Challenges in Determination of Control Efficiencies for PM Condensable

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INTRODUCTION

- MN rule
  - Started in 1980s
  - Permitted facilities submit an annual emission inventory (EI) report
  - Charge fees on PM10-PRI emissions
- EPA
  - Beginning with the 2008 NEI
  - Separate PM-FIL (including PM10-FIL and PM25-FIL) and PM-CON

INTRODUCTION

- MN EI
  - Started in the 2011 EI
    - Due to the development of the EI system
  - Separate emissions for PM-FIL and PM-CON
    - Collect from **large facilities**

      - 85% of PM10-PRI emissions from point sources
    - Estimate for small facilities based on PM10-PRI emissions

INTRODUCTION

- Challenges in PM-CON emissions
  - Process-specific emissions
    - Permitting program - not reference estimation of PM-CON
  - Generic and state-specific emission factors
  - State-specific speciation factors
    - Ratios of PM-CON/PM10-FIL
    - EPA Augmentation Tool
    - Uncontrolled processes
  - PM-CON control efficiencies
    - Few process-specific
    - No generic and state-specific

METHODS

- 2011 to 2013 Emission Inventories
  - Assume control PM10-FIL, not PM-CON
    - Emission factors – fine
    - Speciation factors?

$$(E_{PM10-FIL})_{Controlled} \times \left(\frac{PM-CON}{PM10-FIL}\right)_{Uncontrolled}$$

Controlled PM-CON
PM-CON and PM10-FIL have the same control Efficiency

METHODS

- 2014 Emission Inventory

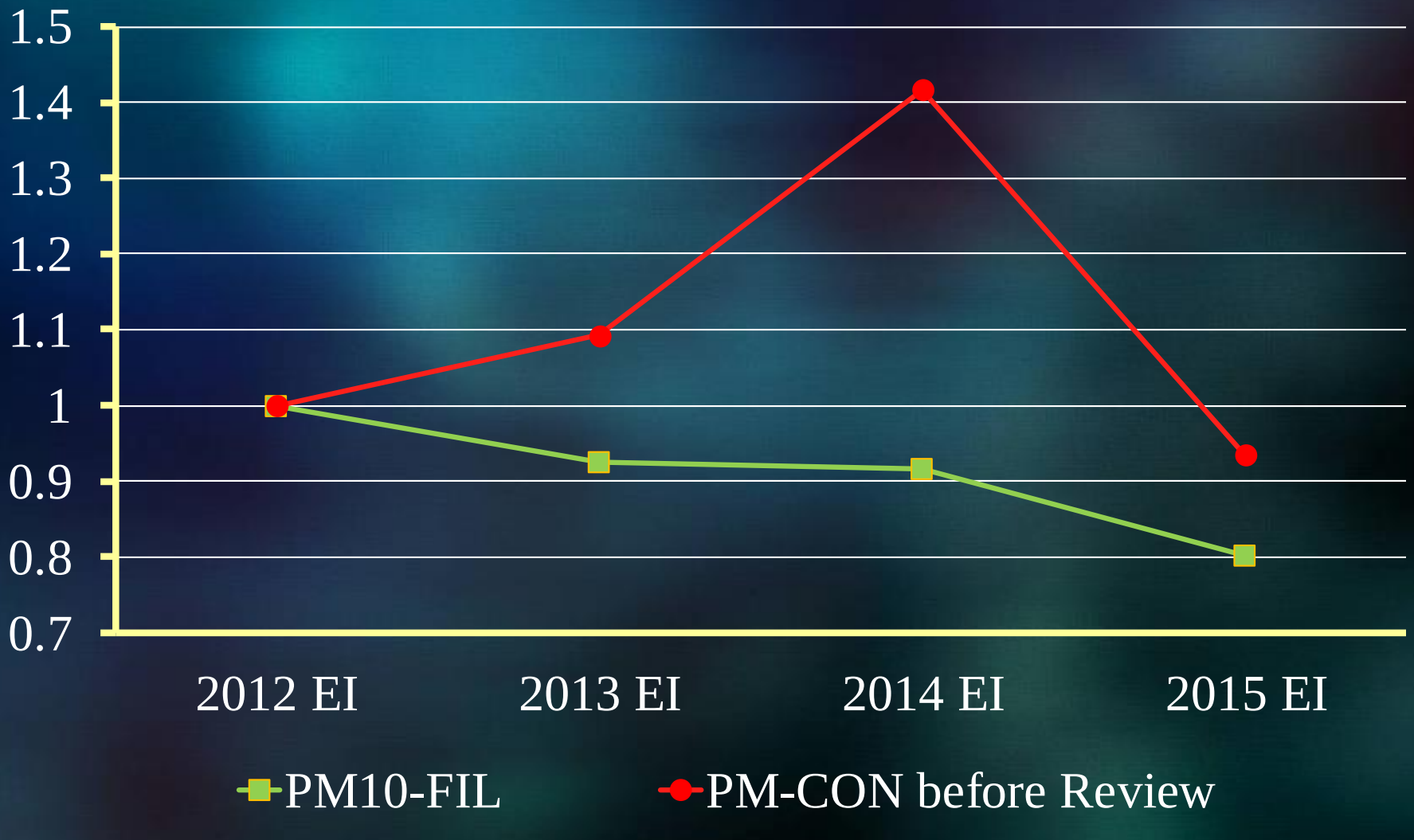
$$(E_{PM-CON})_{Uncontrolled}$$

$$= (E_{PM10-FIL})_{Uncontrolled} \times \left(\frac{PM-CON}{PM10-FIL}\right)_{Uncontrolled}$$

$$(E_{PM10-FIL})_{Uncontrolled}$$

$$= (E_{PM10-FIL})_{Controlled} \div (1 - CE_{PM10-FIL})$$

PM Emissions Change with Years for Large Facilities - Using Emissions in 2012 EI as the Baseline



Explanation of PM-CON emissions (Ton) change with years for large facilities before review

Inventory	PM10-FIL	PM-CON Total	PM-CON Calculated with Speciation
2012 EI	16,199	4,331	419
2013 EI	14,987	4,733	838
2014 EI	14,854	6,134	2,620
2015 EI	12,974	4,050	1,031

METHODS

- 2015 Emission Inventory
  - Determine types of control devices that could control PM-CON
    - 106 – EPA list
      - 10 – Definitely, assume controlled the same as for FIL
      - 14 - Dependent on operating conditions
  - Case-by-Case review for PM-CON control efficiencies
    - 2014 EI and 2015 EI
    - Estimated with non-process-specific information
    - Focused on controlled with any devices in 14

RESULTS

- 1076 Processes
  - – could have PM-CON Control
    - 600 in 2014
    - 476 in 2015

Facility awareness

Ex: Slag mineral wool manufacturing plant

From speciation factor to stack testing

1,740 Ton reduction

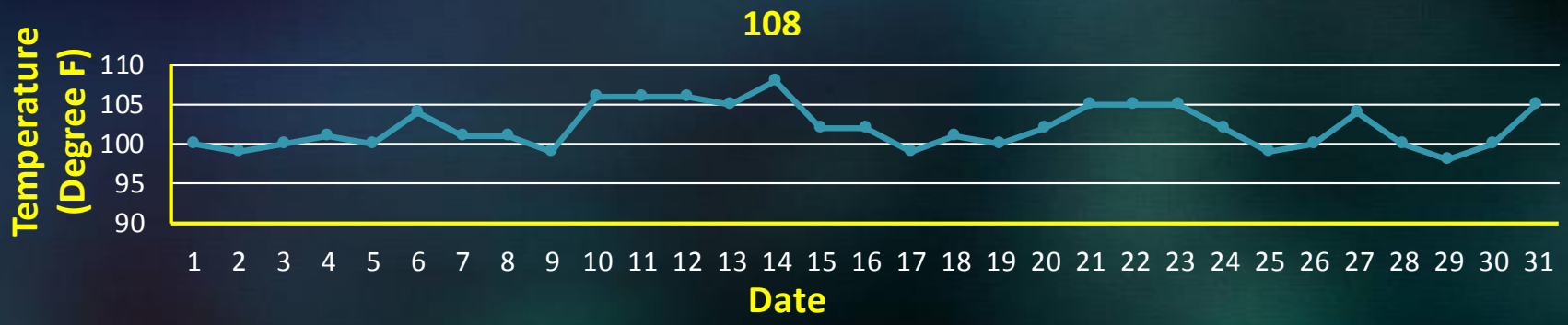
RESULTS

- 13 processes in each year with definite PM-CON control
- Used 10 out of 14 types of control devices
- 1050 Processes need case-by-case review
  - Resource restriction

RESULTS

- 141 Processes selected
  - PM-CON > 0.88 tons
  - Exhaust temperature
    - < = 108°F controlled same as the lower efficiency of PM10-FIL and PM25-FIL – 76 processes
    - > 108°F no control – 55 processes

July highest temperature in MN



SCCs and number of processes with PM-CON control

SCC	Short Description	2015 EI	2014 EI
30200503	Feed & Grain Terminal Elevators /Cleaning	1	
30400224	Secondary Metals /Copper /Charge with Brass and Bronze: Electric Induction Furnace	3	2
30400303	Secondary Metals /Grey Iron Foundries /Electric Induction Furnace	4	7
30400310	Secondary Metals /Grey Iron Foundries /Inoculation	2	2
30400315	Secondary Metals /Grey Iron Foundries /Charge Handling	4	5
30400318	Secondary Metals /Grey Iron Foundries /Pouring, Cooling	1	2
30400320	Secondary Metals /Grey Iron Foundries /Pouring/Casting	4	4
30400321	Secondary Metals /Grey Iron Foundries /Magnesium Treatment	1	3
30400325	Secondary Metals /Grey Iron Foundries /Castings Cooling	3	3
30400331	Secondary Metals /Grey Iron Foundries /Casting Shakeout	14	14
30405101	Secondary Metals /Metallic Lead Products /Ammunition		5
30400708	Secondary Metals /Steel Foundries /Pouring/Casting	1	
30400711	Secondary Metals /Steel Foundries /Cleaning	1	
Total		**39**	**47**

RESULTS

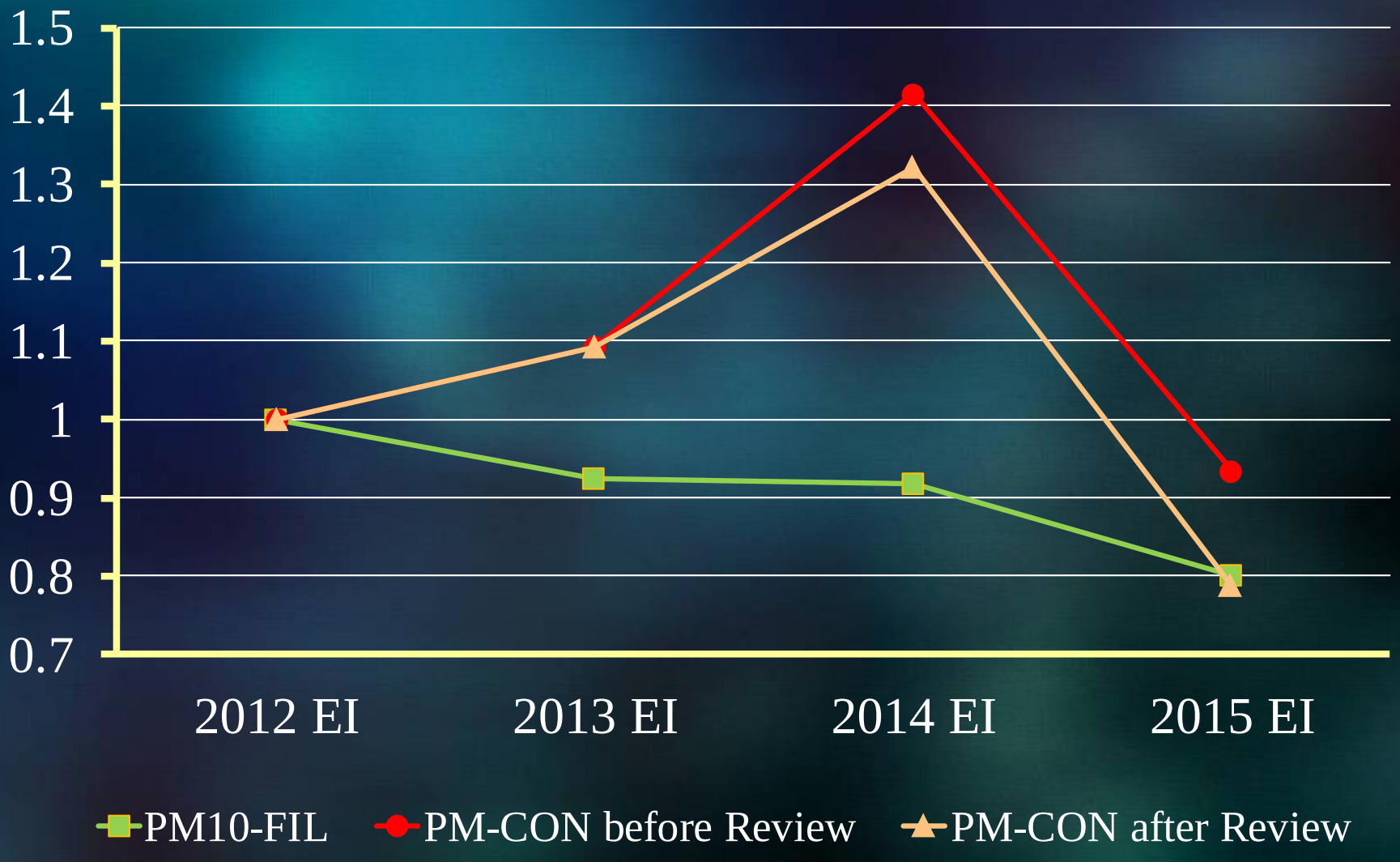
- Applicability of speciation factors
  - SCC 30400711
    - PM Augmentation Tool - 2.682 as PM-CON/PM10-FIL
    - Process removing loose flash from steel and iron castings with blasting of abrasive materials – No PM-CON

RESULTS

Reduction of PM-CON emissions (Ton) from the case-by-case review

Emission Inventory Year	Original Emissions	Emissions After Review	Emission Reduction
2014	449	40	409
2015	678	40	638

PM Emissions Change with Years for Large Facilities - Using Emissions in 2012 EI as the Baseline



SUMMARY

- Speciation factors need to be used for uncontrolled processes
- A careful review is needed when applying speciation factors to processes with PM control devices
- Case-by-case review yielded reductions of PM-CON emissions in MN
- Review results will be carried over to the future

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