will be used for demonstrating compliance with Rule 9-10. Any revision of the refinery plan will be considered a permit condition modification and will require the refinery to submit a permit application to the District.

**Other Monitoring Requirements:**

2. Each fuel line of each affected unit shall be equipped with a fuel-flow meter as required by Section 9-10-502.2.
3. Records shall be kept as required by Section 9-10-504, except the records shall be retained for a period of five years from date of entry.