



trinityconsultants.com

Ambient Air Modeling

Appendix W Revision Status,
EPA Approvals of Beta Options, and
Draft Guidance on SILs for Ozone & PM_{2.5}

NCASI 2016 West Coast Regional Meeting
Vancouver, Washington ♦ September 28, 2016

Anna Henolson, P.E.
ahenolson@trinityconsultants.com



Outline

- > Introduction - How big changes to modeling guidance affects you
- > Appendix W Revision Status
- > EPA Approvals of Beta Options
 - ❖ Flurry of Clearinghouse Memos
- > Draft Guidance on SILs for Ozone and PM_{2.5} in PSD
 - ❖ Brief Summary of SIL Legal History
 - ❖ Summary of Guidance
- > Conclusion

Introduction

How big changes to modeling guidance affects you

- > What big changes?
 - ❖ Appendix W
 - ❖ Model Clearinghouse Memos
 - ❖ PM_{2.5} and O₃ SIL
- > Modeling affects:
 - ❖ Permitting timeline
 - ❖ Emission limits*
 - ❖ Project feasibility

More on how changes affect facilities

Implications of Appendix W Revision

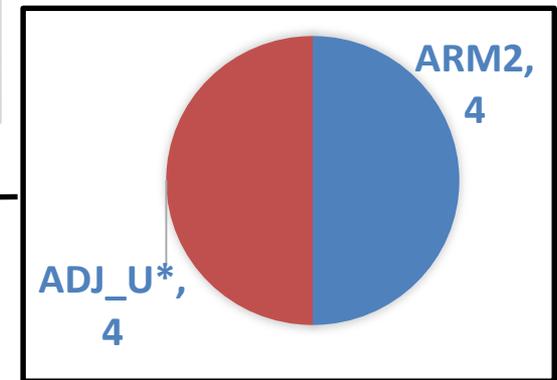
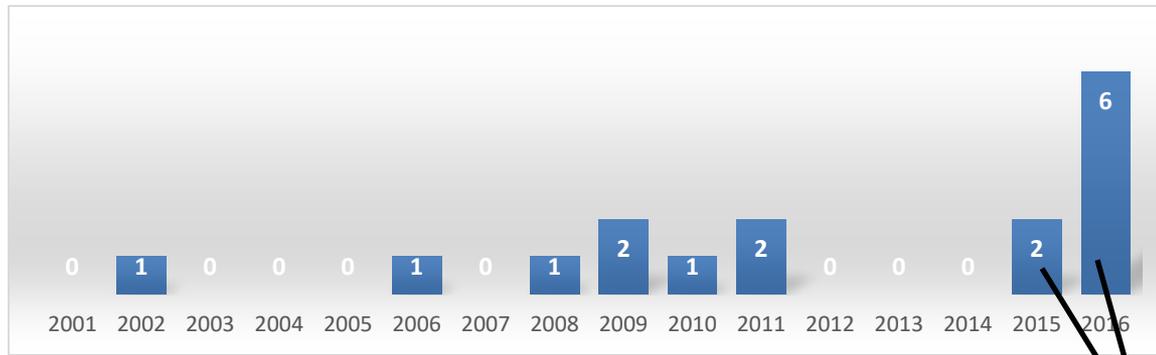
- > Legally binding
- > Some of the proposed changes will streamline process 😊
 - ❖ Tier 3 NO₂ as recommended default
 - ❖ LowWind and ADJ_U* option as recommended default
 - ❖ De minimis thresholds for secondary pollutants (MERPs)?
- > Some proposed changes could slow the process 😞
 - ❖ Codifying requirements for Model Clearinghouse
 - ❖ Removal of recommended model for LRT
 - ❖ Lack of prescriptive guidance or models for secondary pollutant modeling (O₃ and PM_{2.5})

Appendix W Revision Status

- > Timing: Spring 2016? → Now expected **November** 2016
- > Differences between Final and Proposed?
 - ❖ No clues of changes from Submittal Abstract:
 - ◆ *Includes important enhancements to the EPA's AERMOD near-field dispersion modeling system that will:*
 - *significantly improve the model performance under **stable/light wind conditions**,*
 - *allow for the use of meteorological input data derived from **prognostic meteorological models**,*
 - *provide additional options for the modeling of **nitrogen dioxide**,*
 - ◆ *Additionally, these revisions would incorporate the use of **photochemical modeling techniques** to more adequately account for the secondary chemical formation of **fine particulate matter** and **ozone** associated with precursor emissions from single sources.*
 - ◆ All this was in the July 2015 draft guidance
 - ❖ Any clues from recent EPA or FLM actions also in alignment with draft guidance

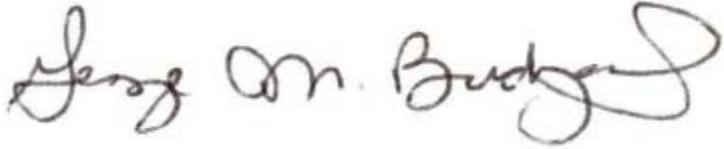
EPA Approvals of Beta Options

> Flurry of Model Clearinghouse Memos



- ❖ 8 memos issued in 13 months (July 2015 - Aug 2016)
- ❖ Compared to an average of 0.6 per year 2001-2014
- ❖ EPA communicated they wanted memos (working around roadblocks and pave way for others' use)

Model Clearinghouse Memos (1/2)

- > What are they? 
- > Why would you want one?
 - ❖ 40 CFR Part 56 -Section 56.5(b): *A responsible official in a Regional Office shall seek concurrence from the appropriate EPA Headquarters office on any interpretation of the Act, or rule, regulation, or program directive when such interpretation may result in inconsistent application among the Regional Offices*
 - ❖ Appendix W Proposed: *it is appropriate that concurrence with the Model Clearinghouse is sought on the approval of any alternative model or technique*

Model Clearinghouse Memos (2/2)

> How do you get one?

❖ Summary of the process:

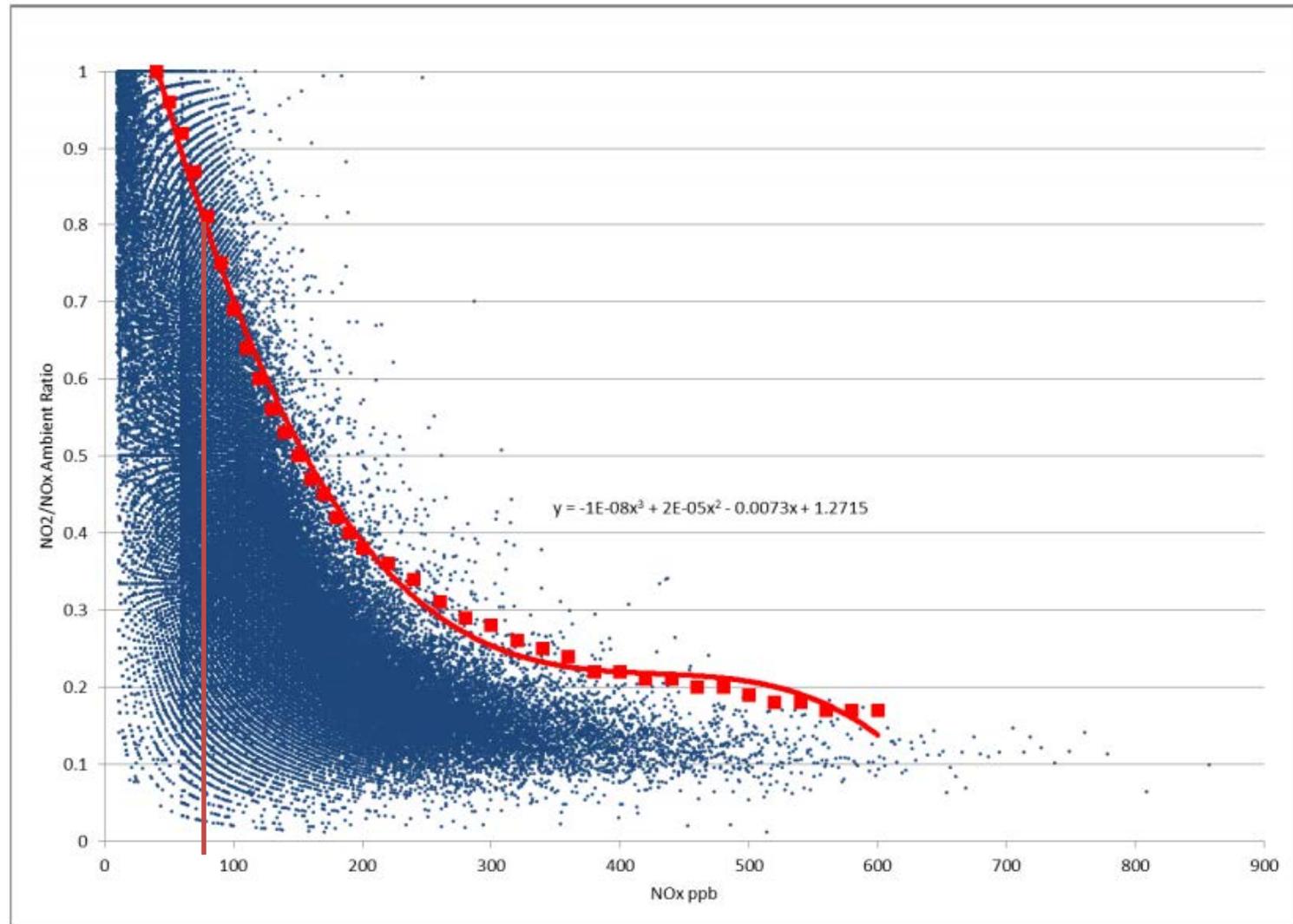
1. State → Region Office
 - Model issue requiring EPA review and/or approval
2. Regional Office determines if it is an *alternative modeling situation*
3. Regional Office → Modeling Clearinghouse
4. Clearinghouse → EPA Region
 - Engaged and consulted on solutions and writes formal concurrence response memorandum

❖ Timeline?

- ◆ Say “few weeks” - but 3 months at best, ~ 1 yr at worst

> What do the memos mean for other applicants proposing the same or similar techniques?

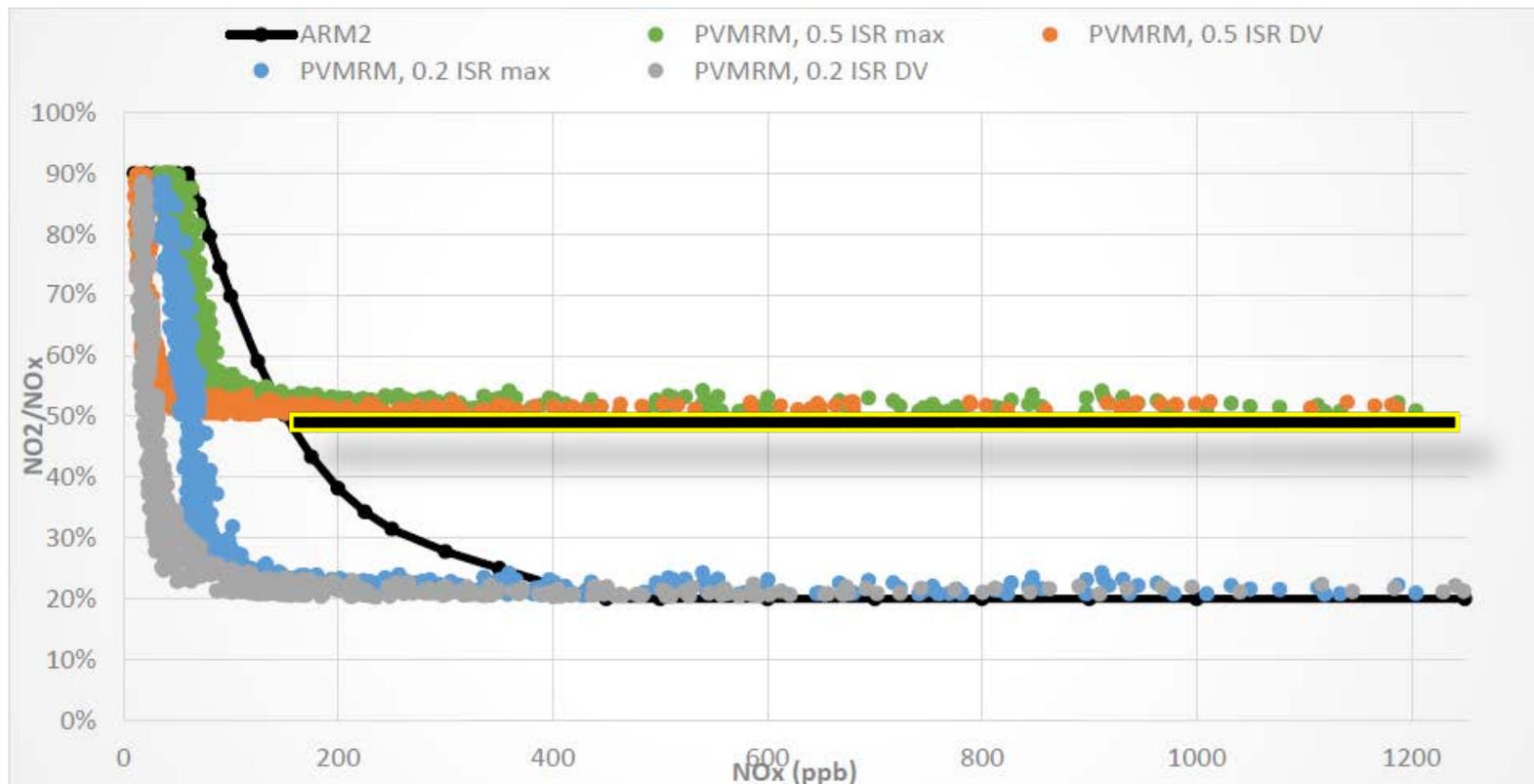
ARM2 - What is it?



From: 2013 RSL Meeting Presentation by Mark Podrez of RTP Env. Assoc.

ARM2 (and NO₂) in Appendix W

- > Proposing that ARM2 (with new default minimum NO₂/NO_x ratio of 0.5) and OLM/PVMRM become regulatory default
 - ❖ What does it mean to change to 0.5?
 - ❖ What doe Appendix W say about PVMRM ISR?



ARM2 Clearinghouse Memo Summary

> Four Memos

- ❖ July 2015 - Min NO_2/NO_x ratio = 0.54
- ❖ December 2015 - Min NO_2/NO_x ratio = 0.2
 - ◆ Greenfield for gas boilers, used database to demonstrate low ISR, also low ozone
- ❖ April 2016- Min NO_2/NO_x ratio = 0.5
- ❖ August 2016- Min NO_2/NO_x ratio = 0.5
 - ◆ 2016 applications requested 0.5, but possibly could have requested lower. Available $\text{ISR} < 0.25$ or 0.2 , but some sources not in database.

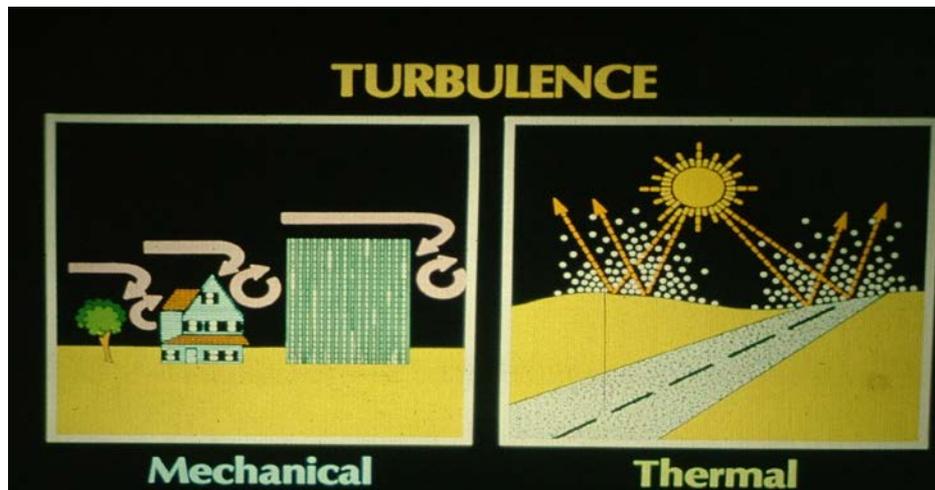
> What these mean for today's application

- ❖ Pass tests? → Likely can apply ARM2 without significant effort

1. $\text{NO}_x \leq 150 - 200$ ppb **AND/OR** 2. Low ISR (≤ 0.5) **AND** 3. Low Ozone

ADJ_U* - What is it?

- > u^* = Surface Friction Velocity
 - ❖ A measure of the amount of mechanical turbulence
 - ❖ u^* is used in AERMOD to calculate vertical profiles of wind speed, temperature, and turbulence
- > ADJ_U* corrects underestimation by AERMET in low winds
 - ❖ Underestimation of u^* -> overestimation of concentrations
 - ❖ EPA incorporated in 12345 and updates in subsequent versions (most recently 15181 tied to Appendix W)



ADJ_U* in Appendix W

- > EPA proposed that the ADJ_U* option be incorporated into the regulatory version of AERMET
- > Also proposed AERMOD LowWind3 be incorporated into regulatory version of AERMOD

ADJ_U* Clearinghouse Memo Summary

> 4 Memos

- ❖ February 2016 (Mine) - low level fugitives
 - ◆ Also included POINTCAP & POINTHOR (not requested)
 - ◆ Excluded the sigma-theta turbulence parameter (site-specific met data)
- ❖ April 2016 (Power Plant) - tall stacks, high conc. in terrain at ~15 km
 - ◆ Used 2 existing evaluation databases to *demonstrate a **significant improvement...** for a facility with tall stacks located near complex terrain*
 - ◆ Not site-specific so no sigma-theta or sigma-w turbulence concerns
- ❖ June 2016 (Power Plant) - tall stacks, high conc. in terrain, ~20, 35 km
- ❖ August 2016 (Power Plant) - tall stacks, high conc. in terrain at ~15 km



> What these mean for today's application?

Draft Guidance on SILs for Ozone and PM_{2.5} in PSD - Background

- > Brief Summary of SIL Legal History
 - ❖ 2010 - Promulgation of PM_{2.5} SILs
 - ❖ 2013 - Court vacated and remanded the PM_{2.5} SILs per EPA's request
 - ❖ 2015 - EPA proposed revisions to Appendix W
 - ❖ Historically no SIL for ozone

Summary of Ozone & PM_{2.5} SILs Guidance

- > *Does Not Represent Final Agency Action; Draft for Public Review & Comment*
- > Recommends permitting authority can use SILs as a compliance demonstration **tool**
 - ❖ Technical analysis to provide a basis for a permitting authority to conclude that concentration increases below the SIL *do not cause or contribute to violations of the NAAQS* or PSD increments
 - ❖ Guidance memorandum, technical basis, and legal support documents are intended to be included in any permit record where the recommended SILs are used
- > Recommends the most conservative values that are provided overall from the 2010 rule and the current technical analysis:

Criteria pollutant (NAAQS level)	Recommended NAAQS SIL concentration
Ozone 8-hour (70 ppb)	1.0 ppb
PM _{2.5} 24-hour (35 µg/m ³)	1.2 µg/m³
PM _{2.5} annual (12 µg/m ³ or 15 µg/m ³)	0.2 µg/m³*

*The permitting authority has discretion to interpret an annual impact between 0.2 µg/m³ and 0.3 µg/m³ as significant.

Summary of Ozone & PM_{2.5} SILs Guidance

> PSD Increment SILs applied ratio equation:

$$PM_{2.5} \text{ PSD Class I increment SIL} = \text{NAAQS SIL} \times \frac{\text{Class I increment}}{\text{Class II increment}}$$

PM _{2.5} Annual PSD increments, increment SILs	Concentrations, µg/m ³		
	Class I	Class II	Class III
Increments	1	4	8
2010 rule PSD increment SILs	0.06	0.3	0.3
Recommended PSD increment SILs	0.05*	0.2	0.2

PM _{2.5} 24-hr PSD increments, increment SILs	Concentrations, µg/m ³		
	Class I	Class II	Class III
Increments	2	9	18
2010 rule PSD increment SILs	0.07	1.2	1.2
Recommended PSD increment SILs	0.27*	1.2	1.2

*Class I PSD increment SIL values were listed incorrectly in the initial draft guidance, posted on August 1st. They have since been corrected; please refer to the August 18th version for these correct values.

Conclusion

- > Big changes are taking place
- > Plan ahead for permit modeling
- > Look for final Appendix W Rule in fall
 - ❖ In meantime, consider alternative options and leveraging clearinghouse memos
- > PM_{2.5} and Ozone SILs provide some clarity on one piece of the puzzle
 - ❖ **BUT** these pollutants can be the most problematic due to secondary formation and evolving guidance on single source modeling for secondary formation

Questions?

Anna Henolson, P.E.

ahenolson@trinityconsultants.com

Phone: (253) 867-5600

