EPA Methods 3A, 6C, 7E, 10 & 20

Corrections to May 15, 2006 Final Rule That Updated the Methods

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Updated Methods

- Method 3A – O2 & CO2
- Method 6C – SO2
- Method 7E – NOx
- Method 10 – CO
- Method 20 – NOx/SO2/Diluent

Update of Methods 3A, 6C, 7E, 10, and 20
Purpose

- Harmonize
  - Consistent Equipment Requirements
  - Consistent Performance Tests
  - Calibration Gases & Ranges
- Simplify & Make Flexible
  - Make Equipment Performance-Based Instead of Technology-Based
  - Allow Verifications by Manufacturer
- Update
  - Relax Outdated Requirements
  - Incorporate Recently Accepted Options & New Techniques
  - Address Dilution Sampling Systems

EPA Methods 3A, 6C, 7E, 10 & 20

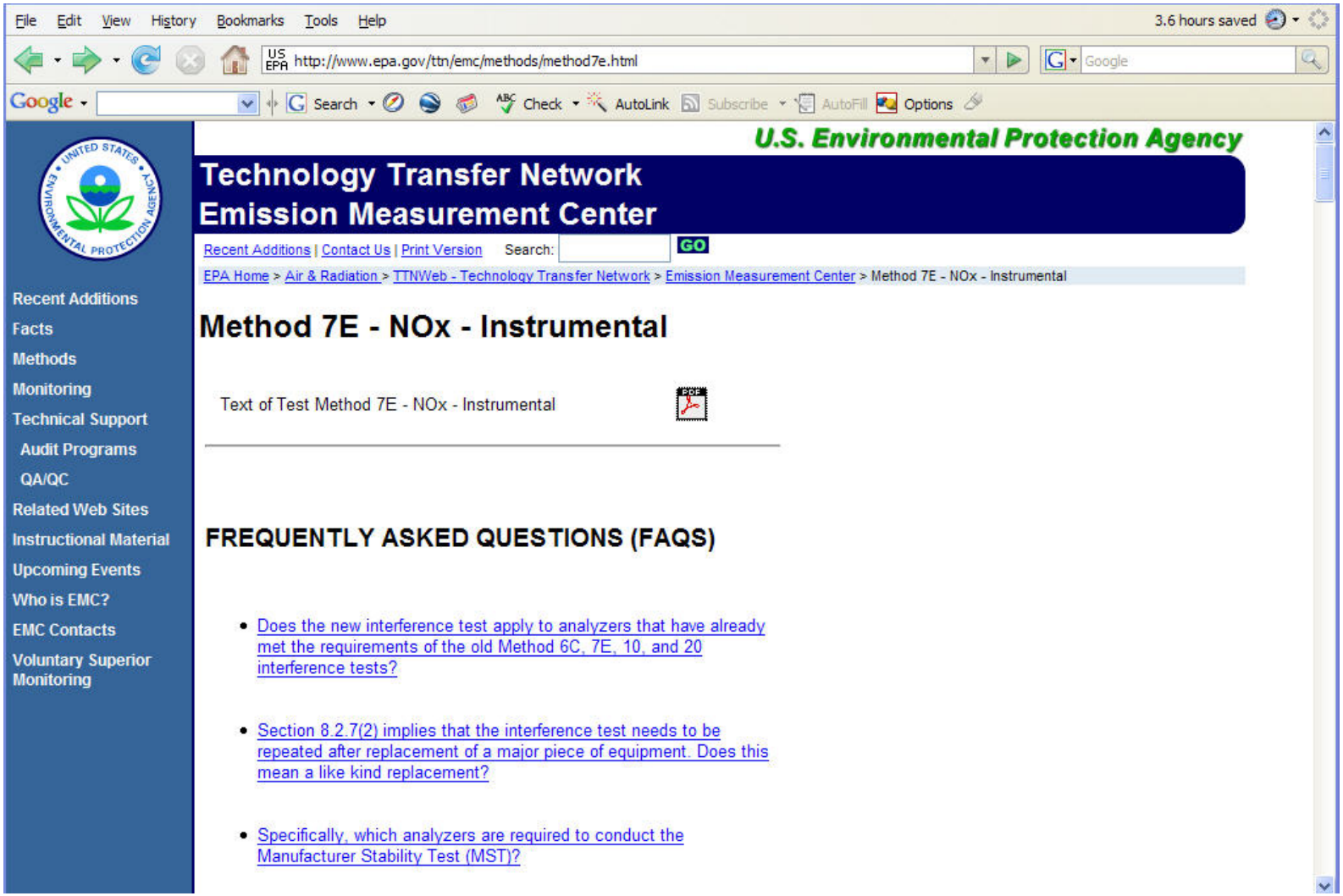
In This Talk

A Discussion of

- Technical Corrections
- Clarifications

Rule Clarifications on Website

www.epa.gov/ttn/emc



Federal Register

Monday,
May 15, 2006

Part II

Environmental Protection Agency

40 CFR Part 60

Update of Continuous Instrumental Test Methods; Final Rule

Stratification Test Requirement

Clarifications

- Stratification Test Required at Each Site
- Only 1 Stratification Test/Group of Methods
- No Need to Test Stacks < 4”

Sample Collection

Clarifications

- Method 20 – Min. Test Run Time = 21 Min.
- Single-Point OK for Stacks < 4”

Dilution Sampling Systems

- No Initial Bias Test for Dilution Sampling Systems

General Equipment Specifications

- Performance Based - OK If Can Pass Interference Check, CE, System Bias Tests
- Before Sample Conditioning –

  Maintain Components Above Gas Dew Point
- Components Not Included in System Bias Check Must Be SS, Teflon, or Glass

Calibration Gas Clarifications

- **Zero Air**

  Part 72.2 Definition for Zero Air Materials

  - SOx/NOx/VOC < 0.1 ppm
  - CO < 1 ppm
  - CO2 < 400 ppm
  - Part 72.2 Definition for Zero Air Material

- **Method 3A High Calibration Gas**

  - May Use Precleaned or Scrubbed Air

Calibration Gas Clarifications

- Must Obtain Gas Quality Certificate from Gas Manufacturer
- Analyzers That Measure NO & NO2 w/o Using Converter – Must Calibrate With Both NO & NO2

Interference Test - Clarifications

- Table 7E-3 Lists *Example* Test Gases
- Must Address All Potential Interferences
- May Be Verified by the Manufacturer
- Test Gases - Manufacturer-Certified
- One Initial Test Per Analyzer Make & Model
- Repeat for Non-model Replacement Parts
- Current Analyzers Grandfathered

Table 7E-3. Example Interference Check Gas Concentrations

Potential Interferent Gas [1]	Concentrations [2] Sample Conditioning Type	
	Hot Wet	Dried
CO_2	5 and 15%	5 and 15%
H_2O	25%	1 %
NO	15 ppmv	15 ppmv
NO_2	15 ppmv	15 ppmv
N_2O	10 ppmv	10 ppmv
CO	50 ppmv	50 ppmv
NH_3	10 ppmv	10 ppmv
CH_4	50 ppmv	50 ppmv
SO_2	20 ppmv	20 ppmv
H_2	50 ppmv	50 ppmv
HCl	10 ppmv	10 ppmv

1) Any applicable gas may be eliminated or tested at a reduced level if the manufacturer has provided reliable means for limiting or scrubbing that gas to a specified level.

2) As Practicable, gas concentrations should be the highest expected at test sites.

Calibration Drift

- Section 3.9 of Method 7E

"Difference between measurement system readings for pre- & post-bias checks"

Should read:

"Difference between pre- and post-run system bias checks"

System Bias Check

- Particulate Media Included Only When Using Out-of-Stack Filters

Method 7E NO_2 Converter Check

May Be Performed Before or After a Test or After a Series of Tests

Converter Efficiency Check

Direct Conversion of NO_2 Gas

Protocol Traceable Gas Unstable

- Use Manufacturer-Certified Gas
- Use Mid- to High-Concentration Range Gas Instead of 40-60 ppm Gas
- Other, Lower Concentrations Also Allowed

Converter Efficiency Check

Method 20 Bag Procedure

- Procedure Amendment
  - Secondary Steps For Determining Conversion Efficiency Were Confusing - Dropped
  - Acceptance Criterion: 2% Drop from NOx Peak
  - Requirement to Introduce Test Gas Upstream of Dilution Assembly For Sample Dilution Systems has been Dropped

Manufacturer Stability Test

- Use Procedures Similar to 40 CFR 53.23 (not 53.55 or 53.56 as listed in Final Rule)
- Stability Against Test Site Variations in
  - Temperature*
  - Line Voltage*
- For Routine Analyses Below 20 ppm
- Performed by Manufacturer or Tester
- One Time Test

Alternative Dynamic Spike Check

- Optional in place of:
  - Bias Test
  - Interference Check
- Best on Steady-State Process
- Approval Required for CAMD Tests

Converter Eff. Calculation Corrections

Old Method 20 Converter Check Calculation

- Final Rule Incorrect Equation

$$EffNO2 = \frac{NOxfinal - NOfinal}{NOxpeak - NOxfinal} \; x \; 100$$

- Correct Equation

$$\%\ Decrease = \frac{NOxpeak - NOxfinal}{NOxpeak} \; x \; 100$$

Calculation Corrections/Revisions

System Calibration Error Calculation

Missing DF in Eq. 7E-3

$$SCE = \frac{(Cs - Cv)\ x\ DF}{CS}\ x\,100 \qquad Eq.7E-3$$

Calculations Corrections/Revisions

Dynamic Spike Recovery Calculation

- Final Rule Incorrect Equation

$$R = \frac{Css - Cavg}{Ccalc} \, x\, 100 \qquad Eq.7E - 12$$

- Correct Equation

$$R = \frac{DF(Css - Cnative) + Cnative}{Cspike} x100$$

Calculations Corrections/Revisions

Missing Sample Concentration Calculation
When Using a Zero Gas

- Final Rule Equation for Non-Zero Gas

$$Cgas = (Cavg - Cm)\frac{Cma - Coa}{Cm - Co} + Cma \qquad Eq.7E-5a$$

- Added Equation For Zero Gas

$$Cgas = (Cavg - Co)\frac{Cma}{Cm - Co} \qquad Eq.7E-5b$$