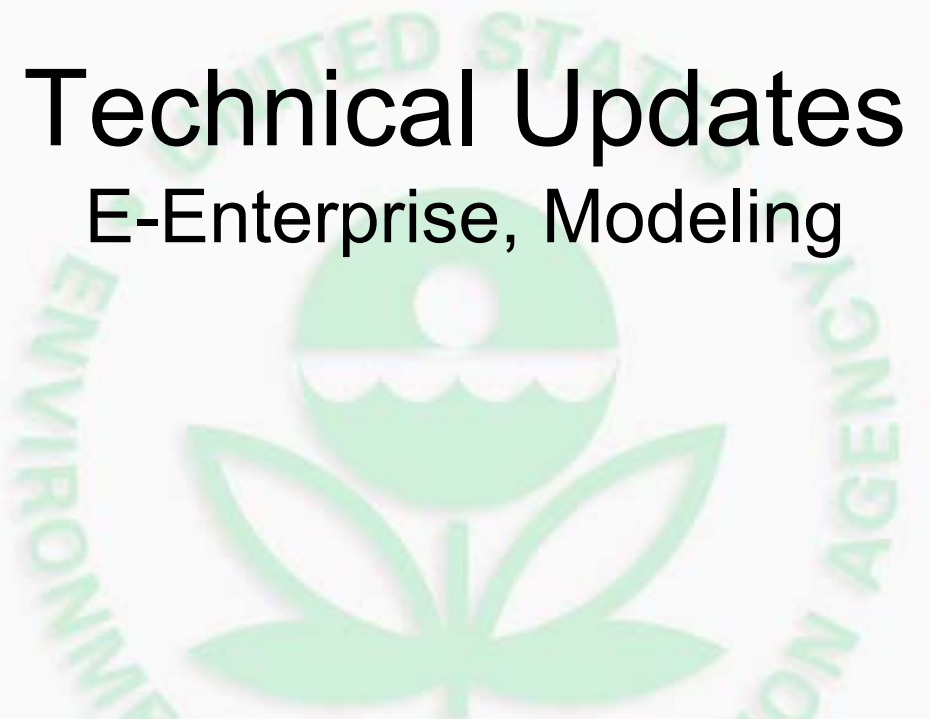


Technical Updates

E-Enterprise, Modeling



Richard A. (Chet) Wayland
US EPA OAQPS
CENSARA Fall Meeting
October 11, 2017



Topics

- E-Enterprise Air Quality Projects
- Appendix W
- Transport & Regional Haze
- 2014 NATA



E-Enterprise Air Quality Projects





E-Enterprise for the Environment

- E-Enterprise supports the environment, public health and the economy by modernizing the business of environmental protection
- EPA, states, territories, and tribes are working together to transform the way we implement programs, as a shared responsibility, into a national enterprise for environmental protection
 - **We streamline processes.**
 - **Citizens and the regulated communities will get better environmental information.**
 - **The tools and technology available to co-regulators are enhanced by mobile applications, online portals, smart tools and other investments in information technology.**
- For more information:
- <https://e-enterprisefortheenvironment.net/>



E-Enterprise Facility Integration

- Integrated, reconciled, facility information is a key to solving the problem of:
 - Reducing regulatory burden
 - Increasing transparency
 - Ensuring best data available to make decisions
 - Improving data quality
- Common vision
 - Integration and correction of data in as near to real-time as possible
 - Common facility profile model that allows for varying levels of granularity
 - Shared business rules and mapping to common-enough terminology
 - APIs flexible enough to work with EPA, state and other systems
 - Shared good practices and tools
- For further information
 - <https://e-enterprisefortheenvironment.net/our-projects/program-modernization-projects/ee-facility-team/>



Combined Air Emissions Reporting (CAER)

- CAER basic purpose:
 - An E-Enterprise project to streamline emissions reporting activities through modern data sharing technologies and program collaboration
- CAER Implementation plan
 - Prepared in fall 2016 by State, Local and EPA project collaborators
 - Lays out multi-year process to develop and implement CAER
- Initial phase of the Implementation Plan has started
 - Product Design Team (PDT) formed late 2016
 - “First Round” R&D enabling projects conducted in first half of 2017
 - Projects include: data model requirements, QA/QC, cross-program mapping, source codes and emission factors
 - “Second Round” R&D projects to be defined and scoped out in Fall 2017
 - Potential full scale pilot project scope being defined with goals of a 2018 pilot
- CAER public website:
 - <https://www.epa.gov/e-enterprise/e-enterprise-combined-air-emissions-reporting-caer>



The E-Enterprise Leadership Council (EELC) is making permitting improvements a priority

- The EELC will:
 - identify desired *collective* outcomes and performance metrics from EPA, State, Tribe, and Territory permitting systems.
 - identify candidate permitting programs, where States, Tribes, and EPA have shared implementation responsibility, for a business process improvement effort.
 - support a business process improvement effort in one or more permitting programs where EPA, States, Tribes, and Territories share implementation responsibility.



Moving Forward with Shared Services

- Outlines the approach for the E-Enterprise and the Exchange Network partnership to develop, manage, and operate shared services.
- Intent is to
 - Institutionalize a set of software development methodologies and practices
 - Allow for broad reuse of business relevant resources - build it once, use it many times
 - Use common reporting and data exchange standards resulting in significant benefits.
 - Build more with less
- Example of a new Shared Service
 - MOSAIC

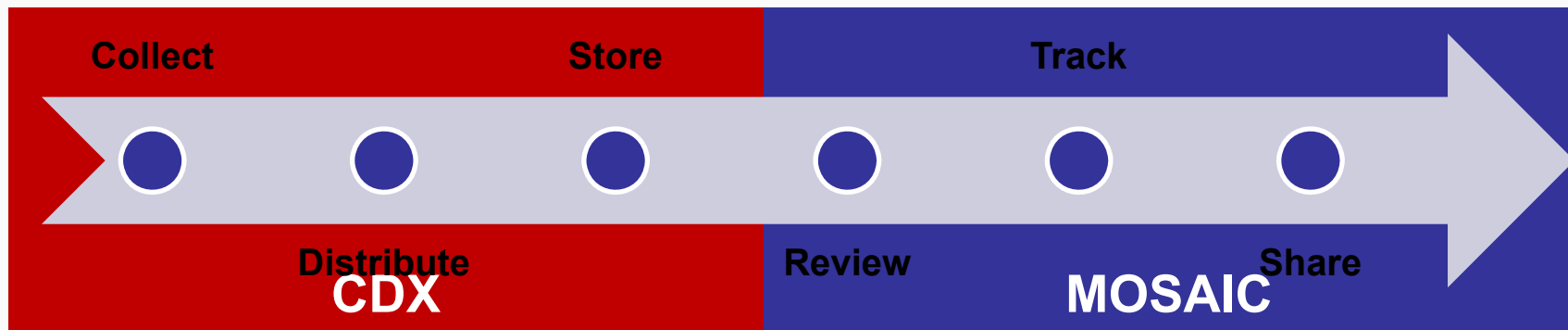


MOSIAC can be a part of permit modernization and e-permitting efforts by EPA and SLTs

- Central Data Exchange (CDX)
 - EPA's centralized electronic reporting site
 - Collects and distributes legally acceptable data and information
 - Used to collect data across a wide variety of EPA and partner programs
- MOSAIC = Modular Submission Application Creator
 - Available to E-Enterprise partners
 - Allows users to select desired modules to build custom applications
 - Supports review of information received through CDX (e.g., plans, permit applications, petitions, exceptional events),
 - Supports delivering data and documents to stakeholders



MOSAIC extends CDX functionality with streamlined data review and data sharing





E-Enterprise Advanced Monitoring Team

- 1) Explore development of an independent third-party evaluation/certification program
 - Spring 2018 Workshop
 - Develop sensor performance targets for PM_{2.5} and O₃
 - Includes open meeting & webinar opportunity for all interested parties to provide input
 - Concurrently working with outside organizations to discuss consensus-based standards
- 2) Develop technology scan and screen procedures
 - Storing results in a Clearing House for state, local, tribal, and federal agency staff
- 3) Data interpretation
 - Finalizing PM_{2.5} and O₃ sensor scale & drafting SO₂, NO₂, CO, and benzene sensor scale
 - Piloting interpretation of Purple Air sensor data alongside data from regulatory monitors
 - Launching revised Village Green website & developing communication materials for developers and sensor users
- 4) Data standards
 - EPA participation in conversations with outside organizations

EPA Regulation Navigation Tools



Regulation Navigation (Reg Nav) tools help owners and operators of facilities in certain industries determine the requirements of specific regulations. Reg Nav tools are online and interactive, and use the information entered to assess potential regulatory requirements.

Reg Nav tools do not store or save information, so you must print or save any output that you want to use or reference. Note that the Reg Nav requirements may not be complete. Refer any questions to your local authority.



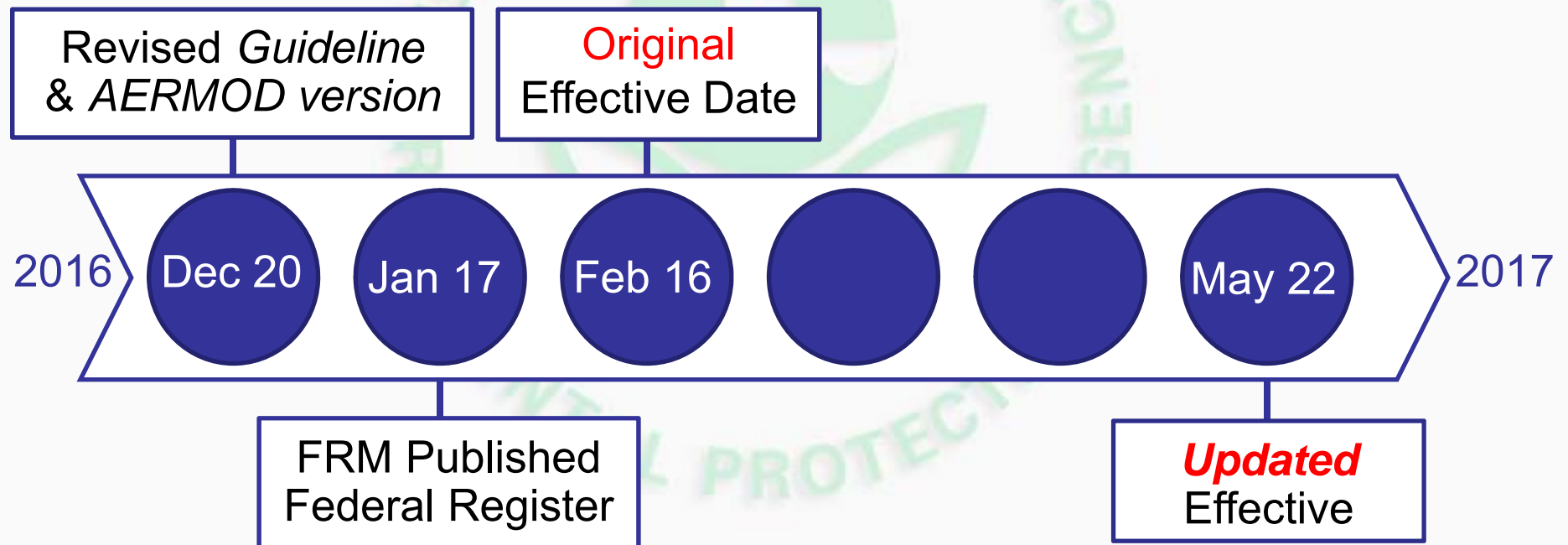
Reg Nav tools are available for five regulations dealing with air pollutants:

Air Pollutant	Regulation	Reg Nav Tool
National Emissions Standards for Hazardous Air Pollutants under 40 CFR part 63	Subpart LLL	Portland Cement Manufacturing Industry
	Subpart ZZZZ	Reciprocating Internal Combustion Engines (RICE)
	Subpart JJJJJ	Brick and Structural Clay Products Manufacturing
New Source Performance Standards	Subpart IIII & Subpart JJJJ (one tool)	Stationary Compression Ignition Internal Combustion Engines and Spark Ignition Internal Combustion Engines



Appendix W

Final Rule to Revise to the *Guideline on Air Quality Models* (Appendix W to 40 CFR Part 51)





Appendix W: Main Final Actions

- Science improvements to AERMOD Modeling System
 - ADJ_U* options to address technical concerns and improve model performance under extremely light winds and stable conditions
 - Enhanced treatment of horizontal and capped stacks
 - Addition of a buoyant line source option
 - Updates to the NO₂ screening techniques, including a new Tier 2 Ambient Ratio Method (ARM) and revised Tier 3 Plume Volume Molar Ratio Method (PVMRM)
 - AERSCREEN as the recommended screening model for simple and complex terrain for single sources
- Long Range Transport (LRT) screening approach
- Single-Source Impacts on Ozone and Secondary PM_{2.5}
- Removal of BLP, CALINE, and CALPUFF as EPA preferred models



Appendix W: Main Final Actions (cont)

- Provide for use of prognostic met data in dispersion modeling for PSD compliance demonstrations
 - Effort to provide more flexibility
 - Improve meteorological inputs for areas where:
 - No representative NWS station
 - Prohibitive or infeasible to collect adequate site-specific data
 - EPA provided the Mesoscale Model InterFace Program (MMIF) that post-processes WRF simulation data for input to AERMOD
 - Also, made publicly available both national, 12km raw WRF data and MMIF processed data for 2013-2015.
 - Coordinated with Multi-Jurisdictional Organizations (MJOs) in an effort to most effectively distribute this data to the states.



Final Action: Single-Source Impacts on Ozone and Secondary PM_{2.5}

- The EPA believes photochemical grid models are generally most appropriate for addressing ozone and secondary PM_{2.5}, because they provide a spatially and temporally dynamic realistic chemical and physical environment for plume growth and chemical transformation.
- Lagrangian models (e.g. SCICHEM) applied with a realistic 3-dimensional field of chemical species could also be used for single source O₃ or PM_{2.5} assessments.
- The EPA has finalized in Section 5 of revised *Guideline* a two-tiered demonstration approach for addressing single-source impacts on ozone and secondary PM_{2.5}.
 - Tier 1 demonstrations involve use of technically credible relationships between emissions and ambient impacts based on existing modeling results or studies deemed sufficient for evaluating a project source's impacts.
 - Tier 2 demonstrations would involve case-specific application of chemical transport modeling (e.g., with an Eulerian grid or Lagrangian model).
- Section 5 does not provide a requirement for chemical transport modeling



MERPs as a Tier 1 Demonstration Tool

- EPA has provided technical guidance that will provide a framework for development of Tier 1 demonstration tools under Appendix W for PSD permitting.
 - Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM_{2.5} under the PSD Permitting Program (EPA-454/R-16-006 December 2016)
- The draft guidance provides a framework on how to arrive at values for MERPs based on existing relevant modeling or newly developed area specific modeling that source/states can utilize in their PSD compliance demonstrations.
 - The guidance does not endorse a specific MERP value for each precursor.
 - Public comments made available on SCRAM on May 26, 2017
- Currently reviewing comments and plan to provide a revised version of the guidance in late 2017 that addresses public comments with emphasis on:
 - More clarity on use of MERPs at national, regional and local level with more detail in the examples provided in the guidance



Next Steps

- SILs Guidance: Pacing item for release of MERPs guidance and PM2.5 Precursor Demo guidance
- EPA hosted 2017 R/S/L Modelers workshop in RTP, NC on September 25th and 26th
 - <https://www.epa.gov/scram/2017-regional-state-and-local-modelers-workshop>
- Continue discussions to improve science in AERMOD, specifically research coordination with ORD and stakeholders on
 - LOWWIND related options
 - Downwash algorithms (updates and/or replace PRIME)
 - Mobile source modeling (RLINE)
 - Evaluation of Offshore & Coastal Dispersion Model (OCD)
- Further engagement with the stakeholder community leading up to the 12th Conference on Air Quality Models in late 2018.



Air Quality Modeling for Ozone Transport





Update on EPA's Ozone Transport Modeling

- EPA issued a NODA in January 2017 with ozone transport data based on air quality modeling using 2023 as the future analytic year
- We are updating this modeling based on NODA comments and other factors to identify nonattainment and maintenance receptors and interstate “linkages” for 2023
 - Key revisions have been made to the methodologies for projecting emissions for EGUs and the oil and gas sector in addition to updates on plant closures
- The updated modeling will utilize the latest public release version of CAMx (v6.40) with the CB6r4 chemical mechanism
- We believe this modeling can serve multiple purposes in helping states develop SIPs for their 2008 obligations
- This modeling will also be informative for future 2015 ozone NAAQS transport SIPs
- The air quality modeling is completed



Air Quality Modeling for Regional Haze





Regional Haze Air Quality Modeling

- To complement proposed rule and draft guidance related to Regional Haze program, EPA conducted modeling for a 2028 future year that provides updated information on regional haze visibility impairment for use by EPA and states.
- Overview of EPA modeling platform
 - 2011 base year, meteorology and boundary conditions
 - 12km national modeling domain
 - 2028 future year emissions
 - Extension of the 2023 emissions projections used for the recent ozone transport NODA (see: <https://www.epa.gov/air-emissions-modeling/2011-version-63-platform>)
 - 2028 CAMx source apportionment (PSAT) by major national source sectors (not by state)
 - 19 tags including EGUs, on-road mobile, fires, etc.



2028 Regional Haze Modeling Caveats

- EPA has identified a number of uncertainties associated with the initial 2028 regional haze modeling analysis.
 - Important model performance issues that need to be addressed before the results can be confidently used in some areas.
 - The visibility impairment contribution from some source categories is uncertain and likely to change with platform updates
 - The analysis uses the EPA draft recommended natural conditions to calculate the glidepath (i.e., the “unadjusted glidepath”).
- EPA recommends using these initial results only as a first step in the process of developing technically sound regional haze modeling for the 2nd implementation period.
 - EPA expects to work collaboratively with MJOs, states, and FLMs to make necessary improvements and ultimately update this modeling.



Working with MJOs/States/FLMs

- Coordinate with MJOs, FLMs, and states, in an effort to improve inputs to the base case and 2028 regional haze modeling platform(s).
 - Base year emissions inventory improvements
 - Updates to emissions projections
 - Issues related to appropriate fire and windblown dust inputs for RH modeling
 - Boundary condition updates
 - Post-processing of modeling results
 - Recommended procedures in the photochemical modeling guidance
 - Estimation of “natural conditions” and possible adjustments to draft recommended values
 - Adjustments to glidepath endpoint to account for international anthropogenic and prescribed fire impacts



Regional Haze Modeling: Next Steps

- EPA working to provide technical support document that summarizes the platform and initial modeling results along with modeling files in October timeframe
 - 2011 model performance
 - 2028 visibility impairment and glidepath results
 - 2028 source apportionment results
- Engage in more detailed discussions of modeling issues and improvements
 - Subsequent MJO calls/special calls by region
 - Western Modeling Workshop, Sept 6-8th in Boulder, CO
 - December Regional Haze National Workshop
 - Other FLM calls/workgroups

NATA





National Air Toxics Assessment (NATA)

- NATA is a screening-level characterization of air toxics across the nation
- Designed to help state, local agencies and tribes identify locations, sources and pollutants of interest for further study

2011 NATA released
Dec 2015
www.epa.gov/nata

Using **LEAN** for 2014
NATA

A screenshot of the EPA website's National Air Toxics Assessment page. The page features a blue header with the EPA logo and navigation tabs for "Learn the Issues", "Science & Technology", "Laws & Regulations", and "About EPA". A search bar is located in the top right. The main content area includes a map of the United States with a yellow overlay indicating the assessment area, and a text box stating: "On December 17, 2015, EPA released the most recent update to the National Air Toxics Assessment (NATA). NATA contains emissions data from 2011 and uses models to make broad estimates of health risks over geographic areas of the country." Below the map, there are three main sections: "NATA Overview" with links for "Limitations", "Glossary of Terms", and "Frequent Questions"; "2011 NATA Assessment" with links for "2011 Assessment Results", "2011 NATA Map", and "2011 Assessment Methods"; and "Quick Links" with links for "Previous versions of NATA", "Other environmental screening tools", "Learn about risk assessment", "Hazardous Air Pollutants website", and "Urban Air Toxics website".



2014 NATA Update

- Based on 2014 NEI Version 2 with hybrid modeling approach using photochemical (CMAQ) and dispersion (AERMOD) models
 - Scheffe et al. *Hybrid Modeling Approach to Estimate Exposures of Hazardous Air Pollutants (HAPs) for the National Air Toxics Assessment (NATA)*. Environmental Science & Technology. pp. 12356–12364, October 2016.
- Emissions & modeling improvements from 2011 NATA
 - Improved spatial allocation for nonpoint, onroad and nonroad categories
 - Improved meteorological inputs (WRF prognostic met data via MMIF tool)
 - Added more CMAQ HAPs
- Conducted NATA review process with State/local/tribal agencies
 - Point: Sept 2016-June 2017, other categories: June 2017-Aug 2017
 - Held several webinars, provided documentation and draft results in Map App and other formats
 - Incorporating comments into the NEI and v2 modeling
 - Will provide a preview for SLT before it is released to the public
- Targeting completion in 2018