Final MERPs Guidance Webinar

June 13, 2019

U.S. EPA / OAQPS / Air Quality Modeling Group

https://epawebconferencing.acms.com/final_merps/

Audio through web conference / your computer speakers (*preferred*)

Backup audio option: 1-202-991-0477, Conference Code: 5659946

Guidance and Webinar Logistics

- The final *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* was released on April 30, 2019
  - https://www3.epa.gov/ttn/scram/guidance/guide/EPA-454_R-19-003.pdf
- Webinar audio is available via:
  - Web conference / your computer speakers (*preferred option*)
  - Backup audio option: 1-202-991-0477, Conference Code: 5659946
  - If using the conference line option, please **MUTE** your line (your mute button or *6) and do not put your phone on hold... simply hang up and dial back when you want to rejoin.
- Questions will be accepted through the webinar chat window and also via the conference line at the end of the webinar.
- A copy of the webinar presentation will be posted to the EPA's SCRAM website.

Webinar Outline

- Overview – Kirk Baker
  - Single-Source Ozone and $PM_{2.5}$ Demonstrations for PSD
- Region 1 Example – Leiran Biton
  - Source Impact Analysis: Class I PSD Increment for $PM_{2.5}$
- Region 4 Example – Mike Moeller
  - Tier 1 $PM_{2.5}$ MERPs Demonstration Example (Class II SILs and Class I LRT)
- Question and Answer Session

Single-Source Ozone and PM2.5 Demonstrations for PSD: Overview

May 2019

Single-Source Impacts on Ozone and Secondary $PM_{2.5}$

- EPA's 2017 revisions to the *Guideline on Air Quality Models* includes the following two-tiered demonstration approach for addressing single-source impacts on ozone and secondary $PM_{2.5}$ (as detailed in Section 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
- 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 O_3 or $PM_{2.5}$ assessments.

Tier 1 Demonstrations for O3 & Secondary PM2.5

- For Tier 1 assessments, EPA generally expects that applicants would use existing empirical relationships between precursors and secondary impacts based on modeling systems appropriate for this purpose.
- Modeled Emission Rates for Precursors (MERPs) can be viewed as a type of Tier 1 demonstration tool under the PSD permitting program that provides a simple way to relate maximum downwind impacts with a critical air quality threshold.
- For PSD, separate MERPs could be developed to relate:
  - volatile organic compounds (VOCs) and/or nitrogen oxides (NO_x) to O_3
  - sulfur dioxide (SO_2) and/or NO_X to secondary $PM_{2.5}$

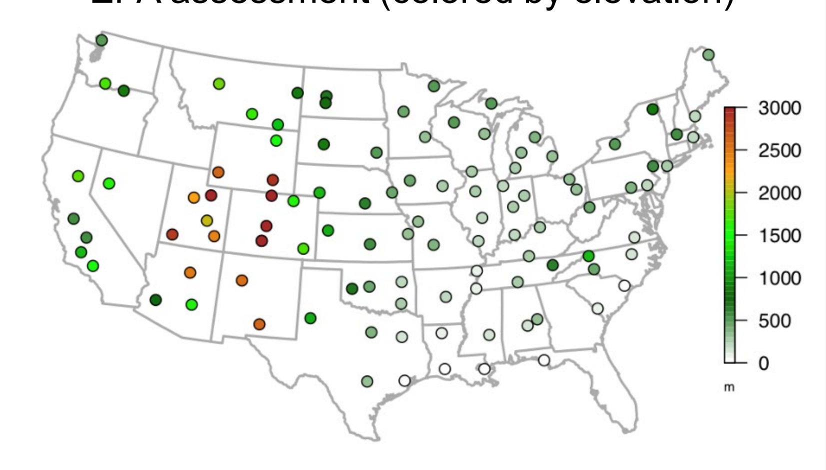
Tier 1 Demonstrations for O3 & Secondary PM2.5

- EPA has provided technical guidance to 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 PM2.5 under the PSD Permitting Program or “MERPs Guidance (EPA-454/R-10-003 April 2019)
  - Distributed on SCRAM with a separate Excel spreadsheet containing MERP values for all of the hypothetical sources presented in the final guidance document
    - Spreadsheet not intended to be static but periodically updated with newer information
  - https://www.epa.gov/scram/clean-air-act-permit-modeling-guidance
- Notable changes from the draft (December 2016) version:
  - Additional hypothetical single source impact modeling included
  - More details on how to use existing modeling for NAAQS demonstrations (SIL and cumulative tests) and a PM2.5 PSD increment demonstration

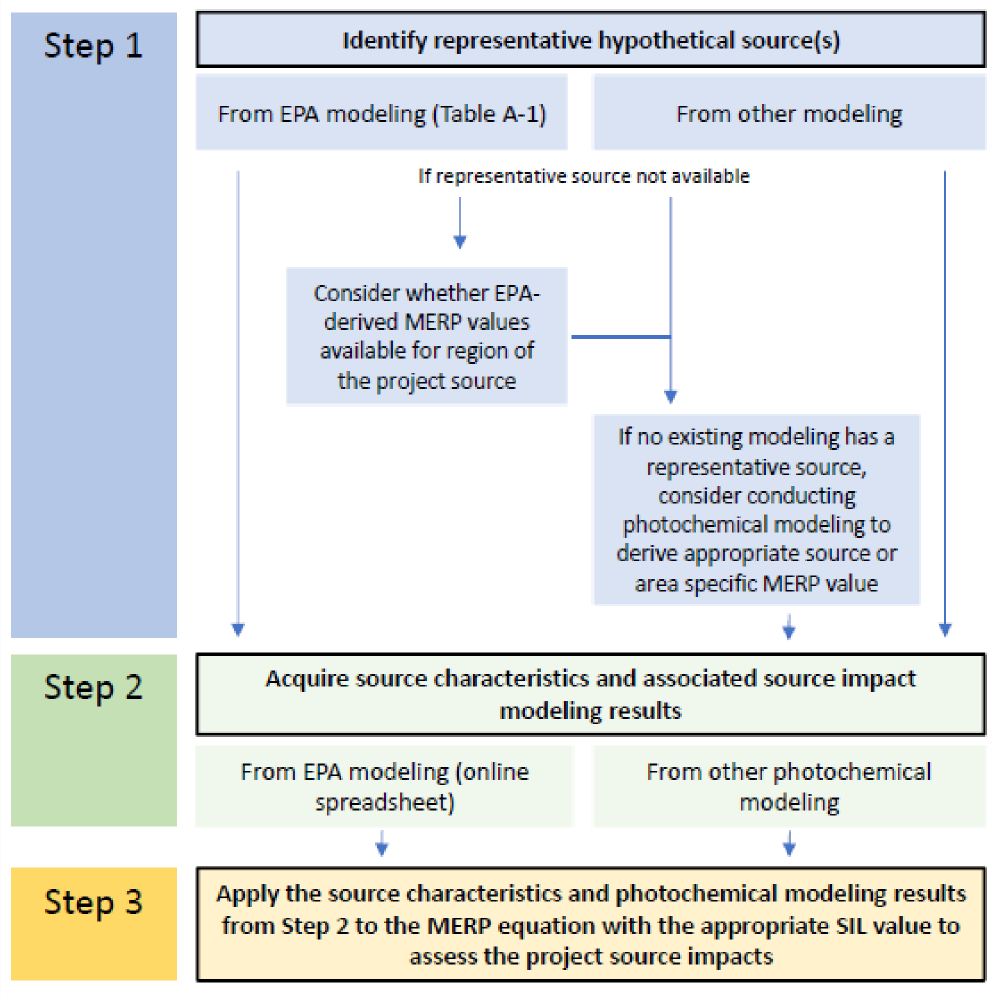
EPA's Illustrative Single Source Modeling

- Tier 1 demonstration guidance provides impacts estimated with a photochemical model for hypothetical sources
- Not intended to represent specific sources or types of industry
- Intended to provide context toward understanding secondary pollutant impacts from specific sources
  - Modeled multiple emission rates and a low and tall stack release height
- In some situations this information could be used to support a Tier 1 demonstration

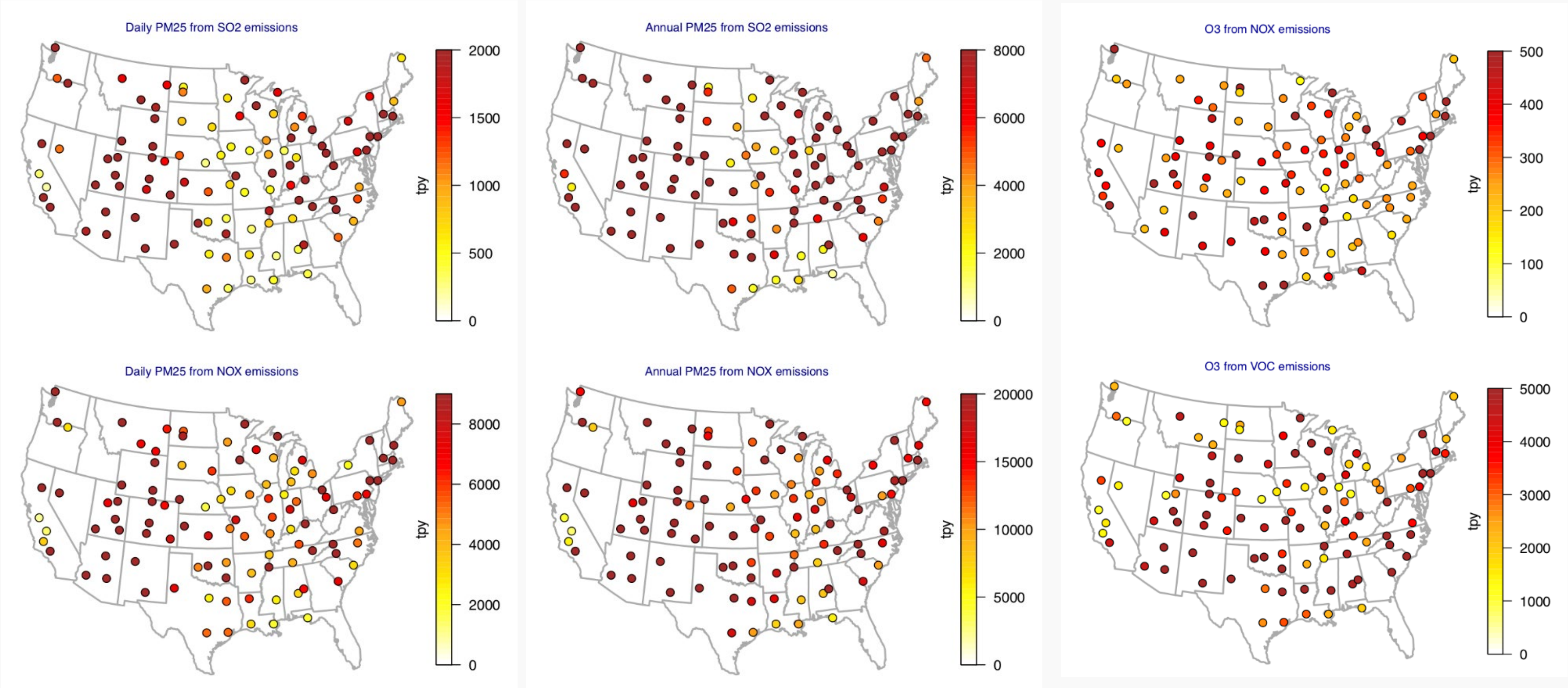
Hypothetical sources modeled as part of EPA assessment (colored by elevation)



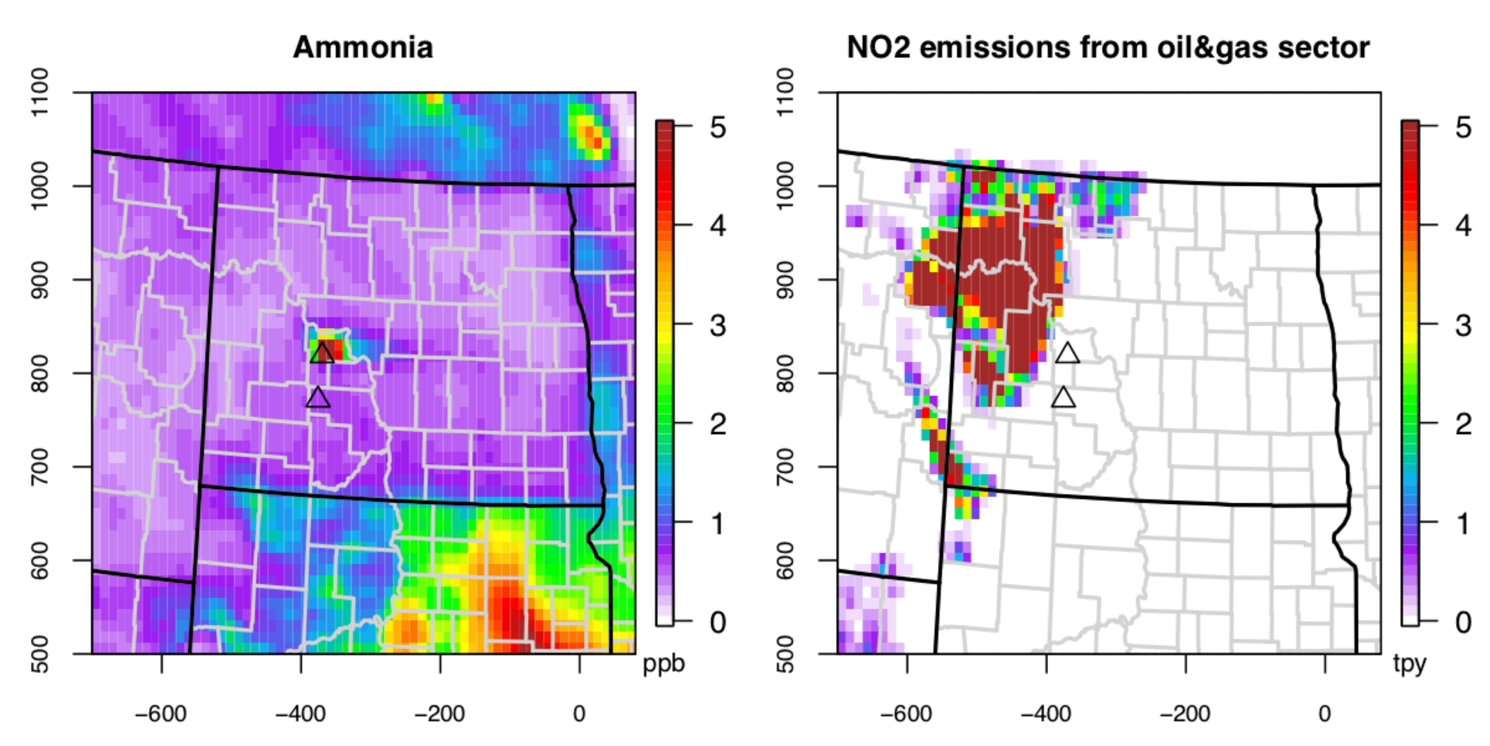
Selecting Information for Tier 1 demonstrations



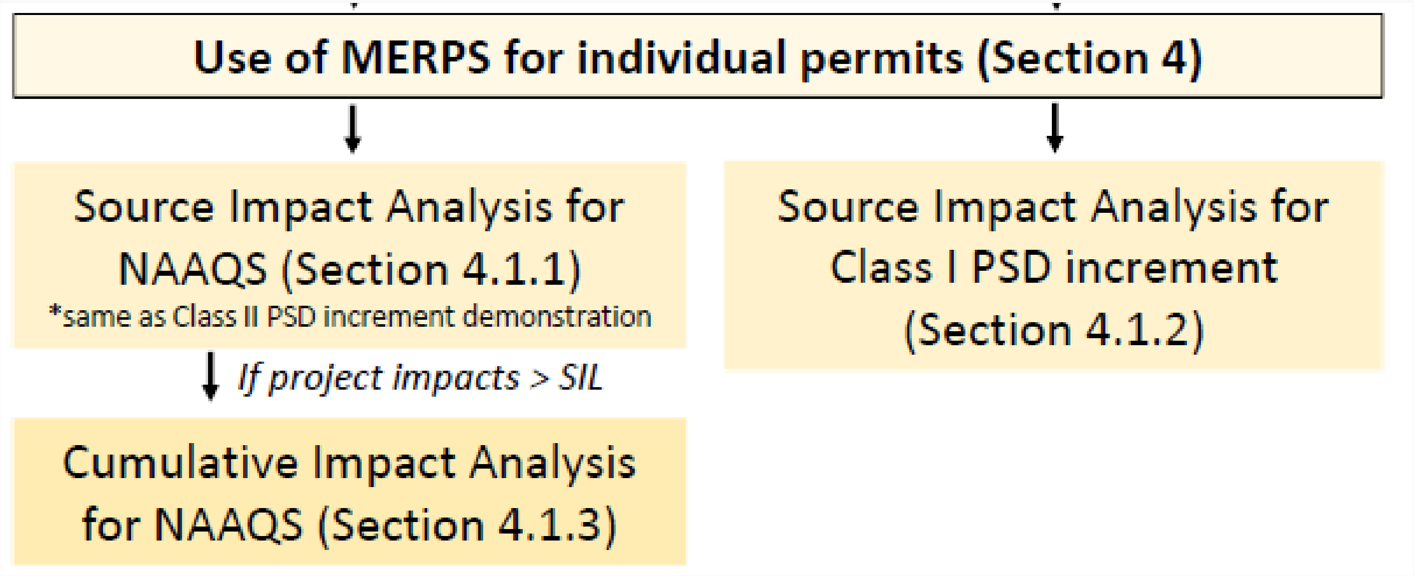
Illustrative MERPs for PM2.5 and O3



Physical and Chemical Variability for Hypothetical Sources

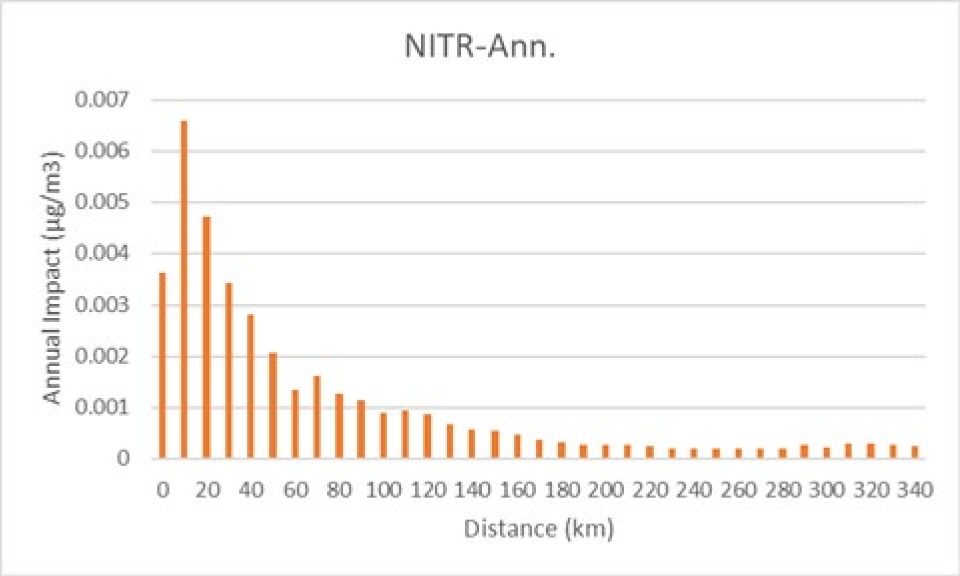


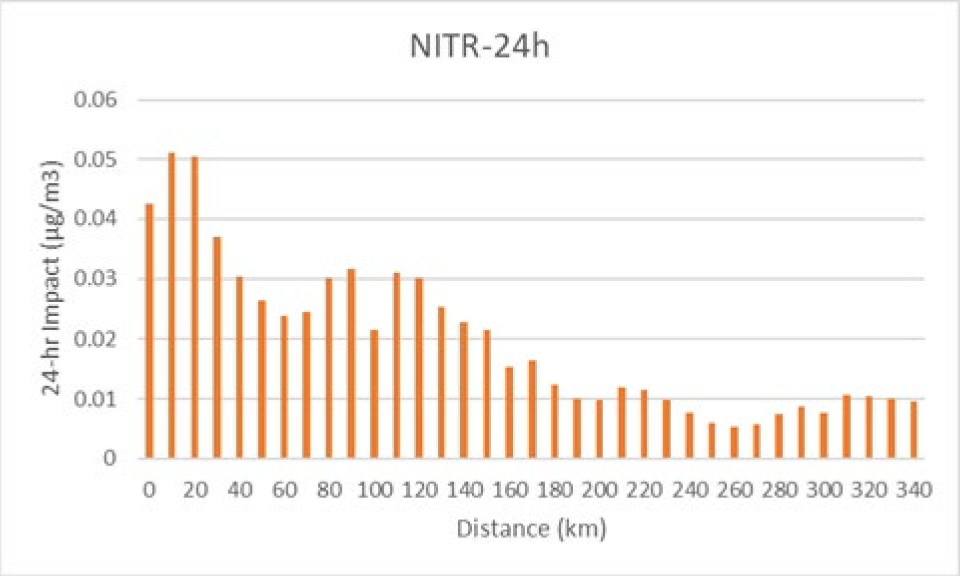
Tier 1 PSD Demonstration Flow Chart



Source Impact Analysis: Class 1 PSD Increment for $PM_{2.5}$

Example use of EPA hypothetical source modeling to address Class I increment





Tier 2 Demonstrations for O3 & Secondary PM2.5

- A Tier 1 demonstration is not a requirement before performing a Tier 2 demonstration
- EPA anticipates few situations where a Tier 2 demonstration would be necessary, we expect most situations could be demonstrated under Tier 1
- For second tier assessments when necessary, EPA technical guidance is provided on the air quality models, inputs, run time options, receptor placement, and application approach for the purposes of estimating the impacts on ozone and secondarily formed PM2.5 from single project sources
  - Guidance on the Use of Models for Assessing the Impacts of Emissions from Single Sources on the Secondarily Formed Pollutants: Ozone and PM2.5 (EPA-454/R-16-005 December 2016)
- Within the second tier described the revised Guideline, the EPA's guidance provides applicants with flexibility in terms of the complexity of model application for comparison to both the SIL and NAAQS
- This flexibility allows for simpler approaches to be compared conservatively to the SIL and NAAQS and more sophisticated approaches could be applied to provide a more representative impact for a source's impact

Applicable Guidance

- Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program (April 2018)
- Guidance on the Use of Models for Assessing the Impacts of Emissions from Single Sources on the Secondarily Formed Pollutants: Ozone and PM2.5 (EPA-454/R-16-005; December 2016)
- Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM2.5 under the PSD Permitting Program (EPA-454/R-19-003; April 2019)
- Guidance for PM2.5 Permit Modeling (EPA–454/B–14–001; May 2014)
- Guidance for Ozone and PM2.5 Permit Modeling (*in preparation*)

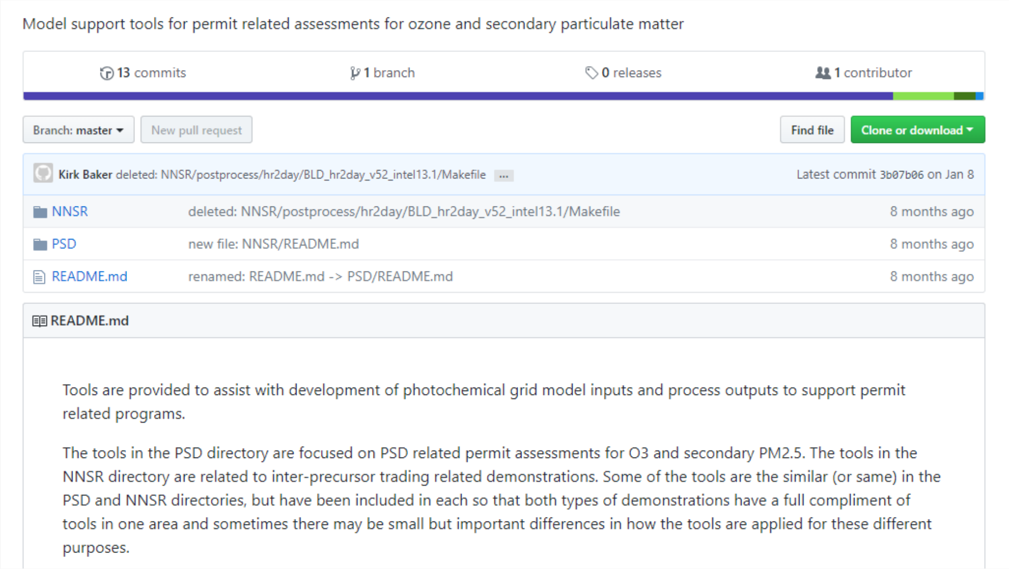
Photochemical Grid Models for Regulatory Assessments

- EPA prepared a memorandum that shows CMAQ and CAMx photochemical models are appropriate to use for the purposes of estimating O3 and PM2.5 for permit related program demonstrations and NAAQS attainment demonstrations

  https://www3.epa.gov/ttn/scram/guidance/clarification/20170804-Photochemical_Grid_Model_Clarification_Memo.pdf
- The *Guideline* outlines elements needed for an alternative model demonstration where no preferred model exists for a particular situation so this memorandum documents that CMAQ and CAMx meet these criteria
- This does not replace the need to provide project specific evaluations that focus on model performance near the project source and key receptors, but does provide a “fit for purpose” basis so that all applicants do not need to provide such a demonstration for each project

PSD Tier 1 & 2 Demonstration Support Tools

- EPA is working toward making tools available that add sources to existing model inputs and post-process outputs for Tier 2 demonstrations and those interested in developing new Tier 1 demonstration tools
- https://github.com/epa-kpc/O3PM-PSDNSR



Model Input/Output Data Availability

- The availability of model inputs and outputs of photochemical models (i.e., model platform data) allows for their application as a Tier 2 demonstration to be streamlined
- EPA and other organizations have made such model platform data freely available to interested users. For instance, model-ready inputs for both CAMx and CMAQ for the entire year of 2011 & 2016 are available at http://views.cira.colostate.edu/tsdw/
- Multi-jurisdictional organizations typically either have existing photochemical grid model inputs or can direct those interested to other groups/organizations in the same region that may have suitable data

Multi-Jurisdictional Organizations

Organization	Region of the country	Internet site
CENSARA	Central U.S.	http://www.censara.org/
LADCO	Upper Midwest	www.ladco.org
MARAMA	Mid-Atlantic	http://www.marama.org/
NESCAUM	Northeast U.S.	http://www.nescaum.org/
NW-AIRQUEST	Northwestern U.S.	http://lar.wsu.edu/airpact/
SESARM	Southeast U.S.	http://www.metro4-sesarm.org/content/metro-4sesarm-partnership
WRAP	Western U.S.	https://www.wrapair2.org/

Source Impact Analysis: Class 1 PSD Increment for $PM_{2.5}$

Thursday, June 13, 2019

Final MERPs Guidance Webinar

Applying the two-level assessment to an Example Source

Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy

- Located on OCS*
- 300 km from Class I area

First Level Assessment

- Primary impacts at 50 km estimated using OCD.
- Secondary impacts at 50 km using representative MERPs modeling.

Second Level Assessment

- Primary impacts at 300 km estimated using illustrative information from EPA’s hypothetical source modeling.
- Secondary impacts at 300 km using representative MERPs modeling.

* Unlike permitting a stationary source on land, OCS permitting regulations require that for the purpose of determining potential emissions, construction-based emissions as well as emissions from vessels servicing or associated with the OCS source when traveling within 25 miles en route to or from any part of the OCS source are considered direct emissions from the source.

Applying the two-level assessment to an Example Source

Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy

- Located on OCS
- 300 km from Class I area

First Level Assessment

- Primary impacts at 50 km estimated using OCD.
- Secondary impacts at 50 km using representative MERPs modeling.

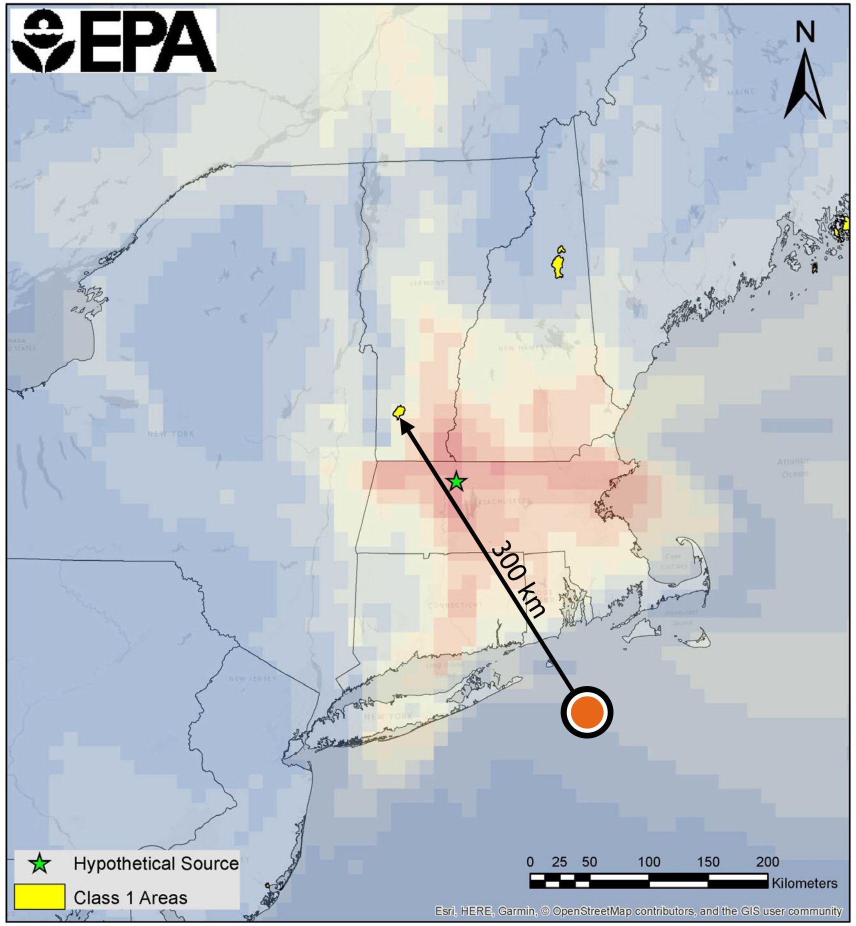
Second Level Assessment

- Primary impacts at 300 km estimated using illustrative information from EPA's hypothetical source modeling.
- Secondary impacts at 300 km using representative MERPs modeling.

Hypothetical Source

NO_X 500 tpy

Applying the two-level assessment to the Example Source



Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by location

Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4

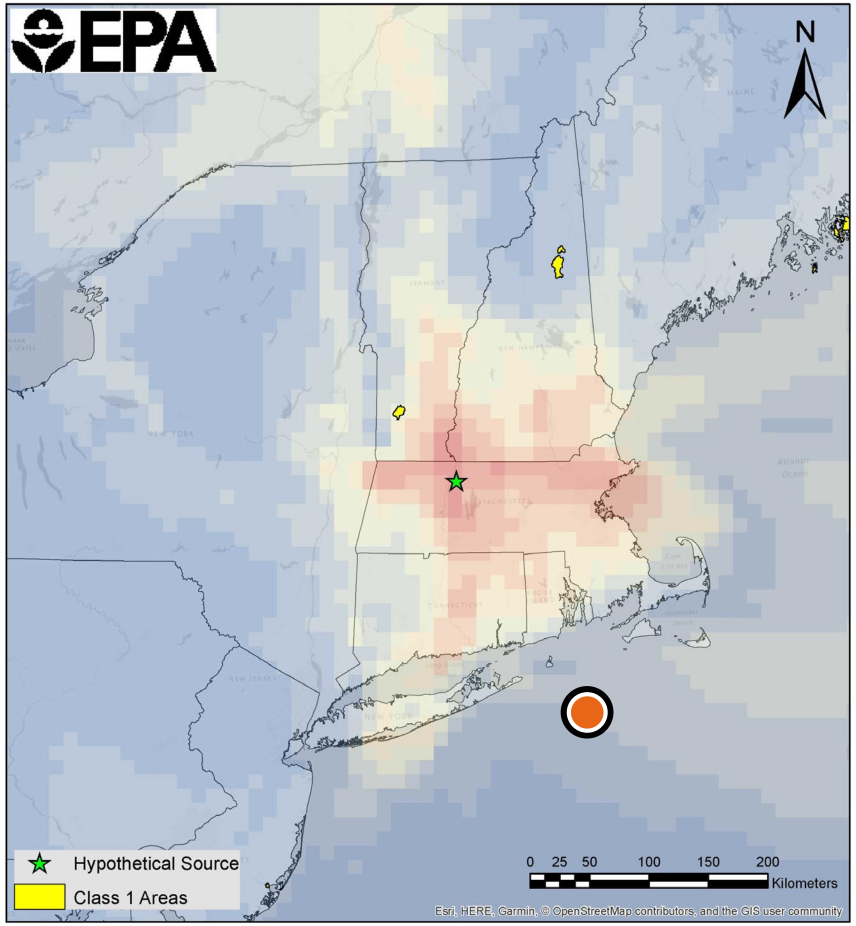
Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy

Hypothetical Source

NO_X 500 tpy

Applying the two-level assessment to the Example Source



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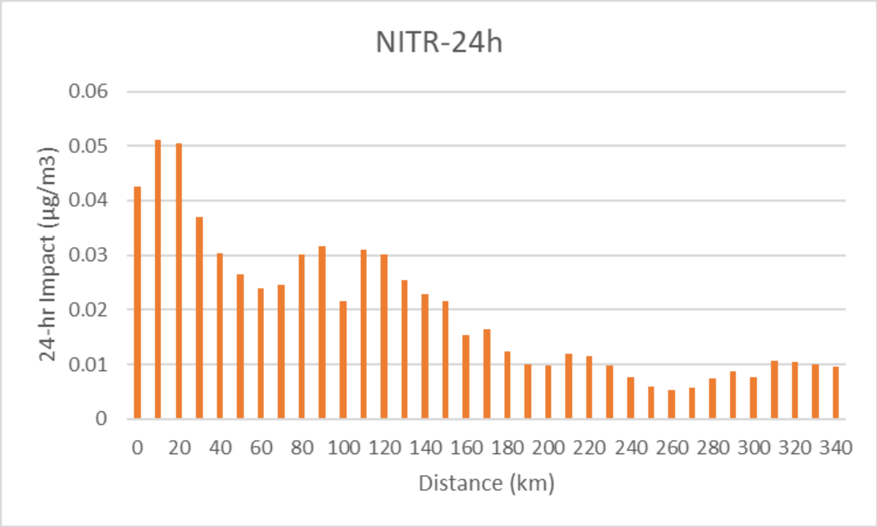


Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by distance

Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4

Impact	Concentration (µg/m^3)
Primary	
Secondary	
Total	

Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy

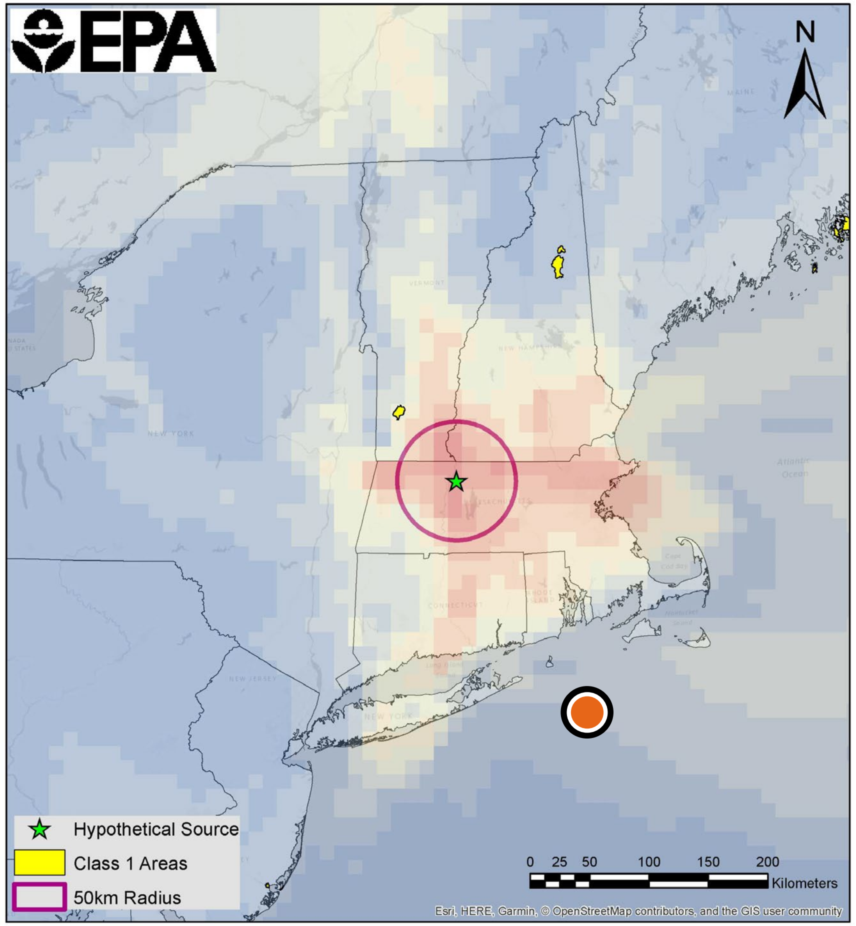
Hypothetical Source

NO_X 500 tpy

Example Source:
First-Level Assessment - Secondary

Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy



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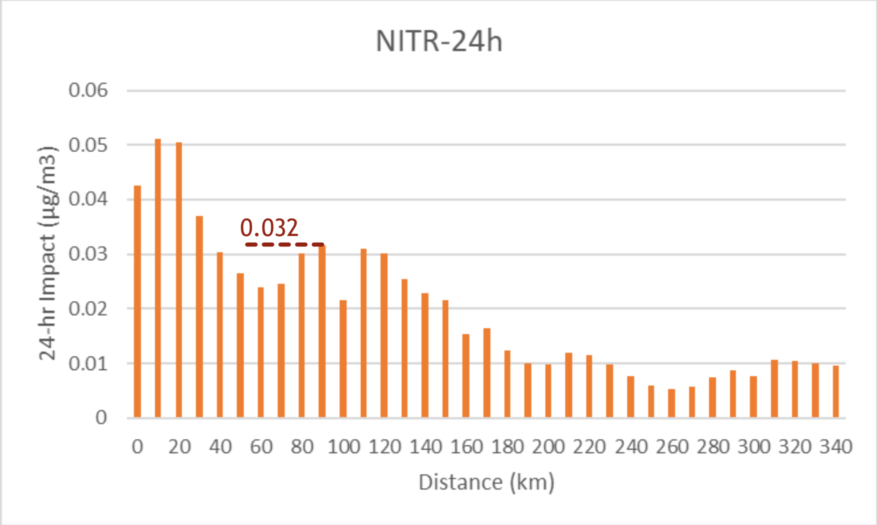


Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by distance
Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4

Impact	Concentration ($\mu g/m^3$)
Primary	
Secondary	0.192
Total	

$0.032 \times 3000/500$

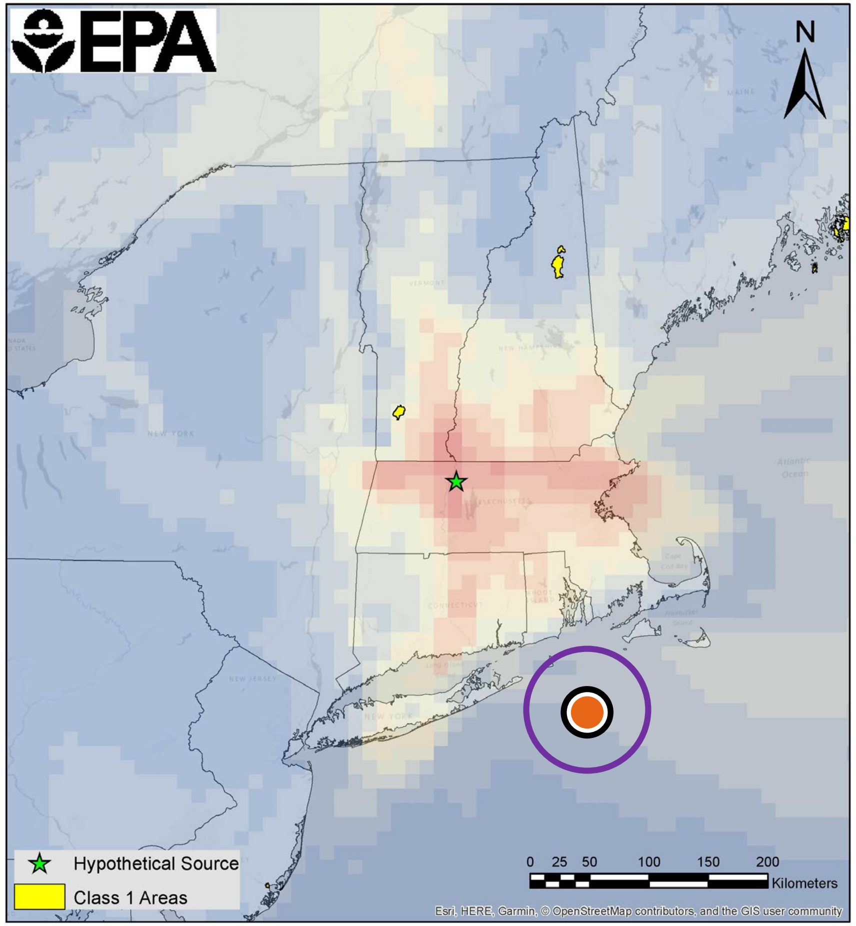
Hypothetical Source

NO_X 500 tpy

Example Source: First-Level Assessment - Primary

Example Source

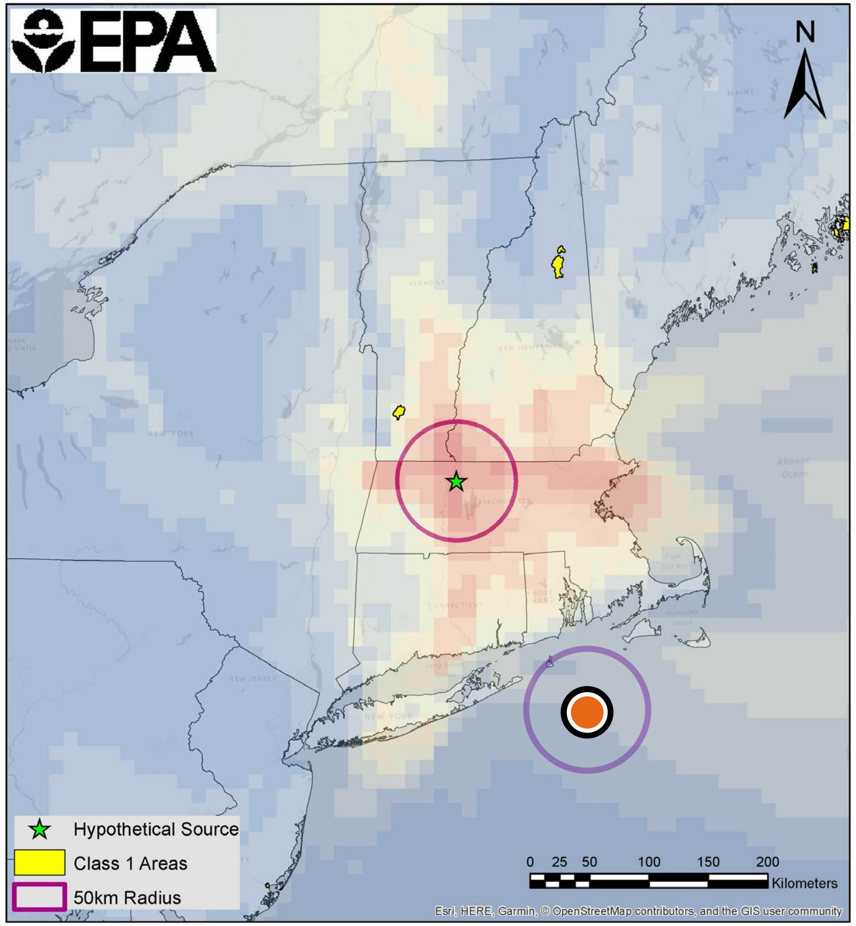
$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy



Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by location
Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4

Impact	Concentration ($\mu g/m^3$)	
Primary	0.20	from OCD
Secondary	0.192	
Total		

Example Source: First-Level Assessment - Total



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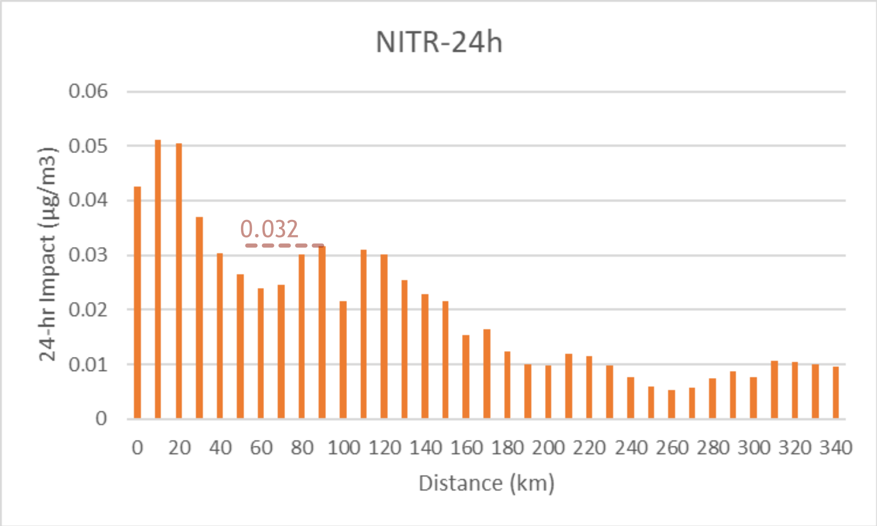


Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by distance
Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4

Impact	Concentration ($\mu g/m^3$)
Primary	0.20
Secondary	0.192
Total	0.392

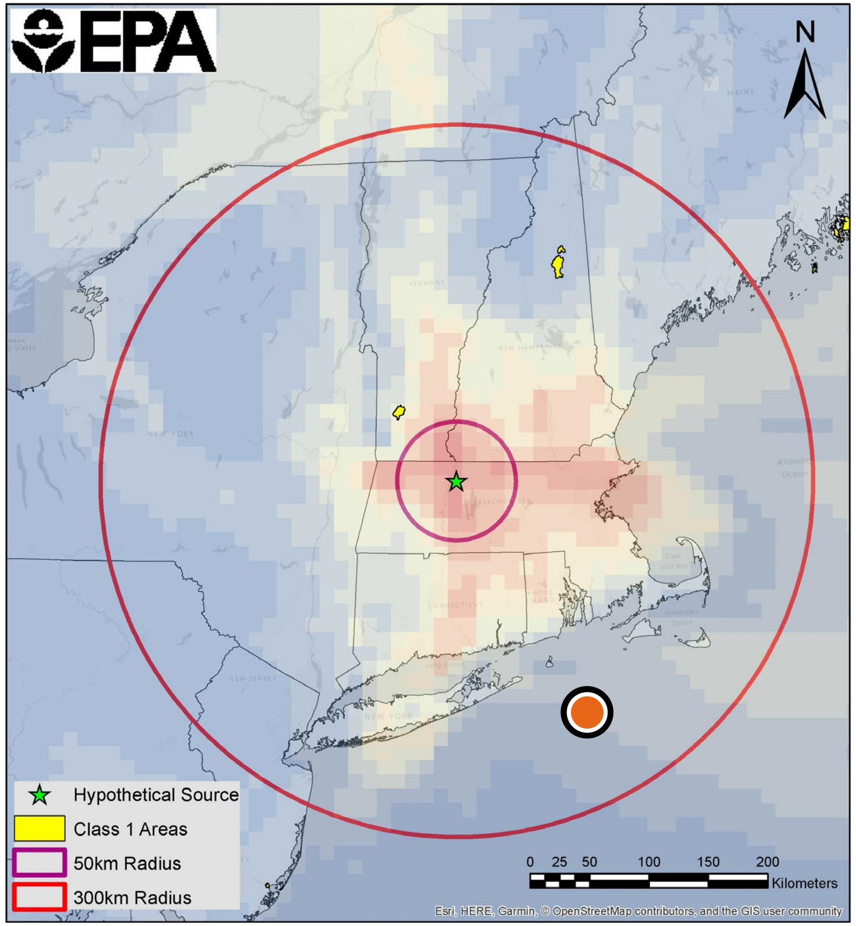
> 0.27 $\mu g/m^3$

Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy

Reference: April 17, 2018 memorandum, "Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program"

Example Source: Second-Level Assessment



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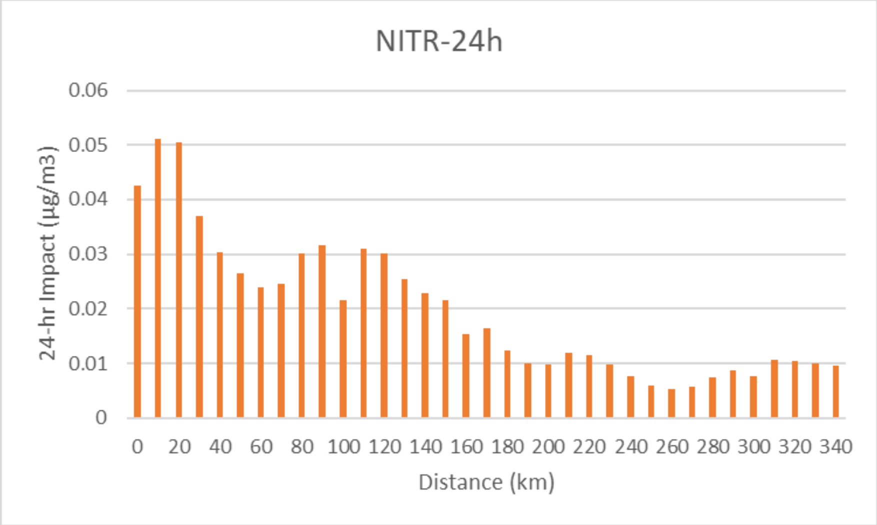


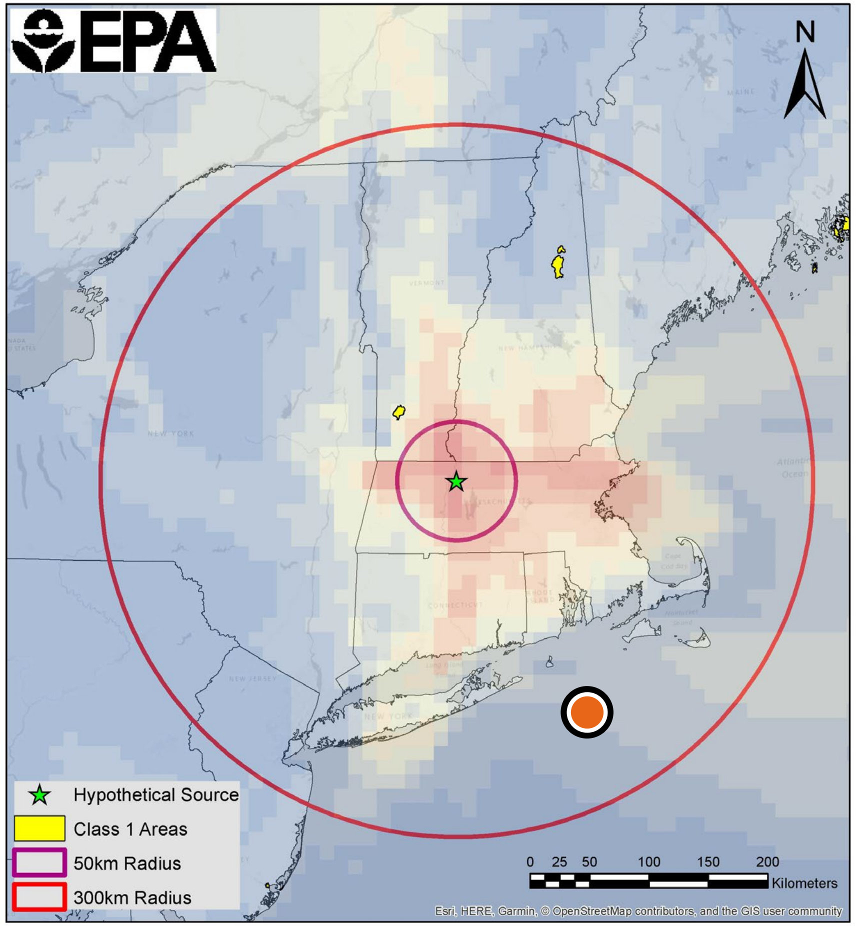
Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by distance
Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4

Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy

Impact	Concentration ($\mu g/m^3$)
Primary	
Secondary	
Total	

Example Source:
Second-Level Assessment - Secondary



Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by location

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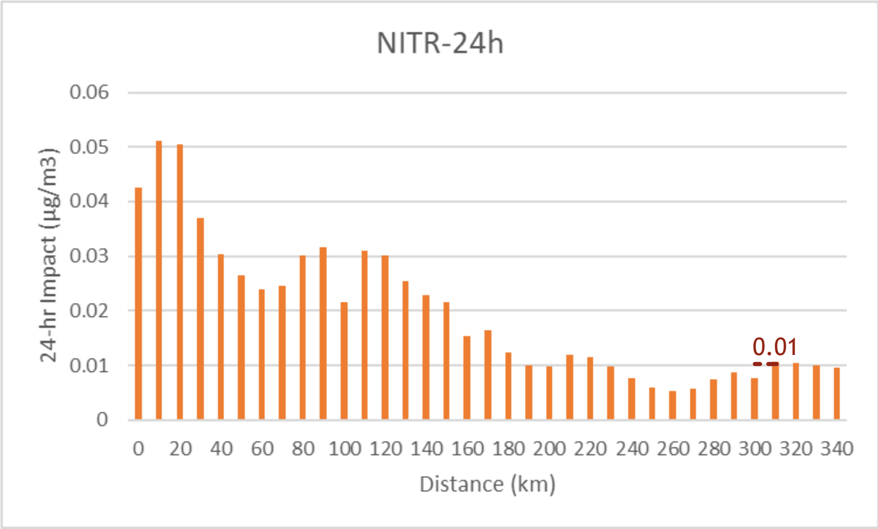


Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by distance

Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4

Impact	Concentration (µg/m^3)
Primary	
Secondary	0.06
Total	

$0.01 \times 3000/500$

Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy

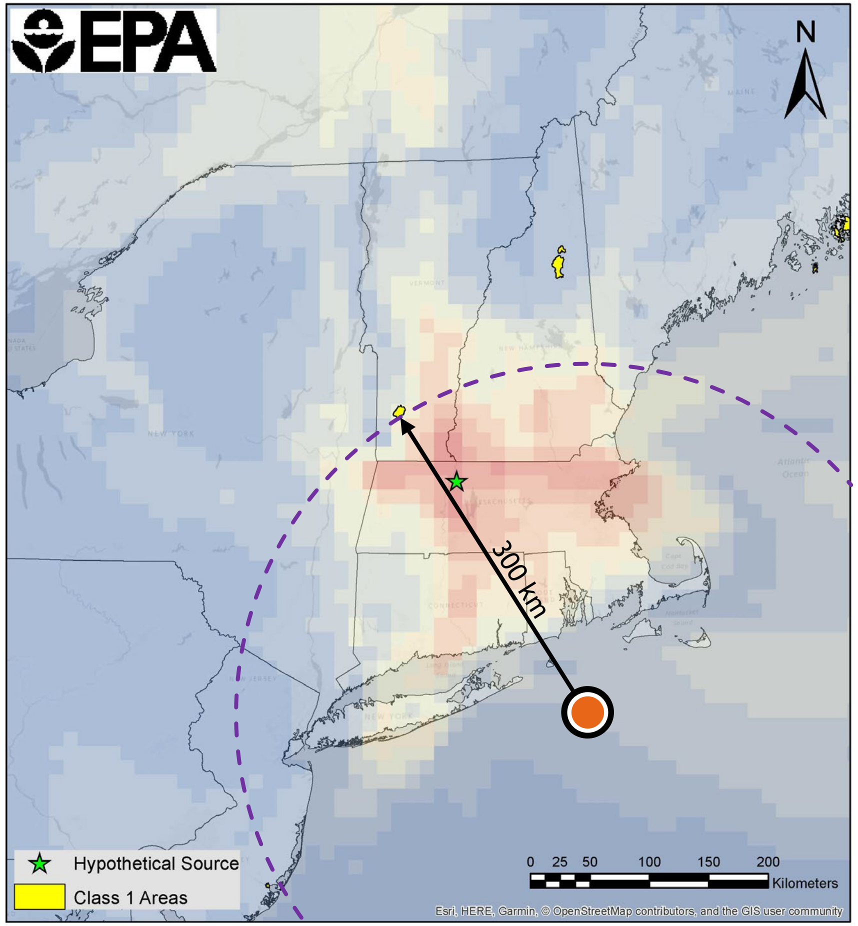
Hypothetical Source

NO_X 500 tpy

Example Source:
Second-Level Assessment - Primary

Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy



Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by location
Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4

Impact	Concentration (µg/m³)
Primary	?
Secondary	0.06
Total	

Example Source: Second-Level Assessment - Primary

Table 4-2. Maximum daily average and maximum annual average primary $PM_{2.5}$ impacts at 100, 200, and 300 km from modeled hypothetical source.

Emission Rate (tpy)	Distance from source (km)	Highest Daily Average Concentration (μg/m³) - tall stack	Highest Daily Average Concentration (μg/m³) - surface release	Highest Annual Average Concentration (μg/m³) - tall stack	Highest Annual Average Concentration (μg/m³) - surface release
100	300	0.0117	0.0123	0.0008	0.0009
100	200	0.0223	0.0212	0.0016	0.0015
100	100	0.0537	0.0445	0.0070	0.0049
150	300	0.0180	0.0184	0.0012	0.0013
150	200	0.0328	0.0311	0.0024	0.0022
150	100	0.0807	0.0632	0.0102	0.0073
500	300	0.0610	0.0625	0.0044	0.0045
500	200	0.1167	0.1095	0.0087	0.0078
500	100	0.2717	0.2536	0.0379	0.0238
1000	300	0.1186	0.1217	0.0087	0.0089
1000	200	0.2300	0.2161	0.0175	0.0157
1000	100	0.5445	0.5009	0.0731	0.0477

Reference: Final MERPs Guidance

<u>Example Source</u>

$PM_{2.5}$	100 tpy
NO_X	3,000 tpy

Impact	Concentration (μg/m³)
Primary	?
Secondary	0.06
Total	

Example Source:
Second-Level Assessment - Primary

Table 4-2. Maximum daily average and maximum annual average primary $PM_{2.5}$ impacts at 100, 200, and 300 km from modeled hypothetical source.

Emission Rate (tpy)	Distance from source (km)	Highest Daily Average Concentration (μg/m^3) - tall stack	Highest Daily Average Concentration (μg/m^3) - surface release	Highest Annual Average Concentration (μg/m^3) - tall stack	Highest Annual Average Concentration (μg/m^3) - surface release
100	300	0.0117	0.0123	0.0008	0.0009
100	200	0.0223	0.0212	0.0016	0.0015
100	100	0.0537	0.0445	0.0070	0.0049
150	300	0.0180	0.0184	0.0012	0.0013
150	200	0.0328	0.0311	0.0024	0.0022
150	100	0.0807	0.0632	0.0102	0.0073
500	300	0.0610	0.0625	0.0044	0.0045
500	200	0.1167	0.1095	0.0087	0.0078
500	100	0.2717	0.2536	0.0379	0.0238
1000	300	0.1186	0.1217	0.0087	0.0089
1000	200	0.2300	0.2161	0.0175	0.0157
1000	100	0.5445	0.5009	0.0731	0.0477

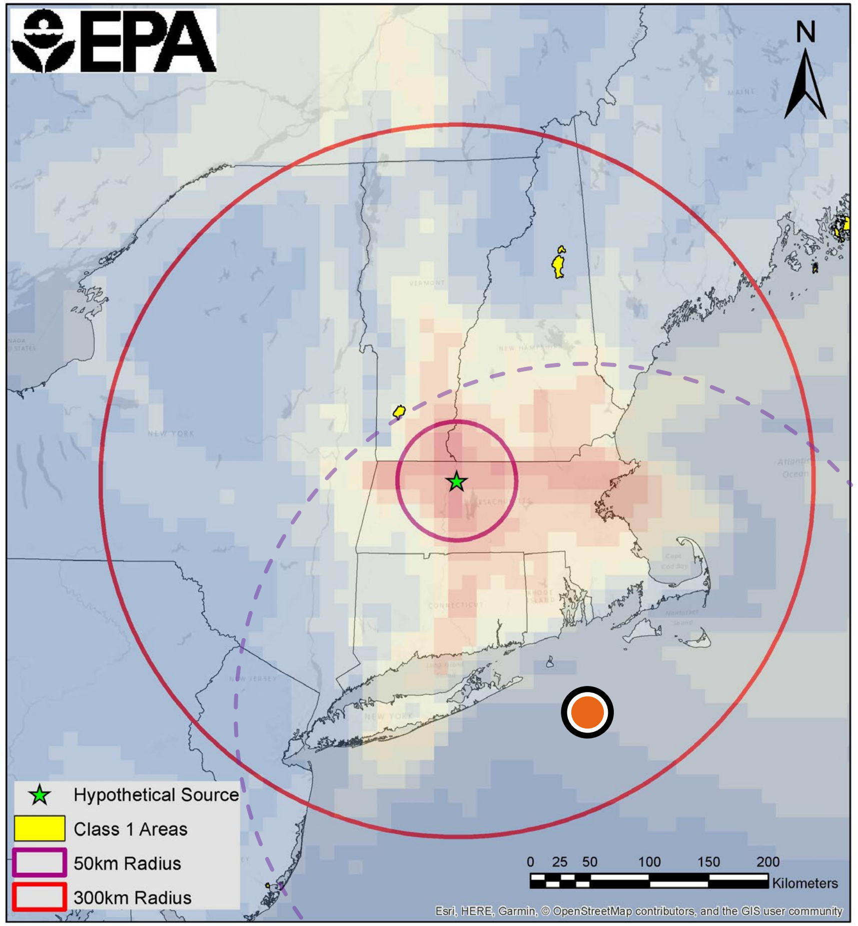
Reference: Final MERPs Guidance

Impact	Concentration (μg/m^3)
Primary	0.0123
Secondary	0.06
Total	

Example Source

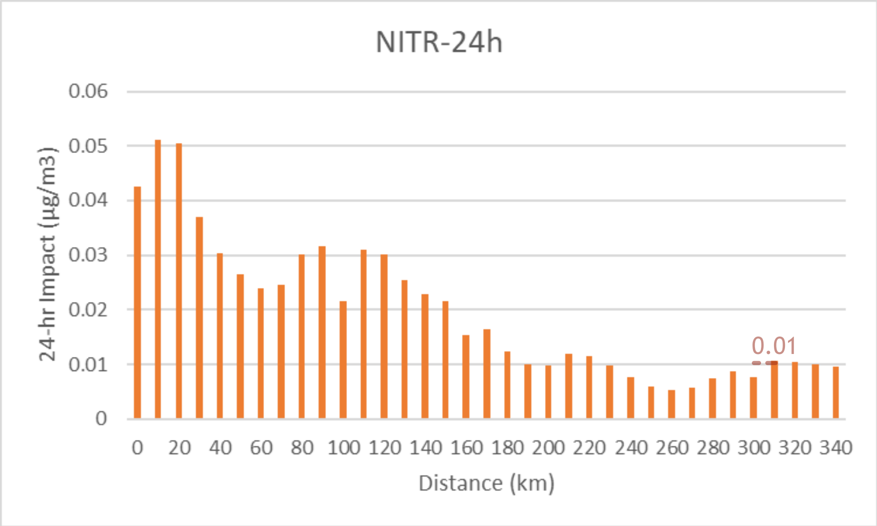
$PM_{2.5}$	100 tpy
NO_X	3,000 tpy

Example Source:
Second-Level Assessment - Total



Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by location

Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4



Hypothetical source secondary formation modeling results: maximum daily nitrate concentration, by distance

Reference: Final MERPs Guidance, Eastern U.S. domain, 500 tpy, low-level release, hypothetical source 4

Example Source

$PM_{2.5}$ 100 tpy
NO_X 3,000 tpy

Impact	Concentration ($\mu g/m^3$)
Primary	0.0123
Secondary	0.06
Total	0.0723

< 0.27 $\mu g/m^3$

Reference: April 17, 2018 memorandum, “Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program”

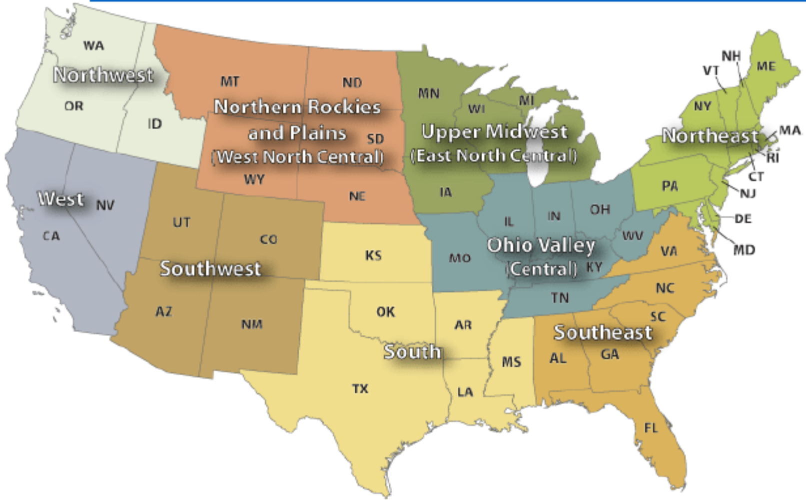
Tier 1 $PM_{2.5}$ MERPs Demonstration Example

A step by step demonstration of how to apply Tier 1 MERPs to assess secondary PM2.5 impacts in PSD permits, including a refined analysis to address long-range transport into Class I areas

Tier 1 Demonstration: Selecting an appropriate hypothetical MERPs

Step 1) Start with lowest, most conservative, illustrative MERPs for selected Climate Zone (Table 4-1, new to revised guidance):

Figure 3-4. NOAA climate zone map with number of hypothetical source locations modeled in each climate zone.
Source: https://www.ncdc.noaa.gov/monitoring-references/maps/us-climate-regions.php



Climate Zone	Sources
Northeast	10
Southeast	9
Ohio Valley	19
Upper Midwest	12
Rockies/Plaines	14
South	17
Southwest	15
West	6
Northwest	3

Table 4-1. Lowest, median, and highest illustrative MERP values (tons per year) by precursor, pollutant and climate zone.
Note: illustrative MERP values are derived based on EPA modeling and EPA recommended SILs from EPA's final SILs guidance (U.S. Environmental Protection Agency, 2018).

	8-hr O_3 from NO_X			8-hr O_3 from VOC		
Climate Zone	Lowest	Median	Highest	Lowest	Median	Highest
Northeast	209	495	5,773	2,068	3,887	15,616
Southeast	170	272	659	1,936	7,896	42,964
Ohio Valley	126	340	1,346	1,159	3,802	13,595
Upper Midwest	125	362	4,775	1,560	2,153	30,857
Rockies/Plains	184	400	3,860	1,067	2,425	12,788
South	190	417	1,075	2,307	4,759	30,381
Southwest	204	422	1,179	1,097	10,030	144,744
West	218	429	936	1,094	1,681	17,086
Northwest	199	373	4,031	1,049	2,399	15,929

	Daily PM2.5 from NO_X			Daily PM2.5 from SO_2		
Climate Zone	Lowest	Median	Highest	Lowest	Median	Highest
Northeast	2,218	15,080	34,307	623	3,955	8,994
Southeast	1,943	8,233	23,043	367	2,475	5,685
Ohio Valley	2,570	10,119	32,257	348	3,070	16,463
Upper Midwest	2,963	10,043	29,547	454	2,482	6,096
Rockies/Plains	1,740	9,389	31,263	251	2,587	19,208
South	1,881	8,079	24,521	274	1,511	10,112
Southwest	6,514	26,322	101,456	1,508	8,730	27,219
West	1,073	8,570	34,279	188	2,236	24,596
Northwest	3,003	11,943	20,716	1,203	3,319	8,418

	Annual PM2.5 from NO_X			Annual PM2.5 from SO_2		
Climate Zone	Lowest	Median	Highest	Lowest	Median	Highest
Northeast	10,142	47,396	137,596	4,014	21,353	41,231
Southeast	5,679	45,076	137,516	859	14,447	25,433
Ohio Valley	7,625	31,931	150,868	3,098	23,420	58,355
Upper Midwest	10,011	33,497	139,184	2,522	17,997	45,113
Rockies/Plains	9,220	39,819	203,546	2,263	16,939	106,147
South	7,453	41,577	110,478	1,781	11,890	58,612
Southwest	11,960	128,564	779,117	10,884	38,937	105,417
West	3,182	29,779	103,000	2,331	11,977	66,773
Northwest	7,942	21,928	71,569	11,276	15,507	18,263

Tier 1 Demonstration: Selecting an appropriate hypothetical MERPs

Step 2) Screen the closest hypothetical sources to the project facility and select the lowest, most conservative, MERPs

Table A-2. A list of emission rates and stack release height combinations modeled for each domain. A complete list of hypothetical sources in each domain are provided in Table A-1. Figures showing the location of specific sources by domain are provided in Figures A1-A4.

				NAAQS & Precursors Modeled		
Geographic Region	# hypothetical sources within the region	Release Type	Emission Rate (tpy)	8-hr O3	Daily PM2.5	Annual PM2.5
12EUS3 (eastern US)	18	H	3000	NOX, VOC	NOX, SO2	NOX, SO2
	18	H	1000	NOX, VOC	NOX, SO2	NOX, SO2
	18	H	500	NOX, VOC	NOX, SO2	NOX, SO2
	18	L	500	NOX, VOC	NOX, SO2	NOX, SO2
12EUS2 (central US)	25	H	3000	NOX, VOC	NOX, SO2	NOX, SO2
	25	H	1000	NOX, VOC	NOX, SO2	NOX, SO2
	25	L	1000	VOC	NOX, SO2	NOX, SO2
	25	H	500	NOX	NOX, SO2	NOX, SO2
	25	L	500	NOX, VOC	NOX, SO2	NOX, SO2
12WUS1 (western US)	26	H	3000	NOX, VOC	NOX, SO2	NOX, SO2
	26	H	1000	NOX, VOC	NOX, SO2	NOX, SO2
	26	H	500	NOX, VOC	NOX, SO2	NOX, SO2
	26	L	500	NOX, VOC	NOX, SO2	NOX, SO2
12US2 (contiguous US)	36	H	1000	NOX	NOX, SO2	NOX, SO2
	36	H	500	NOX	NOX, SO2	NOX, SO2
	36	L	500	NOX, VOC	NOX, SO2	NOX, SO2

Tier 1 Demonstration: Selecting an appropriate hypothetical MERPs

Step 3) If selecting a nearby hypothetical source that is not the most conservative, the applicant should describe how the existing modeling reflects the formation of O_3 or $PM_{2.5}$ in that geographic area and is therefore most appropriate.

Information that could be used to describe the comparability of two different geographic areas include:

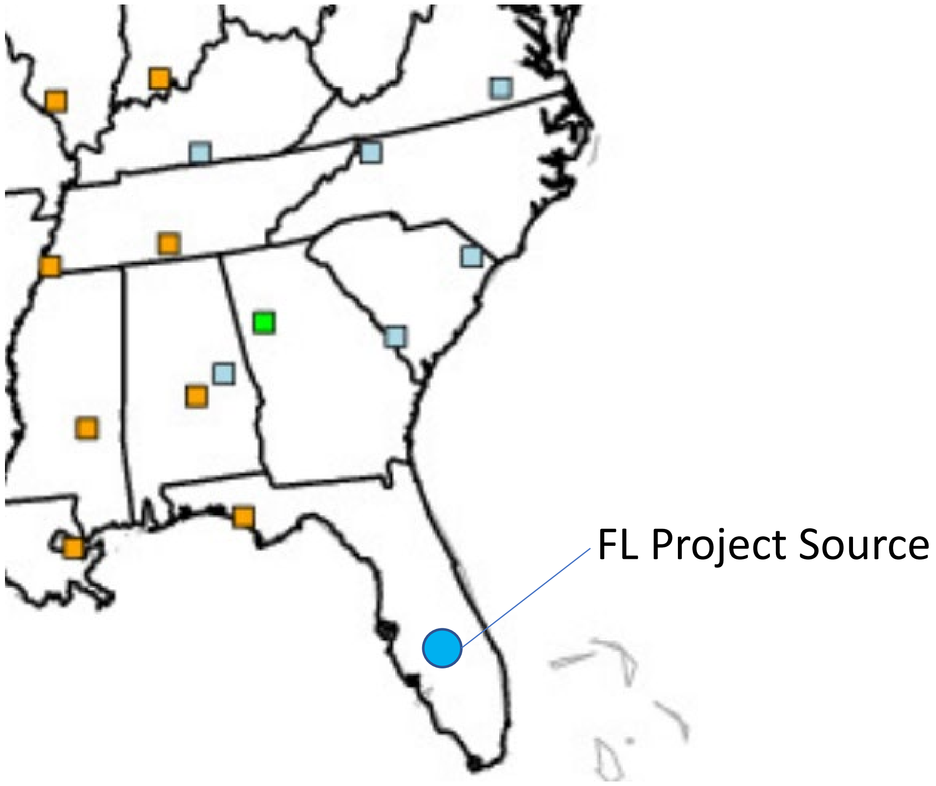
- nearby local and regional sources of pollutants and their emissions (e.g., other industry, mobile, biogenics)
- rural or urban nature of the area
- terrain
- ambient concentrations of relevant pollutants where available
- average and peak temperatures
- humidity

Table A-1. Complete list of EPA modeled hypothetical sources presented in this document. "Max Nearby Urban (%)" column provides the highest percentage urban landcover in any grid cell near (within 50 km) the source.

FIPS	State	County	Domain	Source	Latitude	Longitude	Max Nearby Terrain (m)	Max Nearby Urban (%)
1001	Alabama	Autauga	12EUS2	4	32.522	-86.550	179	25
1123	Alabama	Tallapoosa	12EUS3	19	32.848	-85.809	306	10
4005	Arizona	Coconino	12US2	36	35.428	-111.270	2483	7.4
4007	Arizona	Gila	12WUS1	14	33.469	-110.789	1592	4.3
4012	Arizona	La Paz	12WUS1	17	33.400	-113.408	757	0.9
5119	Arkansas	Pulaski	12EUS2	13	34.724	-92.275	235	32.2

Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with $\boldsymbol{1.0\,\frac{ug}{m3}}$ modeled concentration of Primary $PM_{2.5}$ for the 24-hr Class II SIL.



Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example

NO_X and SO_2 precursor contributions to secondary $PM_{2.5}$ are considered together, in addition to modeled primary $PM_{2.5}$, to determine if the source's air quality impact would exceed the $PM_{2.5}$ SIL.

<u>Equations to assess Project emission secondary impacts:</u>

Project Impact as % of SIL = $\frac{Emission\ rate\ (tpy)\ from\ Project}{MERP\ (tpy)\ from\ hypothetical\ Source} * 100$

Project Impact in ppb or $\frac{ug}{m3}$ = $\frac{Emission\ rate\ (tpy)\ from\ Project}{MERP\ (tpy)\ from\ hypothetical\ source} * applicable\ SIL\ value\ (ppb\ or\ \frac{ug}{m3})$

Project Impact in ppb or $\frac{ug}{m3}$ = $Emission\ rate\ (tpy)\ from\ Project * \frac{Modeled\ air\ quality\ impact\ from\ hypothetical\ soruce}{Modeled\ emission\ rate\ (tpy)\ from\ hypothetical\ source}$

Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with ***1.0*** $\boldsymbol{\frac{ug}{m3}}$ modeled concentration of Primary $PM_{2.5}$ for the 24-hr Class II SIL.

Step 1): Use lowest illustrative MERP from the Southeast Climate Zone:

$PM_{2.5}$ 24-hr SIL = 1.2 $\boldsymbol{\frac{ug}{m3}}$

Is Primary + Secondary $PM_{2.5}$ > SIL?

Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with $\mathbf{1.0 \frac{ug}{m3}}$ modeled concentration of Primary $PM_{2.5}$ for the 24-hr Class II SIL.

$$\text{Project Impact as \% of SIL} = \frac{Emission\ rate\ (tpy) from\ Project}{MERP\ (tpy) from\ hypothetical\ Source} * 100$$

$$\text{Project Impact in } \frac{ug}{m3} = \frac{Emission\ rate\ (tpy) from\ Project}{MERP\ (tpy) from\ hypothetical\ source} * applicable\ SIL\ value\ (\frac{ug}{m3})$$

	Daily PM2.5 from NO_x			Daily PM2.5 from SO_2		
Climate Zone	Lowest	Median	Highest	Lowest	Median	Highest
Northeast	2,218	15,080	34,307	623	3,955	8,994
Southeast	1,943	8,721	23,043	367	2,516	5,685
Ohio Valley	2,570	9,814	32,257	348	2,648	16,463

Step 1): Use lowest illustrative MERP from the Southeast Climate Zone:

$$\text{Project Impact as \% of SIL} = \left(\frac{100\ tpy\ NOX\ from\ source}{1{,}943\ tpy\ NOX\ daily\ PM2.5\ MERP} + \frac{100\ tpy\ SO2\ from\ source}{367\ TPY\ SO2\ daily\ PM2.5\ MERP}\right) * 100 = \mathbf{32\%} \text{ of SIL}$$

$$\text{Project Impact in } \frac{ug}{m3} = \left(\frac{100\ tpy\ NOX\ from\ source}{1{,}943\ tpy\ NOX\ daily\ PM2.5\ MERP} + \frac{100\ tpy\ SO2\ from\ source}{367\ TPY\ SO2\ daily\ PM2.5\ MERP}\right) * 1.2 \frac{ug}{m3} = \mathbf{0.384 \frac{ug}{m3}}$$

Primary + Secondary $PM_{2.5}$ as % of SIL:

$$\frac{1.0 \frac{ug}{m3}\ modeled}{1.2 \frac{ug}{m3}\ SIL} + 0.32 = \mathbf{115\%\ of\ SIL}$$

Primary + Secondary $PM_{2.5}$ in $\frac{ug}{m3}$:

$$1.0 \frac{ug}{m3} + 0.384 \frac{ug}{m3} = \mathbf{1.384 \frac{ug}{m3}}$$

Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with $\boldsymbol{1.0\,\frac{ug}{m3}}$ modeled concentration of Primary $PM_{2.5}$ for the 24-hr Class II SIL.

$PM_{2.5}$ 24-hr SIL = 1.2 $\frac{ug}{m3}$

Step 1): Use lowest, illustrative MERP from the Southeast Climate Zone:

100 tpy NO_x from source/1,943 tpy NO_x daily $PM_{2.5}$ MERP = 0.05
100 tpy SO_2 from source/367 tpy SO_2 daily $PM_{2.5}$ MERP = 0.27
Total Secondary $PM_{2.5}$ = .05 + .27 = .32 * 100 = **32%** or 0.32 * 1.2 $\frac{ug}{m3}$ = **0.384** $\mathbf{\frac{ug}{m3}}$

Is Primary + Secondary $PM_{2.5}$ > SIL?
1.0 + 0.38 = **1.38** $\mathbf{\frac{ug}{m3}}$

If no, then total $PM_{2.5}$ daily is below the SIL and no Class II Increment or NAAQS analysis is necessary

Step 2: Select lowest MERP from nearby sources with similar stack height:

Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with ***1.0*** $\boldsymbol{\frac{ug}{m3}}$ modeled concentration of Primary $PM_{2.5}$ for the 24-hr Class II SIL.

Step 2): Select lowest MERP from nearby sources with similar stack height:

- -Florida, Bay (12EUS2):
- -Alabama, Tallapoosa (12EUS3):
- -Alabama, Autauga (12EU2):

Metric	Poll	State	County	Emissions	Stack Height	Conc	MERP
DAILY	NITRATE	Florida	Bay	1000	10	0.618	1943
DAILY	NITRATE	Florida	Bay	500	10	0.283	2122
DAILY	NITRATE	Alabama	Autauga	500	10	0.178	3370
DAILY	NITRATE	Alabama	Autauga	1000	10	0.341	3514
DAILY	NITRATE	Alabama	Tallapoosa	500	10	0.092	6555

Metric	Poll	State	County	Emissions	Stack Height	Conc	MERP
DAILY	SULFATE	Florida	Bay	1000	10	3.271	367
DAILY	SULFATE	Alabama	Autauga	1000	10	3.097	387
DAILY	SULFATE	Florida	Bay	500	10	1.366	439
DAILY	SULFATE	Alabama	Autauga	500	10	1.231	487
DAILY	SULFATE	Alabama	Tallapoosa	500	10	0.325	1844

Same MERPs from Step 1; therefore:

Total Secondary $PM_{2.5}$ = 0.384 $\frac{ug}{m3}$ or **32%** of SIL

Total $PM_{2.5}$ = 1.0 + 0.38 = **1.38** $\boldsymbol{\frac{ug}{m3}}$

Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with ***1.0*** $\boldsymbol{\frac{ug}{m3}}$ modeled concentration of Primary $PM_{2.5}$ for the 24-hr Class II SIL.

$PM_{2.5}$ 24-hr SIL = 1.2 $\boldsymbol{\frac{ug}{m3}}$

Step 1): Use lowest illustrative MERP from the Southeast Climate Zone:

100 tpy NO_x from source/1,943 tpy NO_x daily $PM_{2.5}$ MERP = 0.05
100 tpy SO_2 from source/367 TPY SO_2 daily $PM_{2.5}$ MERP = 0.27
Total Secondary $PM_{2.5}$ = .05 + .27 = .32 * 100 = **32%** or 0.32 * 1.2 $\frac{ug}{m3}$ = **0.384** $\boldsymbol{\frac{ug}{m3}}$

Is Primary + Secondary $PM_{2.5}$ > SIL?
1.0 + 0.38 = ***1.38*** $\boldsymbol{\frac{ug}{m3}}$

Then Total $PM_{2.5}$ Daily is below the SIL and no Class II Increment or NAAQS analysis is necessary

Step 2: Select lowest MERP from nearby sources with similar stack height:
-Florida, Bay (12EUS2):
-Alabama, Tallapoosa (12EUS3):
-Alabama, Autauga (12EU2):

Same as Step 1:

Total Secondary $PM_{2.5}$ = 0.384 ug/m3 or 32% of SIL
Total $PM_{2.5}$ = 1.0 + 0.38 = ***1.38*** $\boldsymbol{\frac{ug}{m3}}$

Step 3): Select most representative nearby source for similar scenario (500 tpy and L stack):

Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with $\boldsymbol{1.0\,\frac{ug}{m3}}$ modeled concentration of Primary $PM_{2.5}$ for the 24-hr Class II SIL.

Step 3): Select most representative nearby source for similar scenario (500 tpy and L stack):

- -Florida, Bay (12EUS2):
- -Alabama, Tallapoosa (12EUS3):
- -Alabama, Autauga (12EU2):

Information that could be used to assess the comparability of two different geographic areas include:

- nearby local and regional sources of pollutants and their emissions (e.g., other industry, mobile, biogenics)
- rural or urban nature of the area
- terrain features
- ambient concentrations of relevant pollutants where available
- average and peak temperatures
- humidity

Metric	Poll	State	County	Emissions	Stack Height	Conc	MERP
DAILY	NITRATE	Florida	Bay	500	10	0.283	2122
DAILY	NITRATE	Alabama	Autauga	500	10	0.178	3370
DAILY	NITRATE	Alabama	Tallapoosa	500	10	0.092	6555

Metric	Poll	State	County	Emissions	Stack Height	Conc	MERP
DAILY	SULFATE	Florida	Bay	500	10	1.366	439
DAILY	SULFATE	Alabama	Autauga	500	10	1.231	487
DAILY	SULFATE	Alabama	Tallapoosa	500	10	0.325	1844

$$\frac{100\ tpy\ NOX\ from\ source}{6{,}555\ tpy\ NOX\ daily\ PM2.5\ MERP} = 0.015$$

$$\frac{100\ tpy\ SO2\ from\ source}{1{,}844\ TPY\ SO2\ daily\ PM2.5\ MERP} = 0.05$$

Total Secondary $PM_{2.5}$ = .015 + .05 = .065 * 100 = **7%** of SIL or 0.065 * 1.2 $\frac{ug}{m3}$ = $\boldsymbol{0.078\,\frac{ug}{m3}}$

Total $PM_{2.5}$ = 1.0 + 0.078 = ***1.078*** $\boldsymbol{\frac{ug}{m3}}$ √

Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with ***1.0*** $\frac{ug}{m3}$ modeled concentration of Primary $PM_{2.5}$ for the 24-hr Class II SIL.

$PM_{2.5}$ 24-hr SIL = 1.2 $\frac{ug}{m3}$

Step 1): Use lowest illustrative MERP from the Southeast Climate Zone:

100 tpy NO_x from source/1,943 tpy NO_x daily $PM_{2.5}$ MERP = 0.05
100 tpy SO_2 from source/367 TPY SO_2 daily $PM_{2.5}$ MERP = 0.27
Total Secondary PM2.5 = .05 + .27 = .32 * 100 = **32%** or 0.32 * 1.2 ug/m3 = **0.384** $\frac{ug}{m3}$

Is Primary + Secondary $PM_{2.5}$ > SIL?
1.0 + 0.38 = ***1.38*** $\frac{ug}{m3}$

Then Total $PM_{2.5}$ Daily is below the SIL and no Class II Increment or NAAQS analysis is necessary

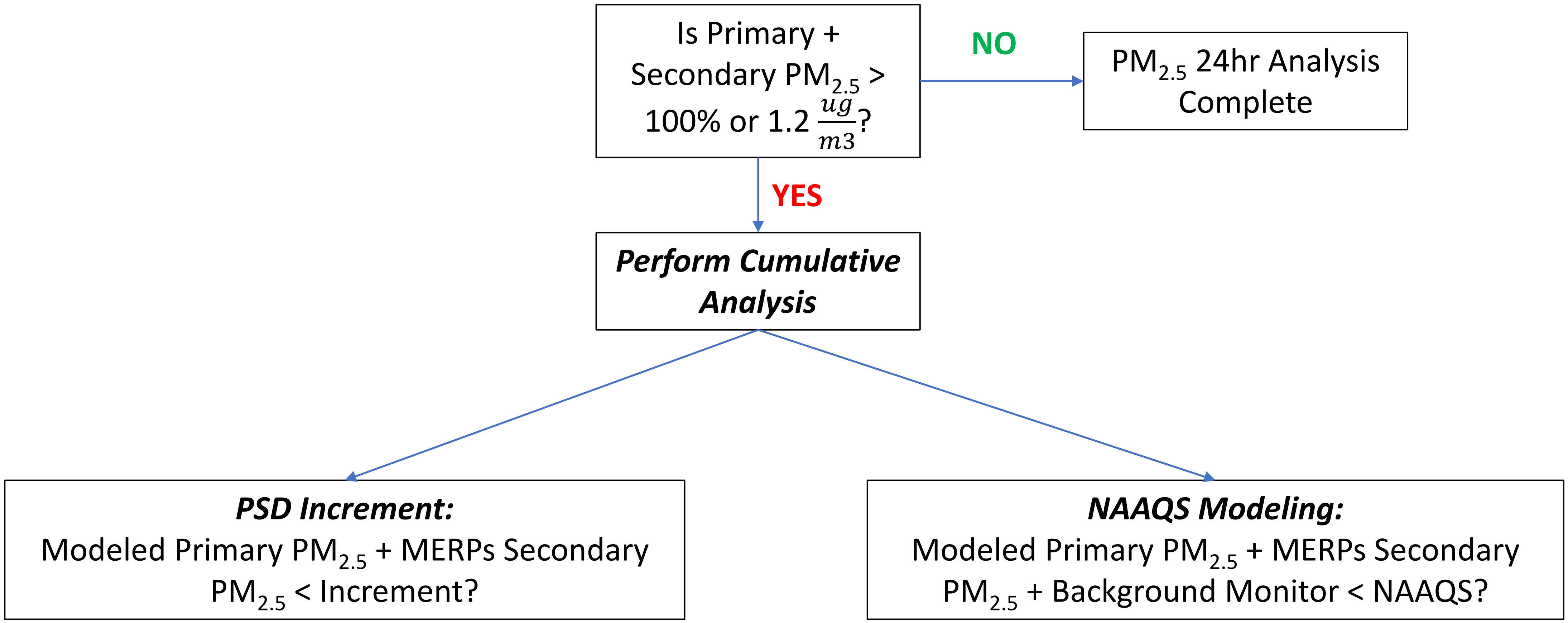
Step 2: Select lowest MERP from nearby sources with similar stack height:
-Florida, Bay (12EUS2):
-Alabama, Tallapoosa (12EUS3):
-Alabama, Autauga (12EUS2):

Same as Step 1:
Total Secondary $PM_{2.5}$ = **32%** of SIL or 0.384 $\frac{ug}{m3}$
Total $PM_{2.5}$ = 1.0 + 0.38 = ***1.38*** $\frac{ug}{m3}$

Step 3): Select representative nearby source for similar scenario (500 tpy and L stack)
-Florida, Bay (12EUS2):
-Alabama, Tallapoosa (12EUS3):
-Alabama, Autauga (12EU2):

NO_x: 100 tpy/6555 MERP = 0.015
SO_2: 100 tpy/1844 MERP = 0.05
Total Secondary $PM_{2.5}$ = **7%** of SIL or **0.078** $\frac{ug}{m3}$
Total $PM_{2.5}$ = 1.0 + 0.078 = ***1.078*** $\frac{ug}{m3}$ √

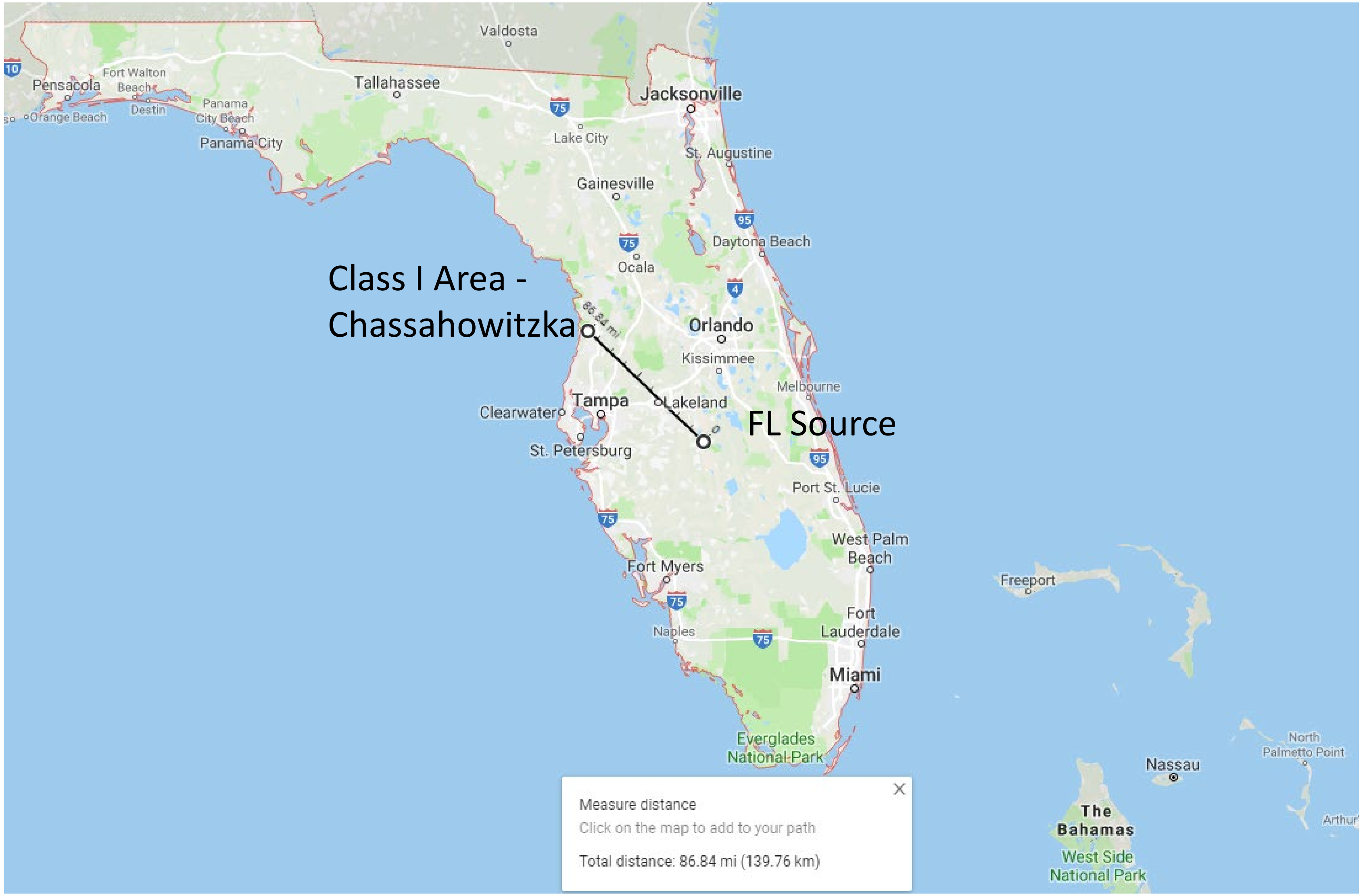
Tier 1 Demonstration: $PM_{2.5}$ 24-hr Class II SIL Example



Tier 1 Demonstration: Class I Analysis Example (Daily $PM_{2.5}$)

$PM_{2.5}$ 24-hr Class I SIL = 0.27 $\frac{ug}{m3}$

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with $\mathbf{0.18\frac{ug}{m3}}$ concentration of Primary $PM_{2.5}$ at 50 km ***and the nearest Class I area is 150 km away***



Use AERMOD to model primary $PM_{2.5}$ at 50km in the direction of the nearest Class I area – Chassahowitzka, 150km away

Primary $PM_{2.5}$ at 50 km = $\mathbf{0.18\frac{ug}{m3}}$

Include Secondary $PM_{2.5}$ for Class I $PM_{2.5}$ assessments

Tier 1 Demonstration: Class I Analysis Example (Daily $PM_{2.5}$)

$PM_{2.5}$ 24-hr Class I SIL = 0.27 $\frac{ug}{m3}$

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with *0.18* $\frac{ug}{m3}$ concentration of Primary $PM_{2.5}$ at 50 km ***and the nearest Class I area is 150 km away***

Step 1) Use lowest illustrative MERP from the Southeast Climate Zone:

100 tpy NO_x from source/1,943 tpy NO_x daily $PM_{2.5}$ MERP = 0.05
100 tpy SO_2 from source/367 TPY SO_2 daily $PM_{2.5}$ MERP = 0.27
Total Secondary $PM_{2.5}$ = .05 + .27 = 0.32 * 1.2 $\frac{ug}{m3}$ = **0.384** $\frac{ug}{m3}$

Primary $PM_{2.5}$ at 50km + Secondary $PM_{2.5}$ = 0.18 + 0.384 = **0.564** $\frac{ug}{m3}$

✗

Tier 1 Demonstration: Class I Analysis Example (Daily $PM_{2.5}$)

$PM_{2.5}$ 24-hr Class I SIL = 0.27 $\frac{ug}{m3}$

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with *0.18* $\frac{ug}{m3}$ concentration of Primary $PM_{2.5}$ at 50 km ***and the nearest Class I area is 150 km away***

Step 1) Use lowest illustrative MERP from the Southeast Climate Zone:

100 tpy NO_x from source/1,943 tpy NO_x daily $PM_{2.5}$ MERP = 0.05
100 tpy SO_2 from source/367 TPY SO_2 daily $PM_{2.5}$ MERP = 0.27
Total Secondary $PM_{2.5}$ = .05 + .27 = 0.32 * 1.2 $\frac{ug}{m3}$ = **0.384** $\frac{ug}{m3}$

Primary $PM_{2.5}$ at 50km + Secondary $PM_{2.5}$ = 0.18 + 0.384 = **0.564** $\frac{ug}{m3}$

Step 2) Select lowest MERP from nearby sources (Florida, Bay) with similar stack height:

Same as Step 1
Total Secondary $PM_{2.5}$ = .05 + .27 = 0.32 * 1.2 $\frac{ug}{m3}$ = **0.384** $\frac{ug}{m3}$

Primary $PM_{2.5}$ at 50km + Secondary $PM_{2.5}$ = 0.18 + 0.384 = **0.564** $\frac{ug}{m3}$

Tier 1 Demonstration: Class I Analysis Example (Daily $PM_{2.5}$)

$PM_{2.5}$ 24-hr Class I SIL = 0.27 $\frac{ug}{m3}$

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with *0.18* $\frac{ug}{m3}$ concentration of Primary $PM_{2.5}$ at 50 km ***and the nearest Class I area is 150 km away***

Step 1) Use lowest illustrative MERP from the Southeast Climate Zone:

100 tpy NO_x from source/1,943 tpy NO_x daily $PM_{2.5}$ MERP = 0.05
100 tpy SO_2 from source/367 TPY SO_2 daily $PM_{2.5}$ MERP = 0.27
Total Secondary $PM_{2.5}$ = .05 + .27 = 0.32 * 1.2 $\frac{ug}{m3}$ = **0.384** $\frac{ug}{m3}$

Primary $PM_{2.5}$ at 50km + Secondary $PM_{2.5}$ = 0.18 + 0.384 = **0.564** $\frac{ug}{m3}$ ✗

Step 2) Select lowest MERP from nearby sources (Florida, Bay) with similar stack height:

Same as Step 1
Total Secondary $PM_{2.5}$ = .05 + .27 = 0.32 * 1.2 $\frac{ug}{m3}$ = **0.384** $\frac{ug}{m3}$

Primary $PM_{2.5}$ at 50km + Secondary $PM_{2.5}$ = 0.18 + 0.384 = **0.564** $\frac{ug}{m3}$ ✗

Step 3): Select representative nearby source (Alabama, Tallapoosa) for similar scenario (500 tpy and L stack)

NO_x: 100 tpy/6555 MERP = 0.015
SO_2: 100 tpy/1844 MERP = 0.05
Total Secondary $PM_{2.5}$ = 0.065 * 1.2 $\frac{ug}{m3}$ **= 0.078** $\frac{ug}{m3}$

Primary $PM_{2.5}$ at 50km + Secondary $PM_{2.5}$ = 0.18 + 0.078 = **0.258** $\frac{ug}{m3}$ √

Tier 1 Demonstration: Class I Analysis Example (Daily $PM_{2.5}$)

$PM_{2.5}$ 24-hr Class I SIL = 0.27 $\frac{ug}{m3}$

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with ***0.2*** $\frac{ug}{m3}$ concentration of Primary $PM_{2.5}$ at 50 km ***and the nearest Class I area is 150 km away.***

Step 3): Select representative nearby source (Alabama, Tallapoosa) for similar scenario (500 tpy and L stack)

NO_x: 100 tpy/6555 MERP = 0.015
SO_2: 100 tpy/1844 MERP = 0.05
Total Secondary $PM_{2.5}$ = 0.065 * 1.2 $\frac{ug}{m3}$ **= 0.078** $\frac{ug}{m3}$

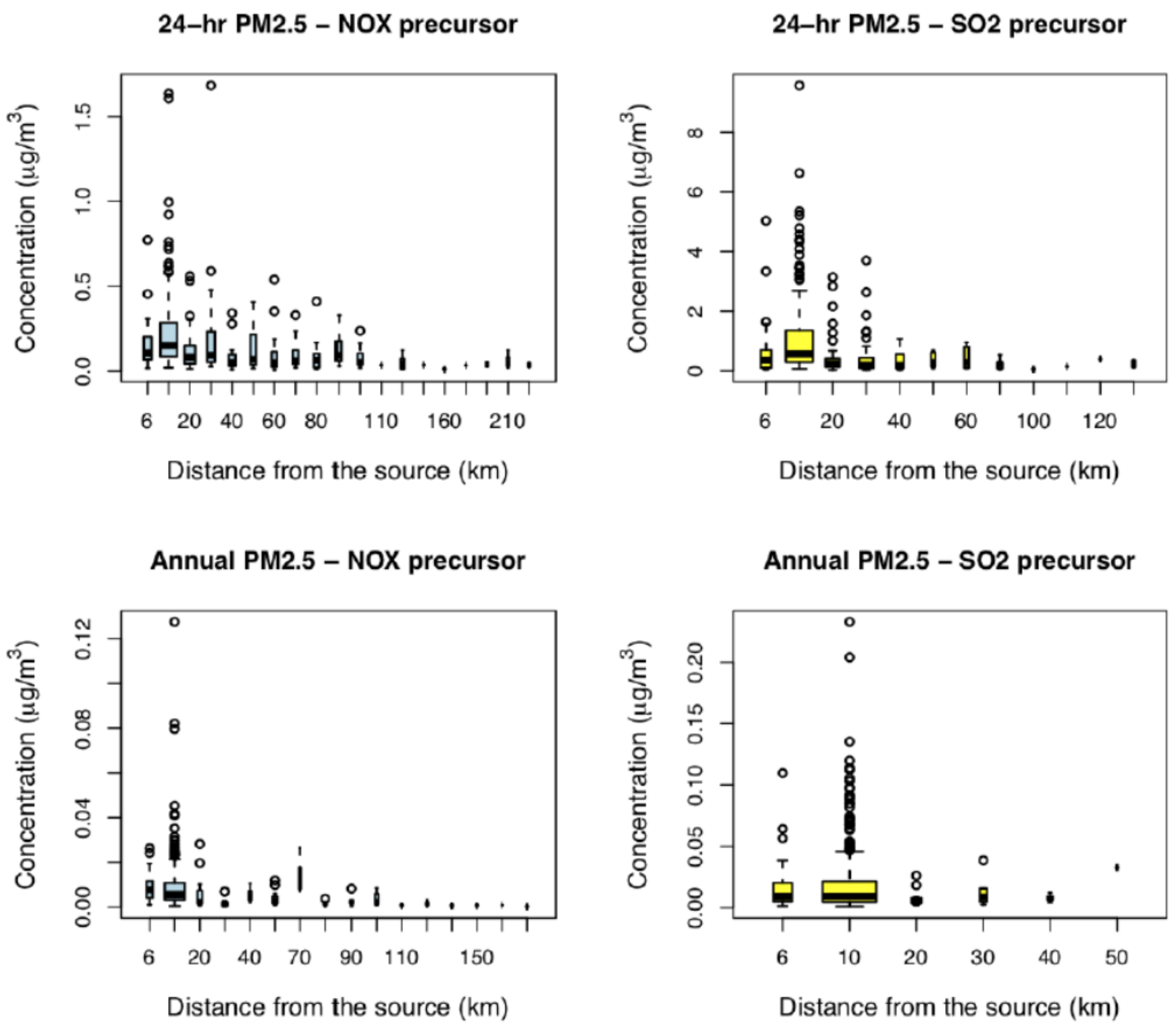
Primary $PM_{2.5}$ at 50km + Secondary $PM_{2.5}$ =
0.2 + 0.078 = **0.278** $\frac{ug}{m3}$

✗

What to do when neither Step 1 – 3 will work and the nearest Class I area is significantly further than 50km?

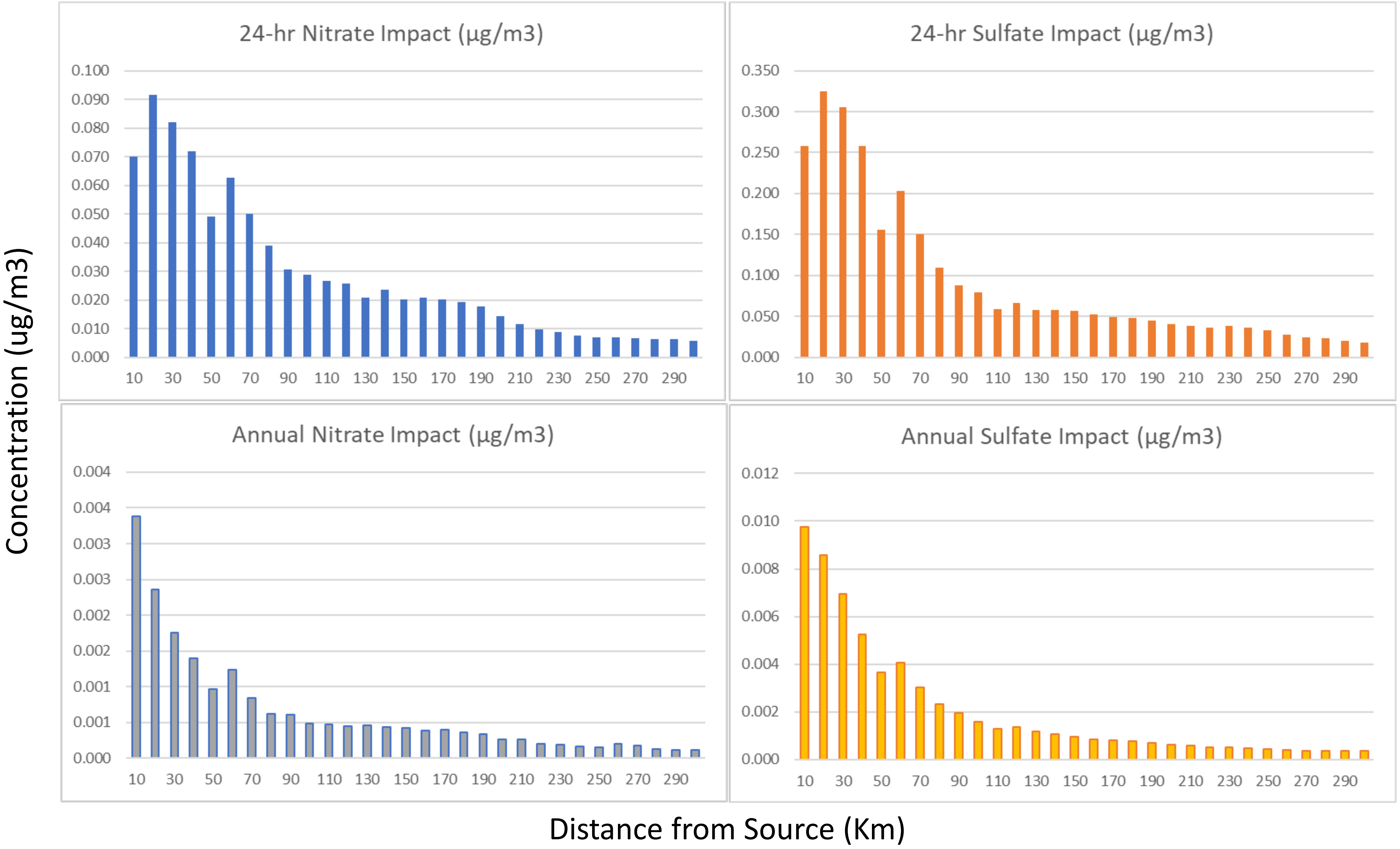
The maximum predicted secondary concentrations are within 10 – 50 km of the source and decrease substantially with distance. Taking the conservative, maximum values from the MERPs may not work for all projects, requiring a more refined approach.

Figure 3-6. Maximum daily and annual average secondary $PM_{2.5}$ nitrate ion impacts from NO_X emissions and $PM_{2.5}$ sulfate ion impacts from SO_2 emissions shown by distance from the source.



https://www.epa.gov/visibility/regional-haze-program

Alabama, Tallapoosa: 500 tpy, L Height (From MERPs Guidance Modeling)



Tier 1 Demonstration: Class I Analysis Example (Daily $PM_{2.5}$)

$PM_{2.5}$ 24-hr Class I SIL = 0.27 $\frac{ug}{m3}$

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with ***0.2*** $\frac{\mathbf{ug}}{\mathbf{m3}}$ concentration of Primary $PM_{2.5}$ at 50 km ***and the nearest Class I area is 150 km away.***

Refined Approach Step 1: Take the maximum impact ≥ 50 km from the hypothetical source and add to the primary $PM_{2.5}$

Source 19: Alabama, Tallapoosa Emissions: 500 TPY Stack Height: L		
	Maximum Impact ≥ 50 km from source (ug/m3)	
	24-hr	Annual
Sulfate	0.2031	0.0041
Nitrate	0.0626	0.0012

$$\textit{Project Impact } \left(\frac{ug}{m3}\right) = Emission\ rate\ (tpy) from\ Project\ * \frac{Modeled\ air\ quality\ impact\ from\ hypothetical\ soruce}{Modeled\ emission\ rate\ (tpy)\ from\ hypothetical\ source}$$

Tier 1 Demonstration: Class I Analysis Example (Daily $PM_{2.5}$)

$PM_{2.5}$ 24-hr Class I SIL = $0.27 \frac{ug}{m3}$

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with ***0.2*** $\frac{\mathbf{ug}}{\mathbf{m3}}$ concentration of Primary $PM_{2.5}$ at 50 km ***and the nearest Class I area is 150 km away.***

Refined Approach Step 1: Take the maximum impact ≥ 50 km from the hypothetical source and add to the primary $PM_{2.5}$

Source 19: Alabama, Tallapoosa Emissions: 500 TPY Stack Height: L		
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$PM_{2.5}$ Nitrate Daily: $100\ tpy * \frac{0.0626\frac{ug}{m3}}{500\ tpy} = .013\ \frac{ug}{m3}$

$PM_{2.5}$ Sulfate Daily: $100\ tpy * \frac{0.2031\frac{ug}{m3}}{500\ tpy} = .041\ \frac{ug}{m3}$

Total Secondary $PM_{2.5}$ = .013 + .041 = .054 $\frac{ug}{m3}$

Primary $PM_{2.5}$ + Secondary $PM_{2.5}$ = .20 + .054 = **0.254** $\frac{ug}{m3}$ √

Tier 1 Demonstration: Class I Analysis Example (Daily $PM_{2.5}$)

$PM_{2.5}$ 24-hr Class I SIL = $0.27\ \frac{ug}{m3}$

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with ***$0.23\ \frac{ug}{m3}$*** concentration of Primary $PM_{2.5}$ at 50 km ***and the nearest Class I area is 150 km away.***

What if Step 1 refined screening was not enough?

Step 2: Take the maximum impact ≥ the distance the project facility is from the nearest Class I area and add to the primary $PM_{2.5}$

Distance (km)	24-hr Impact (µg/m3)	
	Nitrate	Sulfate
10	0.0702	0.2584
20	0.0915	0.3253
30	0.0821	0.3052
40	0.0720	0.2584
50	0.0492	0.1553
60	0.0626	0.2031
70	0.0501	0.1500
80	0.0389	0.1094
90	0.0306	0.0880
100	0.0287	0.0787
110	0.0266	0.0590
120	0.0256	0.0667
130	0.0206	0.0577
140	0.0235	0.0572
150	0.0201	0.0571

Tier 1 Demonstration: Class I Analysis Example (Daily $PM_{2.5}$)

$PM_{2.5}$ 24-hr Class I SIL = $0.27 \frac{ug}{m3}$

Example: A small, surface-level source in central Florida with 100 tpy of NO_x and 100 tpy of SO_2 with ***0.23*** $\frac{ug}{m3}$ concentration of Primary $PM_{2.5}$ at 50 km ***and the nearest Class I area is 150 km away.***

What if Step 1 refined screening was not enough?

Step 2: Take the maximum impact ≥ the distance the project facility is from the nearest Class I area and add to the primary $PM_{2.5}$

Distance (km)	24-hr Impact (µg/m3)	
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130	0.0206	0.0577
140	0.0235	0.0572
150	0.0201	0.0571

Maximum Impact ≥ 150km:

$PM_{2.5}$ Daily Nitrate: $100\ tpy * \frac{0.0201\ ug/m3}{500\ tpy} = .004 \frac{ug}{m3}$

$PM_{2.5}$ Daily Sulfate: $100\ tpy * \frac{0.0571\ ug/m3}{500\ tpy} = .012 \frac{ug}{m3}$

Total Secondary $PM_{2.5}$ = $.004 + .012 = .016 \frac{ug}{m3}$

Primary $PM_{2.5}$ + Secondary $PM_{2.5}$ = $.23 + .016 = .246 \frac{ug}{m3}$

Table A-1. Daily 24-hour and annual average $PM_{2.5}$ impacts from NO_X and SO_2 sources from CUS hypothetical source 3: Giles, Tennessee

Precursor	Stack	Distance (km)	Maximum 24-hr Impact (µg/m3)			Maximum Annual Impact (µg/m3)		
			Emissions (tpy)			Emissions (tpy)		
			500	***1000***	***3000***	***500***	***1000***	***3000***
NO_X	H	≥50	0.0211	0.0442	0.2002	0.0012	0.0027	0.0102
NO_X	L	≥50	0.0550	0.1220		0.0034	0.0078	
SO_2	H	≥50	0.0713	0.2405	1.1773	0.0015	0.0039	0.0205
SO_2	L	≥50	0.1260	0.3977		0.0022	0.0062	

Precursor	Stack	Distance (km)	24-hr Impact (µg/m3)			Annual Impact (µg/m3)		
			Emissions (tpy)			Emissions (tpy)		
			500	***1000***	***3000***	***500***	***1000***	***3000***
NO_X	H	10	0.0460	0.1084	0.4551	0.0023	0.0058	0.0242
NO_X	H	20	0.0363	0.0814	0.3817	0.0011	0.0026	0.0116
NO_X	H	30	0.0334	0.0772	0.3366	0.0014	0.0034	0.0137
NO_X	H	40	0.0293	0.0644	0.2816	0.0012	0.0027	0.0110
NO_X	H	50	0.0201	0.0435	0.2181	0.0012	0.0027	0.0102
NO_X	H	60	0.0209	0.0442	0.2002	0.0012	0.0025	0.0094
NO_X	H	70	0.0192	0.0409	0.1644	0.0012	0.0025	0.0085
NO_X	H	80	0.0166	0.0363	0.1560	0.0009	0.0019	0.0066
NO_X	H	90	0.0183	0.0396	0.1516	0.0008	0.0018	0.0067
NO_X	H	100	0.0185	0.0387	0.1417	0.0008	0.0017	0.0058
NO_X	H	110	0.0164	0.0339	0.1323	0.0007	0.0015	0.0050
NO_X	H	120	0.0138	0.0290	0.1261	0.0006	0.0013	0.0044
NO_X	H	130	0.0127	0.0287	0.1142	0.0005	0.0011	0.0039
NO_X	H	140	0.0145	0.0302	0.1138	0.0005	0.0010	0.0035
NO_X	H	150	0.0134	0.0295	0.1060	0.0005	0.0011	0.0037
NO_X	H	160	0.0177	0.0376	0.1318	0.0007	0.0014	0.0045
NO_X	H	170	0.0197	0.0415	0.1427	0.0007	0.0015	0.0048
NO_X	H	180	0.0211	0.0442	0.1499	0.0007	0.0013	0.0043
NO_X	H	190	0.0190	0.0399	0.1369	0.0006	0.0013	0.0043
NO_X	H	200	0.0178	0.0369	0.1272	0.0005	0.0011	0.0035

Thank You!

Questions?

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Question and Answer Session

- Questions will be accepted through the webinar chat window and also via the conference line.
- We will attempt to answer as many questions as possible and will follow-up with others offline.
- Further questions can be sent to George Bridgers (bridgers.george@epa.gov) and Kirk Baker (baker.kirk@epa.gov).
  - Final MERPs Guidance: https://www3.epa.gov/ttn/scram/guidance/guide/EPA-454_R-19-003.pdf
  - A copy of the webinar presentation will also be posted to the EPA's SCRAM website.