



## U.S. Environmental Protection Agency Applicability Determination Index

**Control Number: D095**

**Category:** NSPS  
**EPA Office:** DSSE  
**Date:** 08/11/1980  
**Title:** NSPS Determination  
**Recipient:** Ullrich, David A.  
**Author:** Reich, Edward E.

---

**Subparts:** Part 60, D, Foss. Fuel Fired Steam Gen. (post 8/17/71)

---

**References:** 60.40  
60.44

---

**Abstract:**

Northern Petroleum Company has two boilers required to monitor NOx emissions. The boilers burn a variable combination of fossil and nonfossil fuels, with hydrogen gas comprising as much as 70% of the nonfossil components.

a) Determine the correct equation for calculating the F-Factor when hydrogen gas is one of the components fired in the boiler.

b) Determine if a CO2 monitor can be used to convert NOx concentration values to units of standard if hydrogen gas is burned.

c) Determine a procedure for prorating F-Factors for use in calculating NOx excess emissions from CEM data when the boiler is burning a combination of fossil and nonfossil fuels.

d) Determine a procedure for prorating the NOx emission limit if a combination of fossil and nonfossil fuels are burned.

e) Determine a procedure for calculating the NOx emission rate and emission limitation for a performance test to be conducted on a boiler burning a combination of fossil and nonfossil fuels.

a) Since the hydrogen gas stream contains organic compounds, the Fc equation in Method 19 may be used; the use of this equation is only practical if the composition of the nonfossil fuel stream does not vary.

b) A CO2 monitor cannot be used to convert NOx concentration values to units of mass per unit calorific value if hydrogen gas only is burned. However, a CO2 monitor can be used if the hydrogen gas is always burned in combination with a fossil fuel. This practice would be limited by the accuracy of the CO2 monitor as more hydrogen is burned; the resultant CO2 in the effluent gas stream will be lower as the proportion of hydrogen is increased and the instrument must measure the CO2 with greater accuracy.

c) The procedure for prorating Fc-Factors in this situation is the same as described for a combination of fossil fuels. Since the boilers burn variable combinations, this procedure may not be easily carried out.

d) It is unclear why this situation should arise. Subpart D has no provision for allowing the heat inputs from nonfossil fuels other than wood residue fuels to be included for determining compliance. The NOx emission limit is based only on the heat content resulting from the combustion of fossil fuel, prorated only to account for the burning of a combination of fossil fuels.

e) The emission limitation used for a performance test should be that limitation specified at 40CFR 60.44. This limitation specifies a mass per unit of heat input derived from fossil fuel. Therefore, Subpart D requires that 100% fossil fuel be burned during the performance test; the only proration procedure allowed is for a combination of fossil fuels, or a combination of fossil and wood residue fuels.

---

**Letter:**

Control Number: D095

August 11, 1980

MEMORANDUM

SUBJECT: NSPS Determination

FROM: Director  
Division of Stationary Source Enforcement

TO: David A. Ullrich, Chief  
Air Enforcement Branch, Region V

This is in response to your June, 12, 1980, request for guidance concerning the calculation of nitrogen oxides emission rates using continuous emission monitor (CEM) data. Additional information was obtained in a July 10, 1980, telephone conversation between Patrick McCoy of your staff and Robert Myers of my staff.

Northern Petroleum Company has two package boilers required to monitor NOx emissions under Subpart D. The boilers burn a variable combination of fossil and nonfossil fuels, with hydrogen gas making up as much as 70% of the nonfossil component. Other nonfossil components include methane, ethane and off gases. You requested guidance on several issues concerning the use of the CO2 F-Factor and the proration of the NOx emission limit when a mixture of fossil and nonfossil fuel is burned.

Your questions and our responses follow.

1. Determine the correct equation for calculating the F-Factor when hydrogen gas is one of the components fired in the boiler.

Since the hydrogen gas stream contains organic compounds, the Fc equation in Method 19 may be used; the use of this equation is only practical if the composition of the nonfossil fuel stream does not vary.

2. Determine if a CO2 monitor can be used to convert NOx concentration values to units of standard if hydrogen gas is burned.

A CO2 monitor cannot be used to convert NOx concentration values to units of mass per unit calorific value if hydrogen gas only is burned. However, a CO2 monitor can be used if the hydrogen gas is always burned in combination with a fossil fuel. This practice would be limited by the accuracy of the CO2 monitor as more hydrogen is burned; the resultant CO2 in the effluent gas stream will be lower as the proportion of hydrogen is increased and the instrument must measure the CO2 with greater accuracy.

3. Determine a procedure for prorating F-Factors for use in calculating NOx excess emissions from CEM data when the boiler is burning a combination of fossil and nonfossil fuels.

The procedure for prorating Fc-Factors in this situation is the same as described for a combination of fossil fuels. Since the boilers burn variable combinations, this procedure may not be easily carried out.

4. Determine a procedure for prorating the NOx emission limit if a combination of fossil and nonfossil fuels is burned.

It is unclear why this situation should arise. Subpart D has no provisions for allowing the heat inputs from nonfossil fuels other than wood residue fuels to be included for determining compliance. The NOx emission limit is based only on the heat content resulting from the combustion of fossil fuel, prorated only to account for the burning of a combination of fossil fuels.

5. Determine a procedure for calculating the NOx emission rate and emission limitation for a performance test to be conducted on a boiler burning a combination of fossil and nonfossil fuels.

The emission limitation used for a performance test should be that limitation specified at 40 CFR 60.44. This limitation specifies a mass per unit of heat input derived from fossil fuel. Therefore, Subpart D requires that 100% fossil fuel be burned during the performance test; the only proration procedure allowed is for a combination of fossil fuels, or a combination of fossil and wood residue fuels.

This response has been prepared with the concurrence of the Office of Air Quality Planning and Standards. If you have any questions, please contact Robert Myers of my staff at FTS 755-2564.

Edward E. Reich

cc: Roger Shigehara  
Kirk Foster  
George Walsh  
Patrick McCoy