Wisconsin
Department of Natural Resources

# Air Management Study Group
## Quarterly Meeting

Madison
August 27, 2015

# DNR Strategic Alignment

**Andy Stewart**
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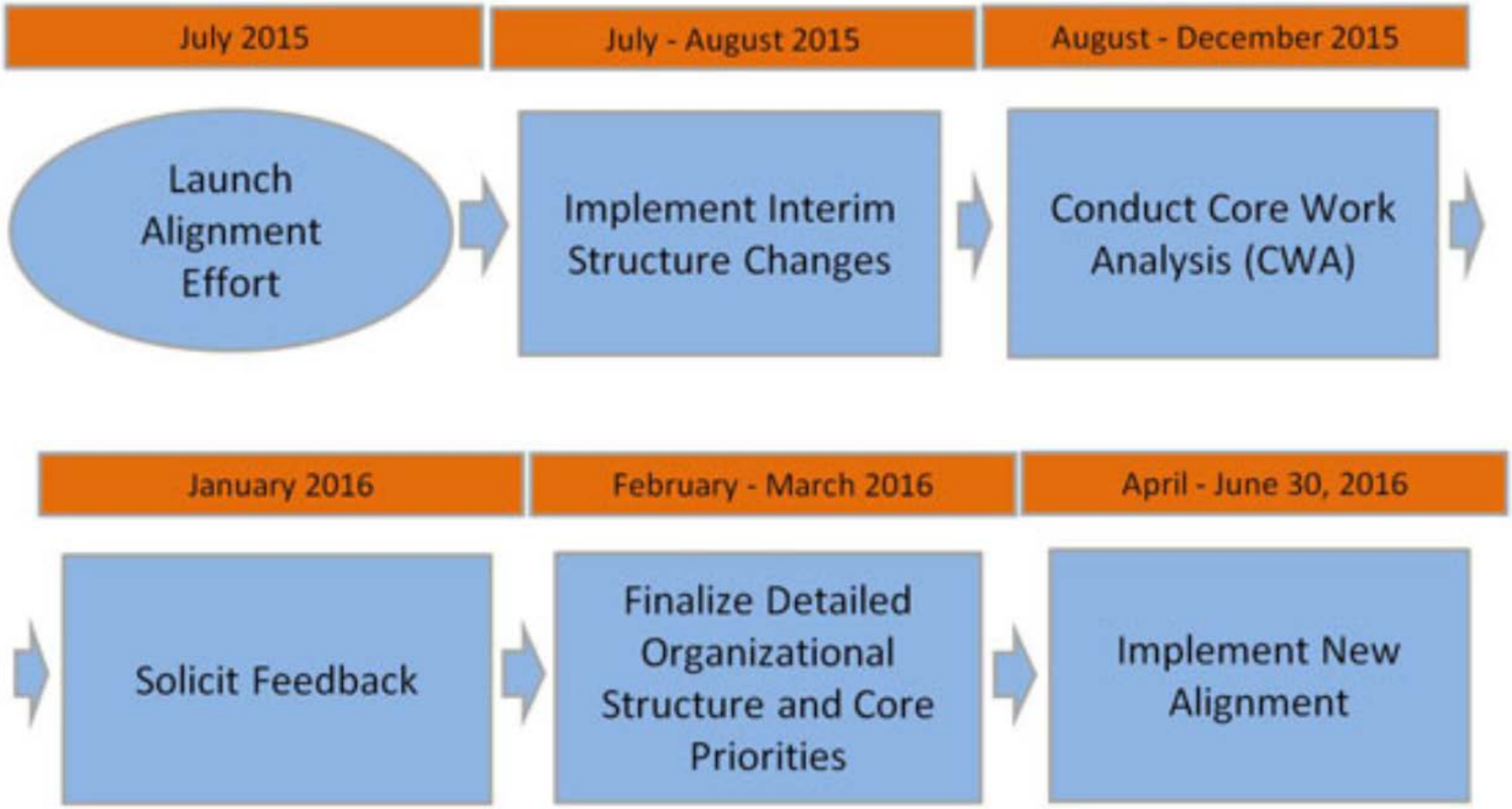
WDNR

Wisconsin Department of Natural Resources

# Interim Structure

# Alignment Process



# Update on Monitoring Data and $SO_2$ Implementation

**Gail Good**
Air Monitoring Section Chief and Acting Air Director

**David Bizot**
Regional Pollutant and Mobile Source Section Chief

Air Management Program
WDNR

Wisconsin Department of Natural Resources

**Top Four Ozone Concentrations - as of August 17, 2015**

| site | SITE ID | 1st high | | 2nd high | | 3rd high | | 4th high | | Current 2013-2015 "design value" |
|---|---|---|---|---|---|---|---|---|---|---|
| | | conc (ppb) | date | conc (ppb) | date | conc (ppb) | date | conc (ppb) | date | |
| BAD RIVER TRIBAL SCHOOL - ODANAH | 550030010 | 63 | 05/23/2015 | 60 | 05/24/2015 | 59 | 05/03/2015 | 57 | 05/02/2015 | 57 |
| GREEN BAY - UW | 550090026 | 77 | 05/07/2015 | 66 | 05/02/2015 | 66 | 05/03/2015 | 65 | 05/23/2015 | 65 |
| COLUMBUS | 550210015 | 64 | 05/02/2015 | 64 | 05/23/2015 | 64 | 05/28/2015 | 64 | 06/09/2015 | 66 |
| MADISON - EAST | 550250041 | 67 | 06/09/2015 | 64 | 05/02/2015 | 64 | 05/23/2015 | 64 | 06/02/2015 | 65 |
| HORICON WILDLIFE AREA | 550270001 | 71 | 06/09/2015 | 68 | 05/07/2015 | 67 | 05/23/2015 | 66 | 05/02/2015 | 68 |
| NEWPORT PARK | 550290004 | 79 | 05/07/2015 | 76 | 07/24/2015 | 74 | 07/11/2015 | 74 | 07/12/2015 | 69 |
| EAU CLAIRE - DOT SIGN SHOP | 550350014 | 64 | 05/02/2015 | 64 | 06/09/2015 | 61 | 05/03/2015 | 59 | 04/16/2015 | 60 |
| FOND DU LAC | 550390006 | 69 | 06/09/2015 | 68 | 05/23/2015 | 67 | 05/07/2015 | 65 | 05/02/2015 | 65 |
| POTAWATOMI | 550410007 | 66 | 05/03/2015 | 64 | 05/02/2015 | 64 | 05/28/2015 | 63 | 05/07/2015 | 61 |
| JEFFERSON - LAATSCH | 550550009 | 68 | 06/09/2015 | 65 | 05/07/2015 | 65 | 05/23/2015 | 65 | 05/28/2015 | 68 |
| CHIWAUKEE PRAIRIE STATELINE | 550590019 | 80 | 07/10/2015 | 77 | 05/07/2015 | 75 | 07/05/2015 | 70 | 05/02/2015 | 73 |
| KENOSHA - WATER TOWER | 550590025 | 71 | 07/05/2015 | 68 | 05/07/2015 | 68 | 05/23/2015 | 67 | 05/02/2015 | 68 |
| KEWAUNEE | 550610002 | 76 | 07/11/2015 | 75 | 05/07/2015 | 75 | 07/12/2015 | 70 | 07/24/2015 | 67 |
| LA CROSSE - DOT BUILDING | 550630012 | 64 | 05/02/2015 | 64 | 05/03/2015 | 62 | 06/09/2015 | 61 | 05/23/2015 | 61 |
| MANITOWOC - WDLND DUNES | 550710007 | 80 | 07/24/2015 | 78 | 07/10/2015 | 77 | 05/07/2015 | 77 | 07/11/2015 | 72 |
| LAKE DUBAY | 550730012 | 67 | 05/02/2015 | 65 | 05/03/2015 | 64 | 04/16/2015 | 63 | 05/28/2015 | 63 |
| MILWAUKEE - SIXTEENTH ST. HEALTH CENTER | 550790010 | 66 | 05/07/2015 | 64 | 07/05/2015 | 63 | 06/09/2015 | 62 | 05/23/2015 | 61 |
| MILWAUKEE - SER DNR HDQRS | 550790026 | 70 | 07/10/2015 | 67 | 05/07/2015 | 66 | 07/11/2015 | 65 | 07/05/2015 | 66 |
| BAYSIDE | 550790085 | 74 | 05/07/2015 | 71 | 07/10/2015 | 68 | 07/11/2015 | 66 | 05/02/2015 | 68 |
| APPLETON - AAL | 550870009 | 69 | 05/07/2015 | 67 | 07/11/2015 | 66 | 05/23/2015 | 66 | 05/28/2015 | 67 |
| GRAFTON | 550890008 | 76 | 05/07/2015 | 71 | 07/10/2015 | 71 | 07/11/2015 | 69 | 05/02/2015 | 70 |
| HARRINGTON BEACH PARK | 550890009 | 77 | 07/10/2015 | 75 | 05/07/2015 | 69 | 07/05/2015 | 69 | 07/24/2015 | 69 |
| RACINE - PAYNE AND DOLAN | 551010020 | 72 | 07/10/2015 | 69 | 05/07/2015 | 68 | 07/05/2015 | 68 | 07/24/2015 | |
| BELOIT - CONVERSE | 551050030 | 70 | 06/09/2015 | 67 | 06/02/2015 | 64 | 05/02/2015 | 64 | 05/07/2015 | 67 |
| DEVILS LAKE PARK | 551110007 | 67 | 05/02/2015 | 64 | 05/23/2015 | 63 | 04/16/2015 | 63 | 04/19/2015 | 63 |
| SHEBOYGAN - KOHLER ANDRAE | 551170006 | 89 | 07/24/2015 | 85 | 07/10/2015 | 79 | 05/07/2015 | 76 | 07/11/2015 | 75 |
| SHEBOYGAN - HAVEN | 551170009 | 76 | 05/07/2015 | 70 | 06/09/2015 | 69 | 05/02/2015 | 65 | 07/11/2015 | |
| TROUT LAKE | 551250001 | 69 | 07/25/2015 | 65 | 05/02/2015 | 65 | 05/28/2015 | 60 | 04/16/2015 | 60 |
| LAKE GENEVA | 551270005 | 73 | 05/28/2015 | 68 | 05/07/2015 | 67 | 06/09/2015 | 67 | 06/10/2015 | 69 |
| WAUKESHA - CLEVELAND AVE. | 551330027 | 70 | 05/23/2015 | 67 | 05/07/2015 | 66 | 06/09/2015 | 66 | 07/11/2015 | 63 |

# $SO_2$ Data Requirements Rule – Changes to Final Rule

| Rule Feature | Final Rule | Proposed Rule |
|---|---|---|
| Applicability threshold | 2000 tpy SO2 (nationally) (Clarifies that, generally, does not apply to sources in designated nonattainment areas) | 1000 tpy in CBSAs<br>2000 tpy elsewhere |
| Emissions coverage (based on 2011 data) | 89% of point sources nationally | 90% |
| Options for characterization | Monitoring, modeling, or option to limit emissions to less than 2000 tpy by 1/13/17 | Monitoring or modeling |

# $SO_2$ Data Requirements Rule – Changes to Final Rule

| Rule Feature | Final Rule | Proposed Rule |
|---|---|---|
| Deadline for selecting option | July 1, 2016 | Jan 15, 2016 |
| If new monitor not operational by January 1, 2017 | Area remains subject to monitoring requirements | Area "moved" to modeling pathway |
| Ongoing data requirements | Monitoring: May discontinue operation if below 50% of NAAQS during first or second 3-year period, thereafter must meet 40 CFR 58.14<br><br>Modeling: Use of actual emissions for attainment designation will require annual review of emissions changes and the potential need to conduct updated modeling. | Monitoring: Two options for discontinuing operation:<br>1) 50% of NAAQS<br>2) 80% of NAAQS<br><br>Modeling: Use of actual emissions for attainment designation will require updated modeling every 3 years. |

Wisconsin Department of Natural Resources

## Top Four $SO_2$ Concentrations - as of August 24, 2015

**Note: 99th percentile value is the fourth highest**

| | | 1st high | | 2nd high | | 3rd high | | 4th high (99% value) | | Current 2013-2015 "design value" |
|---|---|---|---|---|---|---|---|---|---|---|
| site | SITE ID | conc (ppb) | date | conc (ppb) | date | conc (ppb) | date | conc (ppb) | date | |
| GREEN BAY - EAST HIGH | 550090005 | 73.8 | 03/31/2015 | 71.7 | 05/01/2015 | 71.4 | 05/28/2015 | 68.9 | 02/16/2015 | 75 |
| MADISON - EAST | 550250041 | 3 | 02/22/2015 | 3 | 03/19/2015 | 2 | 02/18/2015 | 2 | 02/28/2015 | 7 |
| HORICON WILDLIFE AREA | 550270001 | 6 | 08/06/2015 | 4 | 01/28/2015 | 4 | 03/19/2015 | 4 | 02/08/2015 | 6 |
| POTAWATOMI | 550410007 | 8 | 03/24/2015 | 7 | 05/14/2015 | 6 | 04/16/2015 | 4 | 03/21/2015 | 6 |
| MILWAUKEE - SER DNR HDQRS | 550790026 | 23 | 04/01/2015 | 15 | 02/20/2015 | 14 | 03/29/2015 | 13 | 03/28/2015 | 21 |
| RHINELANDER TOWER | 550850996 | 146 | 04/12/2015 | 141 | 03/15/2015 | 141 | 05/07/2015 | 137 | 08/22/2015 | 151 |

# DNR Policy for Regulating $PM_{2.5}$

**Kristin Hart**
Permits & Stationary Source Modeling Section Chief

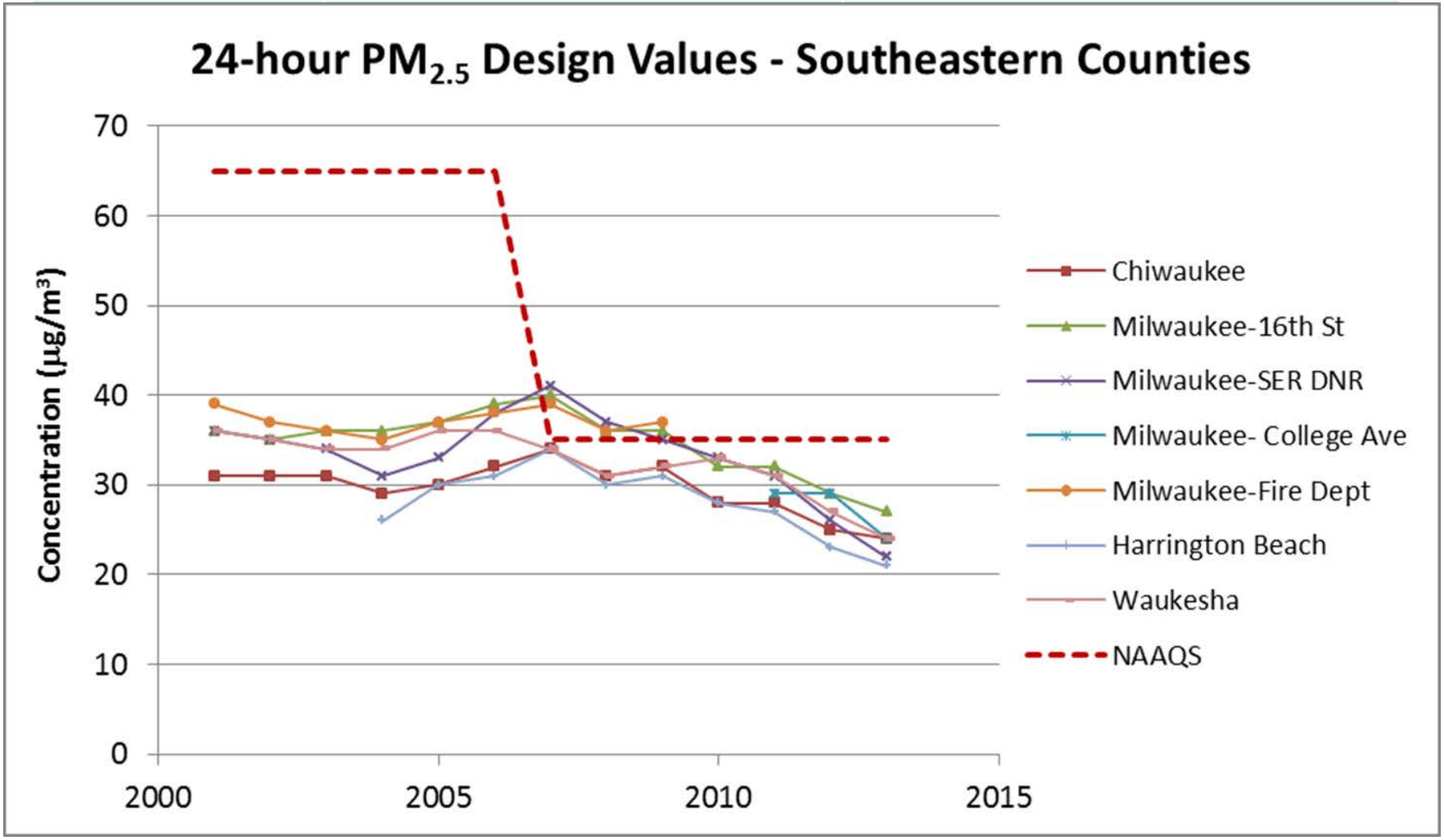
**John Roth**
Stationary Source Modeling Team Leader

Bureau of Air Management
WDNR

# $PM_{2.5}$ Overview

- $PM_{2.5}$ federal and state ambient standard
- Ambient air concentrations are decreasing
- Ambient air concentrations mainly due to secondarily formed compounds
- Traditional treatment of direct emissions, i.e. air permit
- Difficult to quantify direct emissions

# $PM_{2.5}$ Trends in Ambient Concentrations



# $PM_{2.5}$ Overview

| | Fine Mode Particulate | Coarse Mode Particulate |
|---|---|---|
| Size range:<br>(aerodynamic diameter) | < 1-3 µm | > 1-3 µm to 100 µm |
| Formation mechanism: | Chemical reaction<br><br>Nucleation<br><br>Condensation<br><br>Coagulation | Mechanical disruption<br>(crushing, grinding, abrasion)<br><br>Evaporation of sprays<br><br>Suspension of dust<br>(e.g. fugitive dust) |
| Sources: | Fuel combustion<br><br>Secondary formation from SO2/NOx in atmosphere<br><br>High temperature industrial processes<br>(e.g. smelters, steel mills) | Resuspension of industrial dust<br>(e.g. crushing, drying of powders such as whey, spray coating)<br><br>Suspension of disturbed soil<br>(e.g. fugitive dust from unpaved roads, agriculture)<br><br>Construction/demolition |

# $PM_{2.5}$ Overview

| | Fine Mode Particulate | Coarse Mode Particulate |
|---|---|---|
| Atmospheric half-life: | Days to weeks | Minutes to hours |
| Travel distance from source: | 100s to 1000s of km | 1s to 10s of km |
| Distribution in ambient air: | Uniformly distributed over urban areas and larger regions<br><br>Not easily traced back to individual sources | Unevenly distributed over urban areas<br><br>Localized effects |
| Atmospheric removal mechanism: | Primarily by forming cloud droplets and falling out as rain<br><br>Dry deposition slow | Gravitational settling<br><br>Inertial impaction |

# Changing Our $PM_{2.5}$ Regulatory Approach

- $PM_{2.5}$ permitting of stationary sources has been ineffective in reducing ambient concentrations
- Difficulty determining emissions, modeling compliance, and assessing compliance (stack testing)
- EPA released their dispersion modeling guidance update

# $PM_{2.5}$ in Air Permits

- Sources are required to meet standard in code
- Dispersion modeling using traditional PM rates is scientifically inaccurate
- Dispersion modeling is not *required* for most permit actions, i.e., DNR does not model VOC emissions against ozone standard
- Propose to correct methodology for estimating emissions and to not model direct $PM_{2.5}$

# Proposed $PM_{2.5}$ Policy

- Direct $PM_{2.5}$ emissions from fuel combustion or high-temperature processes (e.g. metal melting)
- Weight of evidence approach used to determine the impact of direct $PM_{2.5}$ emissions
- ROP-B (50% ROP) uses weight of evidence approach
- Existing permit requirements for $PM_{2.5}$ remain

# Permitting Implications – Minor Sources

- $PM_{2.5}$ limits will not appear in minor source permits (including Title V's that are not major for PSD/NAA) except:
  - Previously established limit that must be carried over
  - Limit to avoid major source PSD/NAA permitting
- Permit support documents will discuss
  - Whether or not a PM source emits $PM_{2.5}$ or
  - If a source of $PM_{2.5}$, why are NAAQS protected
- Guidance will be provided for permit applicants on when a unit operation is presumed to not be a significant source of $PM_{2.5}$

# Permitting Implications – Major Sources

- Only direct emissions of $PM_{2.5}$: fuel combustion and high temperature processes
- Low temperature PM sources are not direct sources of $PM_{2.5}$
- Direct $PM_{2.5}$ will be in netting analyses and modeled as directed by EPA
- Stack testing not required unless the test method can be properly performed
- Alternate compliance demonstration will be developed

# Contact Information

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# EPA Proposed Revisions to the Guideline on Air Quality Models

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# Background Information

- EPA's *Guideline on Air Quality Models (Guideline)* published as Appendix W to 40 CFR Part 51
- *Guideline* helps EPA, States, and industry prepare and review air permits or Implementation Plans
- Specifies models for regulatory application and provides guidance for their use
- Provides common basis for estimating air concentrations used in assessing control strategies and limits

# Background Information

- Originally published in 1978, *Guideline* was last updated in 2005 with promulgation of AERMOD
- EPA proposed update to the *Guideline* on July 14, 2015 (published in Federal Register July 29, 2015)
- 90-day public comment window ending October 27, 2015
- Final rulemaking anticipated mid-2016

# Proposed Actions: AERMOD

- Proposes enhancements to the formulation of the near-field dispersion model, AERMOD
  - Option for meteorological data processing in stable, low wind speed conditions
  - Low wind option in AERMOD
  - Issues with tall stacks near small urban areas
  - Regulatory options for capped or horizontal
  - Updates to $NO_x$-to-$NO_2$ conversion options

# Proposed Actions: AERSCREEN & CALINE3

- Proposes AERSCREEN as recommended screening model for single sources and options for multi-source screening with AERMOD
- Replaces CALINE3/CAL3QHC for particulate and CO hot-spot analyses with line source option in AERMOD

# Proposed Actions: Single Source Impacts on Ozone and Secondary $PM_{2.5}$

- Proposes two-tiered demonstration for addressing single-source impacts to be used in concert with future demonstration tools (MERP)
- Specifies photochemical models are appropriate for addressing $O_3$ and secondary $PM_{2.5}$
- Provides specific guidance identifying particular models and techniques to assess the impacts of individual source on $O_3$ and secondary $PM_{2.5}$

# Proposed Actions: CALPUFF and Meteorological Data

- Proposes to remove CALPUFF as a preferred model for long-range assessments, recommends its use as a screening technique
- Provides supporting information on necessity of performing long-range PSD Class I analyses
- Proposes to allow prognostic meteorological data in AERMOD where there is no representative station, and not feasible to collect on-site data

# Proposed Actions: Revisions to Text

- Provides more definitive definition of appropriate modeling domain
- Revises requirements on how to characterize emissions from nearby, explicitly modeled sources
- Includes new language on how to characterize direct and precursor emissions for attainment demonstrations
- Lists recommendations on determining background concentrations when performing cumulative impact analysis for NAAQS or PSD Increment

# Contact Information

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