IMPLEMENTING PM-2.5 NSR IN AIR PERMITS

Rules Applicability - Ketan Bhandutia

Modeling – Alan Dresser

Stack Testing – Mike Klein

ISG Meeting : February 4, 2011

Federal Actions

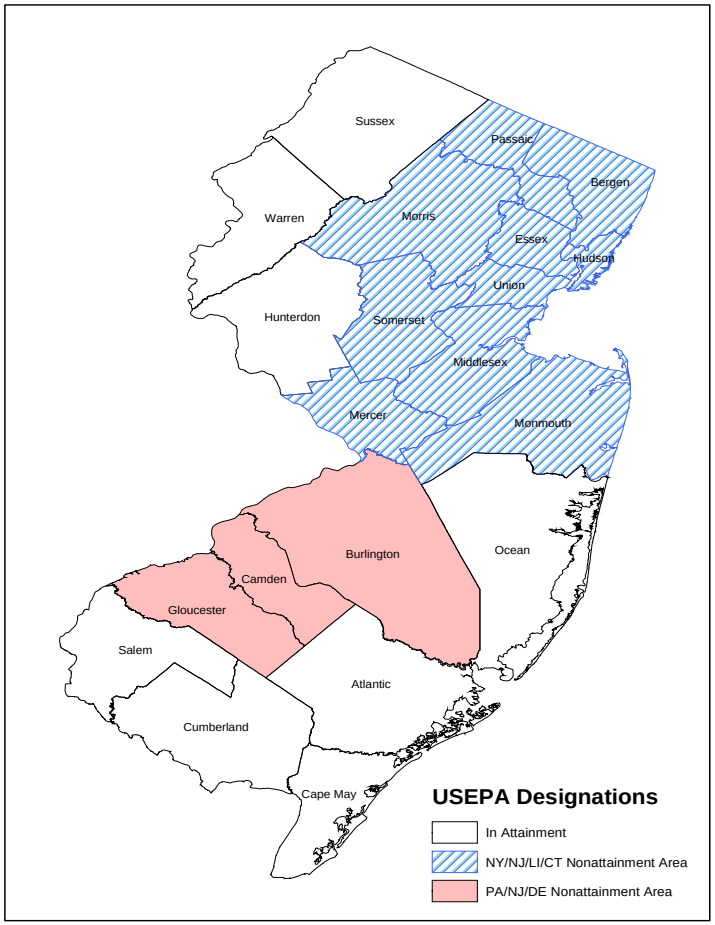
- **EPA established PM-2.5 NAAQS (10/17/2006 FR)**
  - **35 µg/m3 (24-hour) and**
  - **15 µg/m3 (Annual)**
- **PM-2.5 NSR Rules (5/16/2008 FR)**
- **PM-2.5 Increments, Significant Impact Levels (SIL) and Significant Monitoring Concentration (SMC) (10/20/2010 FR)**
- **PM-2.5 Test methods (12/21/2010 FR)**

NJ Area Designations and NSR Rule Applicability

• EPA designated NJ's 8 counties in "Attainment" area

In NJ's 8 "Attainment" counties, the final rules apply through PSD delegation

USEPA Designations of Nonattainment Areas for PM 2.5 in New Jersey



Date: December 21, 2004
Source: http://www.epa.gov/pmdesignations/finaltable.htm
Map: epa_nj

• EPA designated NJ's 13 counties in "Non-Attainment" area

* The Federal rules apply under 40 CFR Part 51, Appendix S until New Jersey revise Subchapter-18, 8 and 22 and submit to EPA as a SIP revision

May 16 2008 PM-2.5 NSR Rule Summary of Requirements

* **PM2.5 Precursors**
  - SO2 and NOx (“Presumed in”)
  - For PSD (40 CFR 52.21): SO2 and NOx
  - For NNSR (40 CFR 51, Appendix S): SO2 only

* **Major Source Thresholds**
  - For PSD: 100 TPY/250 TPY
  - For NNSR: 100 TPY

* **Significant Emissions Rates**
  - For PM-2.5: 10 TPY
  - For PM-2.5 Precursors (SO2 & NOx): 40 TPY

May 16 2008 PM-2.5 NSR Rule
Summary of Requirements (Contd.)

* **Condensable PM**

  - Effective 1/1/2011, Condensibles must be included in applicability and modeling

- **Offsets**

  - Inter-pollutant trading allowed for offsets (not for netting) (Reduction in SO2 to offset PM2.5 increases)
  - PM-2.5:PM-2.5 @ **1:1**
  - SO2:PM-2.5 @ **40:1**
  - Different ratios optional with public input

PSD REQUIREMENTS for PM-2.5

(Review of Applications in 8 Attainment Counties under PSD Delegation)

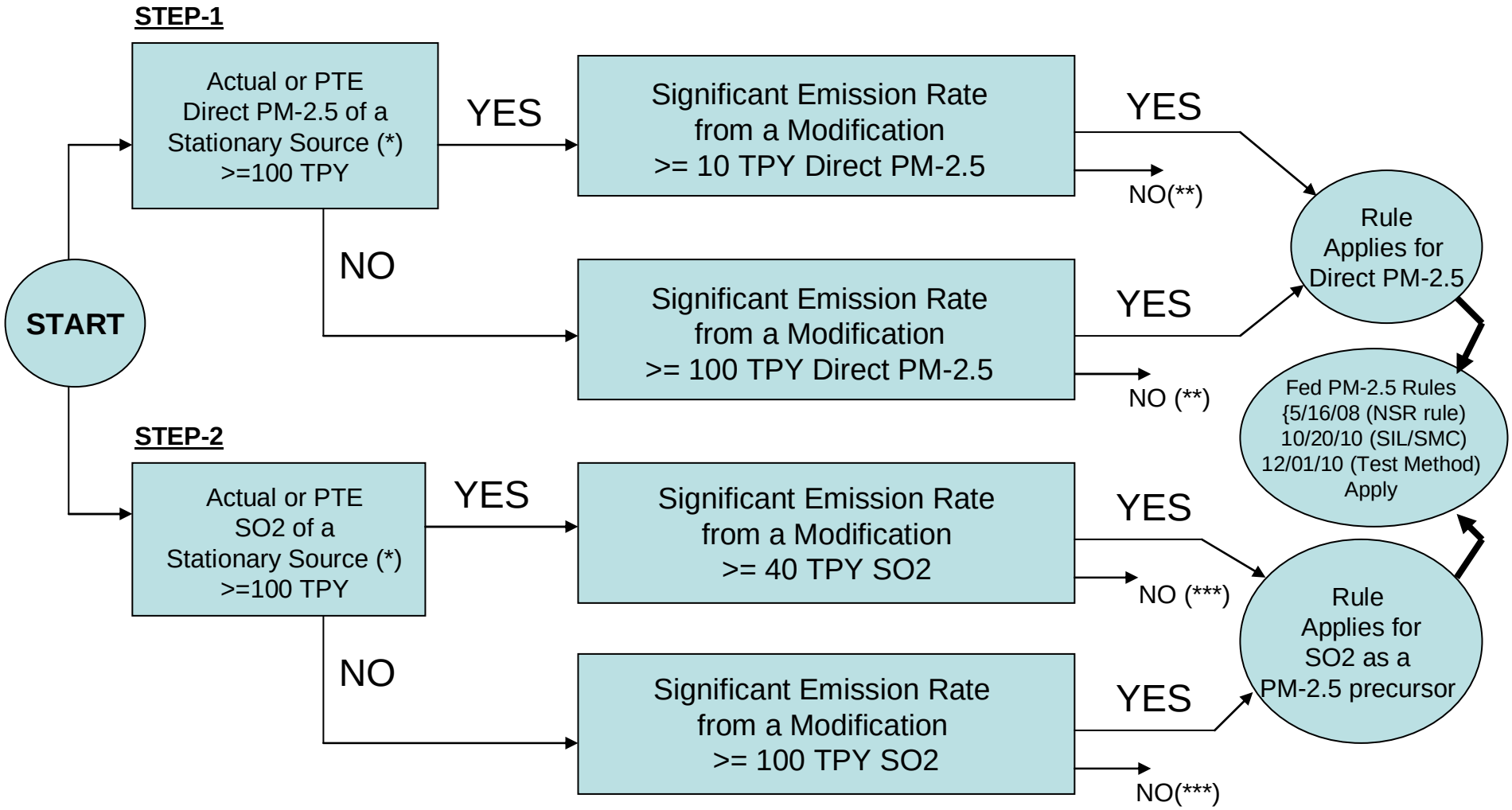
	AFTER July 15 2008
Major Source Triggers	100 TPY/250 TPY of Direct PM-2.5 (Include condensibles)
Modification Triggers	10 TPY (Direct PM-2.5) (Include condensibles) 40 TPY (SO2 and NOx)
BACT	Direct PM-2.5, (SO2 and NOx as applicable)
Increments, SILs and SMCs	Use EPA's 10/20/2010 Final Rule
Ambient Air Quality Analysis	Include condensibles, Consider precursors (SO2 and NOx impacts)
Preconstruction Monitoring	Required, but exempt on a case-by-case basis using SMC

NNSR REQUIREMENTS for PM-2.5

(Review of Applications in 13 Nonattainment Counties under Appendix S)

		After July 15 2008
Applicability		100 TPY (Direct PM2.5)
Modification Triggers		10 TPY (Direct PM-2.5) 40 TPY (SO2)
Netting		Follow Netting procedures of 40 CFR 51 Appendix S (10-year look-back for baseline and Actual to Future Actual/Potential Applicability Test)
Condensibles		Include after 1/1/2011

CHART-1
APPLICABILITY OF FEDERAL PM-2.5 NON-ATTAINMENT NSR RULE UNDER APPENDIX S TO THE EXISTING SOURCES
(Follow Step 1 and Step 2)



(*): See the definition on Slide 2 below
(**) Rule does not apply for Direct PM-2.5. Go to Step-2
(***) Rule does not apply for SO2 as a PM-2.5 Precursor

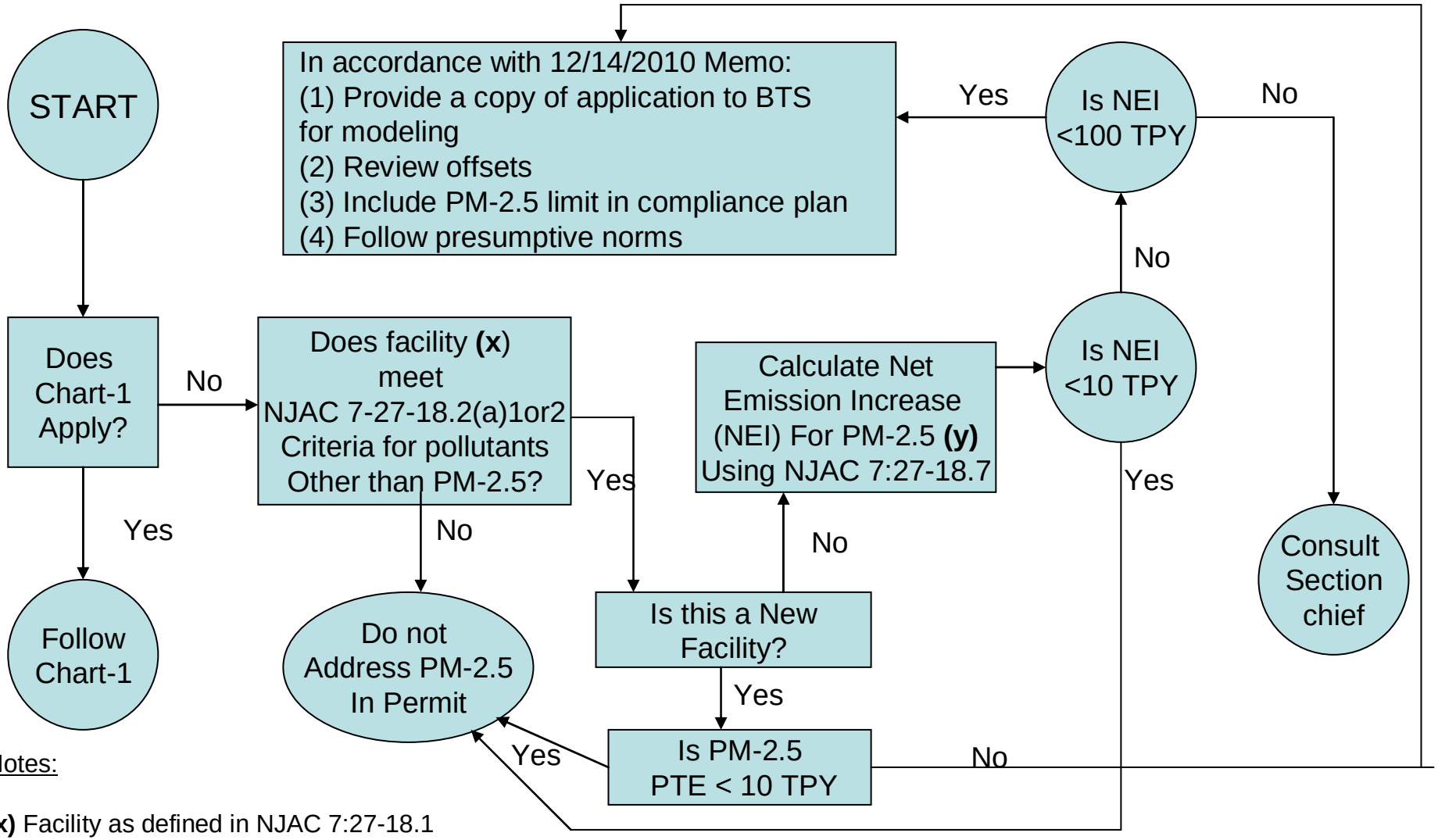
Verbally approved by EPA Region II

Sources emitting 10 to 100 TPY of PM-2.5 (December 14 2010 Memo from AD John Preczewski)

- Direct PM-2.5 emissions only. Do not consider precursor (SO2)
- Direct PM-2.5 should include Condensibles
- Address offsets (1:1), as applicable
- Establish PM-2.5 limits and prepare compliance plans
- Testing of PM-2.5 using presumptive norms for PM-10 testing

CHART-2

APPLICABILITY OF 12/14/2010 MEMO



Notes:

(x) Facility as defined in NJAC 7:27-18.1

(y) Include condensible to the direct PM-2.5 emissions. However, do not consider precursors of PM-2.5 such as SO2

NJDEP IMPLEMENTATION PLAN FOR NJ'S PM-2.5 NON-ATTAINMENT NSR

- EPA rules allow 3 years to revise NJ's NNSR rules and SIP
- NJ Plans to revise Sub-18, 22 and 8 to include PM-2.5 requirements
- Continue reviewing non-attainment NSR requirements for PM-2.5 under Appendix S
- Continue using our Interim Permitting and Modeling Procedures (12/14/2010 Memo) for sources emitting 10 TPY-100 TPY

Modeling for Sources Emitting Less than 100 TPY

(12/14/2010 Memo)

Alan Dresser

Interim $PM_{2.5}$ Memo Modeling Procedures

- ***Emissions modeled***
  = direct $PM_{2.5}$ (no modeling SO_2 or NOx precursors)

- ***$PM_{2.5}$ Modeling Should Follow EPA Guidance Memos***:

  Model Clearinghouse Review of Modeling Procedures for Demonstrating Compliance with PM-2.5 NAAQS, from Tyler Fox, February 26, 2010,

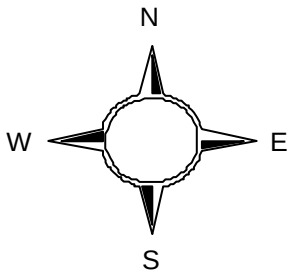
  Modeling Procedures for Demonstrating Compliance with PM-2.5 NAAQS, from Stephen D. Page, March 23, 2010.

- **$PM_{2.5}$ Significant Impact Levels (SILs):**
  annual = 0.3 ug/m^3, 24-hour = 1.2 ug/m^3

- **$PM_{2.5}$ PSD Increment consumption after minor source baseline date set**
  (first PSD permit appl. received after October 20, 2011)

New Jersey Air PM-2.5 Monitoring Network

2007 – 2009
Monitoring Data
Has No NAAQS
Violations



Interim $PM_{2.5}$ Memo Modeling Procedures

If located in a EPA $PM_{2.5}$ attainment or nonattainment area with <u>monitored values below</u> the $PM_{2.5}$ NAAQS

- **Modeling source and add background, compare to NAAQS**
- **When impacts above SILs, also model other nearby $PM_{2.5}$ sources (<10 km)**

If located in a EPA $PM_{2.5}$ nonattainment area with representative <u>monitored values above</u> the $PM_{2.5}$ NAAQS

- **Keep modeled impact below $PM_{2.5}$ SILs (reduce $PM_{2.5}$ emissions, increase stack height, etc.)**
- **If above $PM_{2.5}$ SILs, obtain emission offsets to produce equivalent reduction in ambient impacts**

Stack Emission Testing of PM-2.5

(12/21/2010 Final rule)

Mike Klein

PM2.5 Stack Testing Methods

Revised RM201A and RM202

Methods for Measurement of Filterable PM10 and PM2.5 and Measurement of Condensable Particulate Matter Emissions from Stationary Sources

- • On December 1, 2010, EPA revised two test methods for measuring particulate matter (PM) emissions from stationary sources.
- • One of the revised methods, called Method 201A, will provide the capability to measure the mass of filterable particulate matter that is equal to or less than 2.5 micrometers in diameter (PM2.5).
- • The second revised method, called Method 202, will make a more accurate measurement of condensable particulate matter. Condensable particulate matter (CPM) forms from condensing gases or vapors. It is a common component of both PM10 (particulate matter equal to or less than 10 micrometers in diameter) and PM2.5.
- • The combination of results from Methods 201A and 202 will allow one to determine both PM2.5 and PM10 emissions, which include the filterable component determined from Method 201A and the CPM determined from Method 202.

Source: EPA Fact Sheet on revised methods

Methods for Measurement of Filterable PM10 and PM2.5 and Measurement of Condensable Particulate Matter Emissions from Stationary Sources

BACKGROUND

- • The existing Method 201A was developed prior to 1990 using one component of a five-component measurement device which separated particles into six size classes.
- • The component used by the existing Method 201A provides for two size classes, those larger than 10 micrometers in diameter and those equal to or smaller than 10 micrometers in diameter.
- • The revised Method 201A adds a second component of the five-component device which provides for an additional size class. The three size classes provided by the proposed method include PM larger than 10 micrometers in diameter, PM equal to or smaller than 10 micrometers in diameter but larger than 2.5 micrometers in diameter, and PM equal to or smaller than 2.5 micrometers in diameter.
- • The revised Method 202 eliminates most of the hardware and analytical options in the existing method, thereby increasing the precision of the method and improving the consistency in the measurements obtained between source tests performed under different regulatory authorities.

Source: EPA Fact Sheet on revised methods

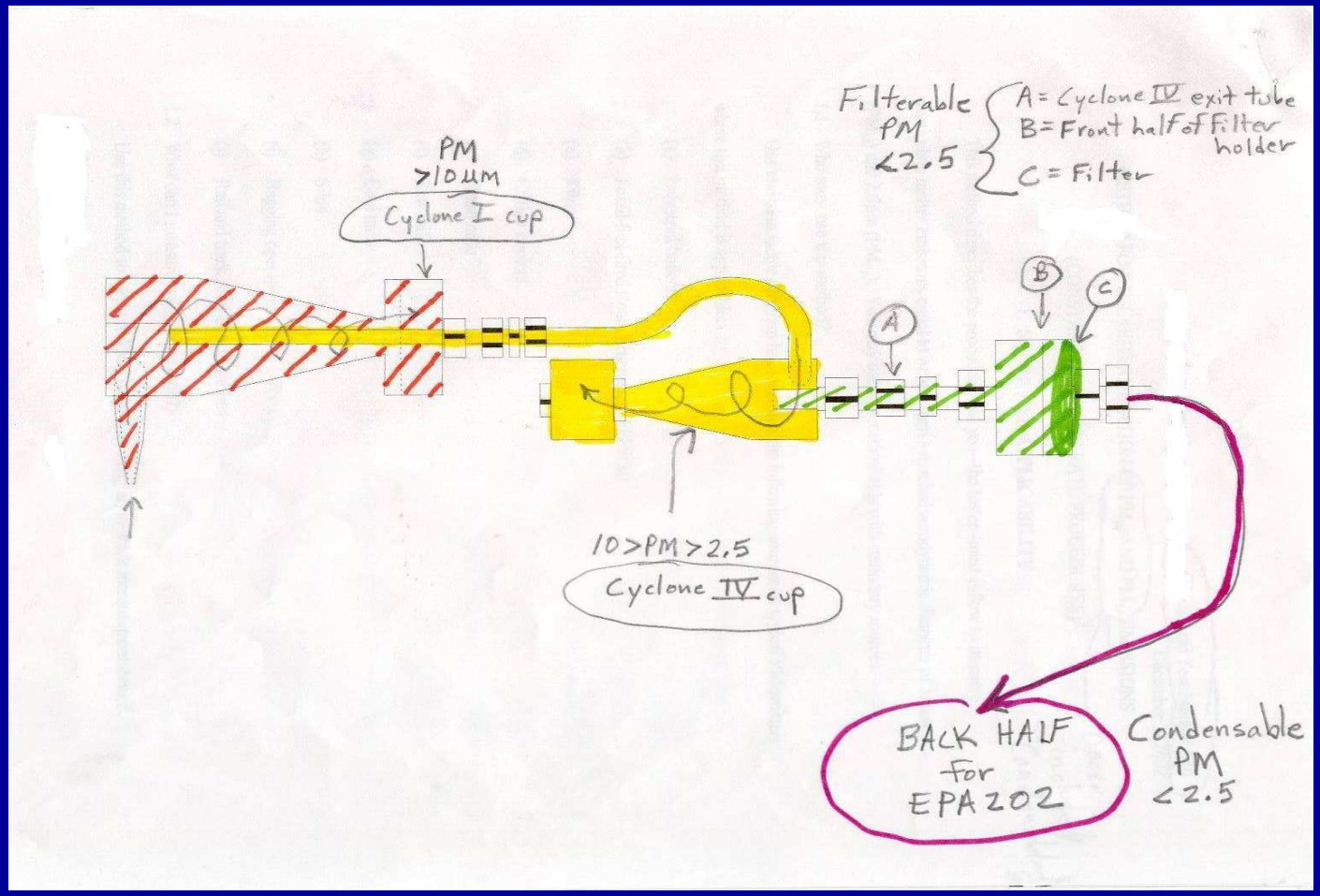
Method 201A - Filterable PM Sizing

(Photos Courtesy of Ron Myers, USEPA)

- Method 201A (1990)

- Method 201A (2010)

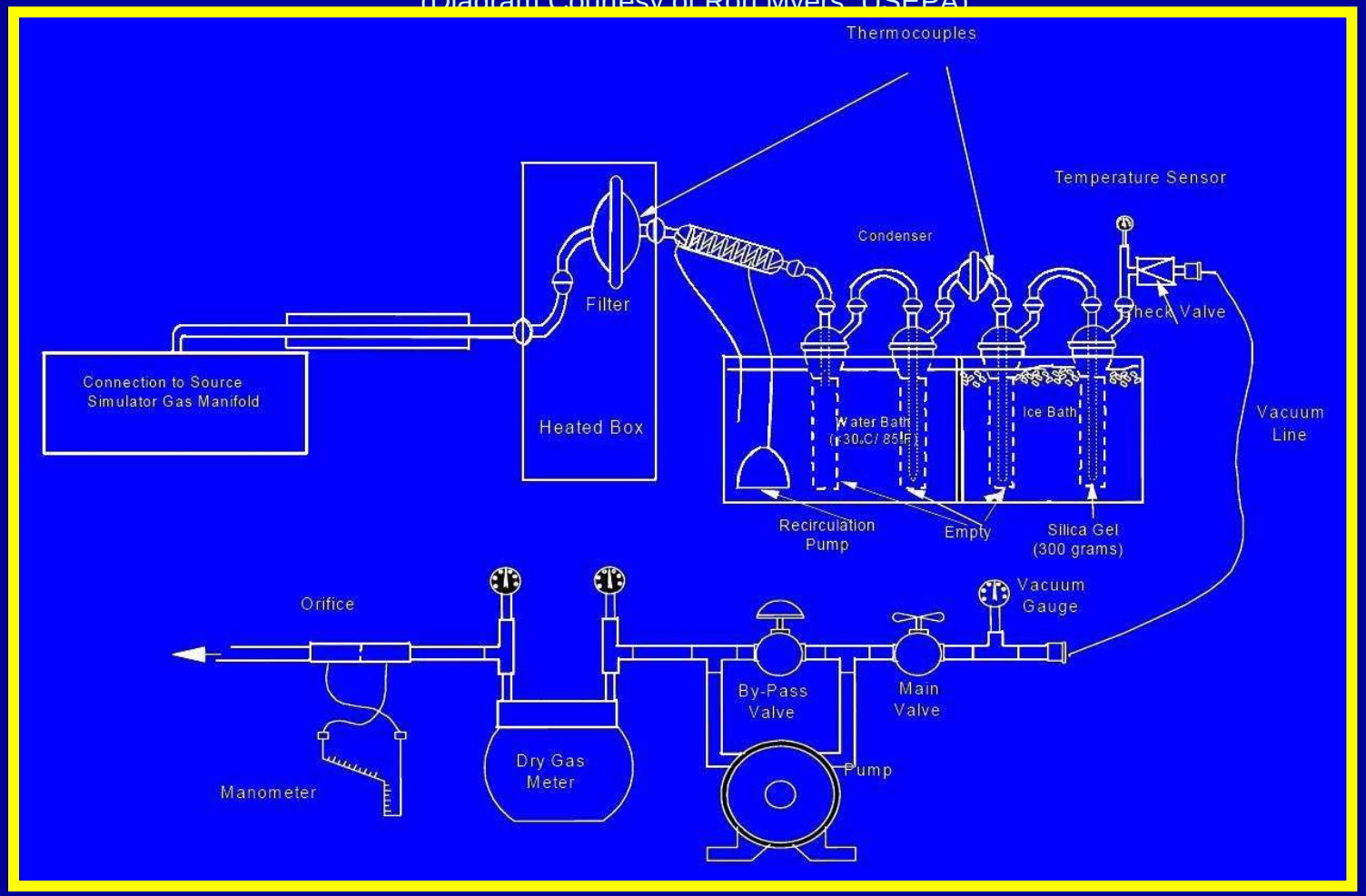
Method 201A - Filterable PM Sizing



Drawing courtesy of Joe Jackson, AirNova, Inc.

Method 202 - Dry Impinger Train Layout

(Diagram Courtesy of Ron Myers, USEPA)



RM201A - Issues

- Filterable PM sizing still cannot be done in stacks with entrained water droplets with revised RM201A. For these stacks, one must determine “worst-case” PM2.5 or PM10 by measuring the total filterable catch (ie: by NJATM1) and assuming the total catch is all PM2.5 or PM10, in conjunction with CPM measurements by RM202. EPA is working on a PM sizing method for moisture saturated stacks.

- Stack diameter is a limiting factor in using RM201A for PM sizing. The sampling head can not block more than 6% of the stack area. For the typical commercially available equipment, this means sampling with the combined PM2.5/PM10 head is limited to stacks greater than ~26". If using just the PM2.5 head, sampling is limited to stacks >18.8". This could mean running separate test trains to measure PM2.5 and PM10 for stacks that fall between.

- Filterable PM sizing can be used at stack temperatures up to 1000F using bolted assemblies with "break-away" bolts and up to 2500F using specialty high-temperature alloys. This is an improvement over the prior version of RM201A (which we used up to ~800F.)

RM202 - Issues

- Prior version could produce results of acceptable precision for most sources if performed carefully and consistently. However, there was the potential for "artifact" formation in the wet impingers in some cases.
- Current version reduces the potential for artifact formation by using dry impingers.
- In most cases, we expect similar or lower results using the revised method for most sources.
- However, there may be cases where results could be higher depending on the relative emissions of filterable and CPM emissions from the source, based on the method revision.