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Implications of NAAQS Updates for Major Industrial Sources

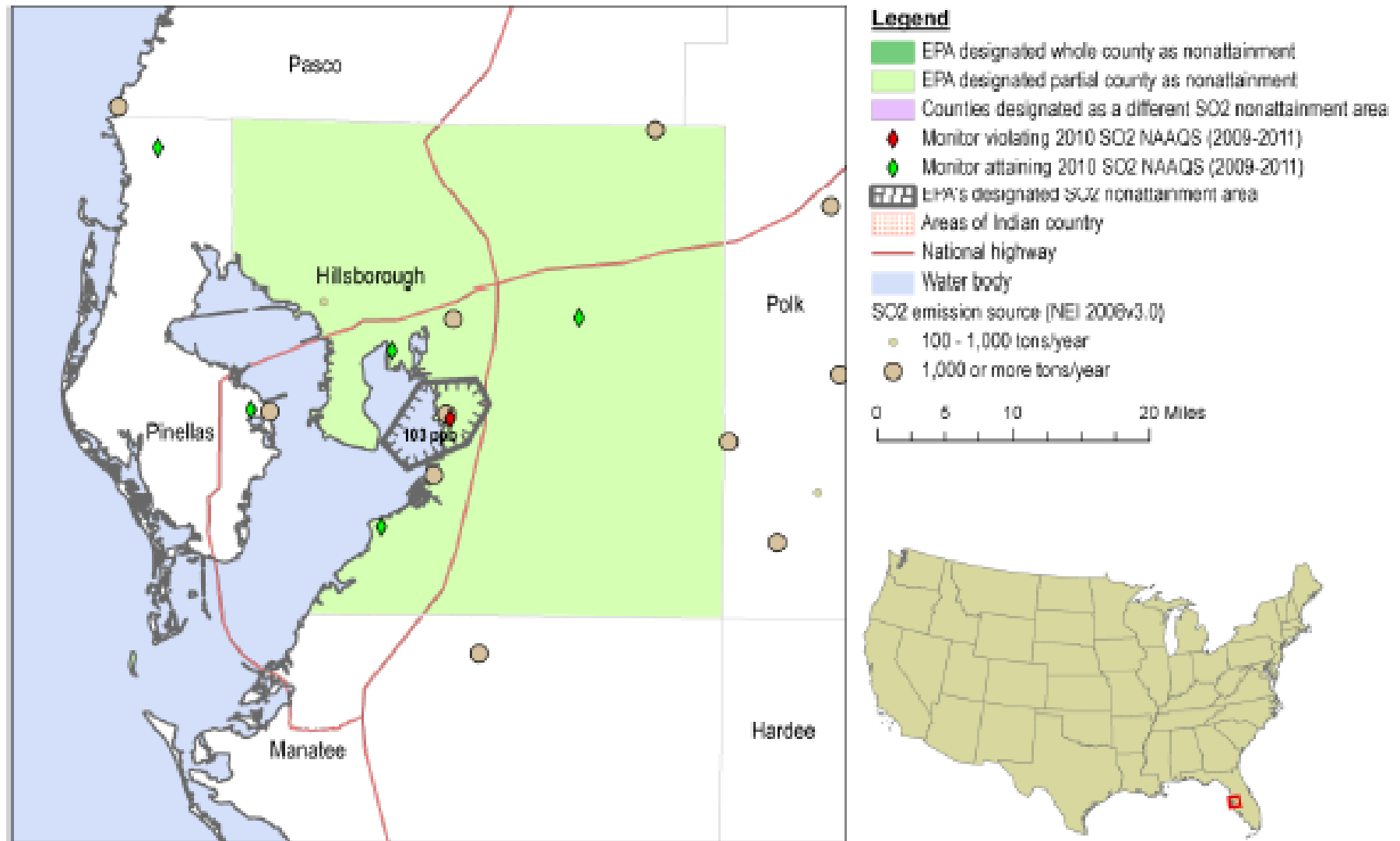
Florida Chamber of Commerce
28th Annual Environmental Summer School
Air Quality Hot Topics ♦ July 23, 2014

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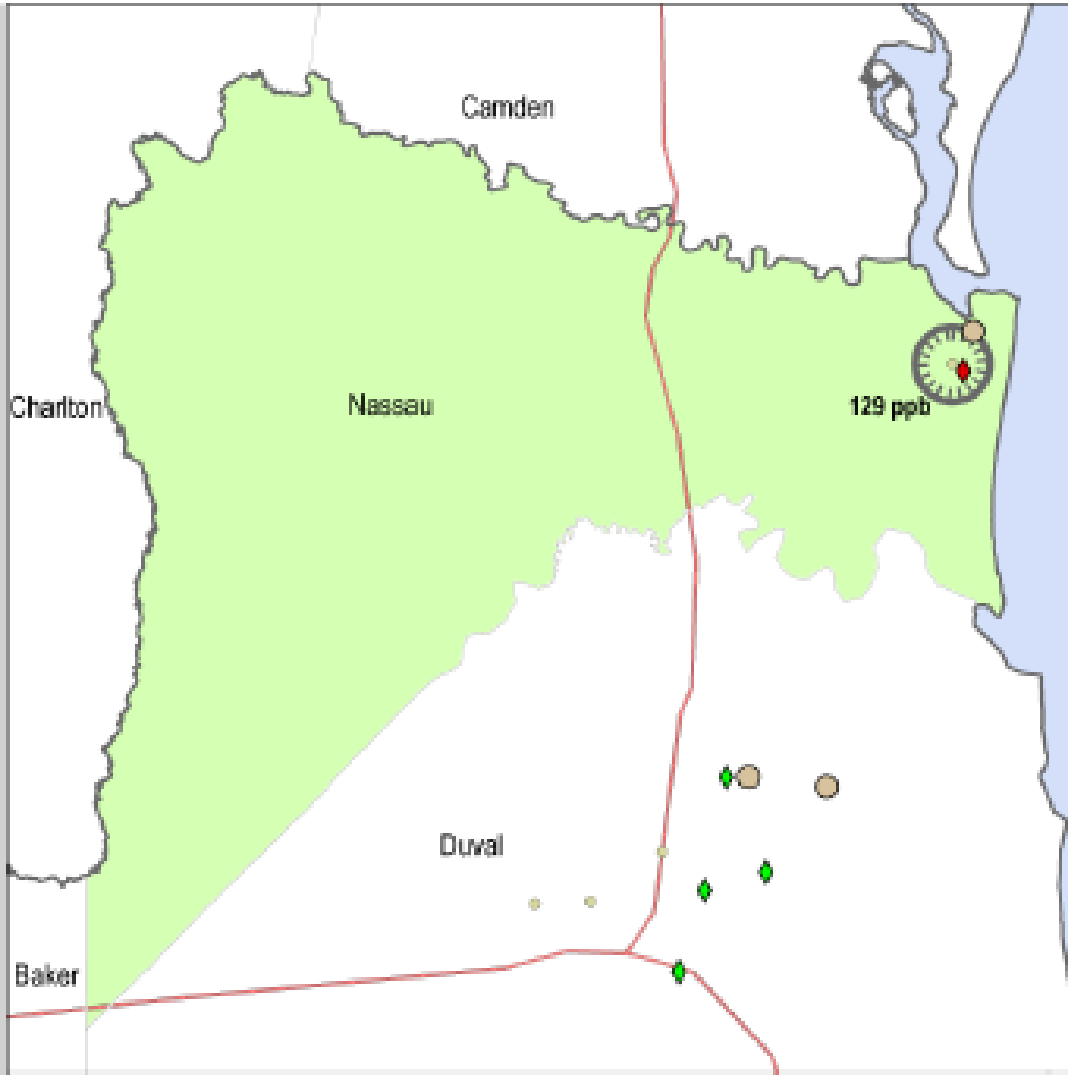
SO₂ NAAQS - Nonattainment in FL

- > SO₂ 1-hr NAAQS - 75 ppb
- > State Nonattainment Areas:
 - ❖ Hillsborough County (partial)
 - ❖ Nassau County (partial)
- > How did DEP complete determination?
 - ❖ Monitor(s)
 - ❖ Modeling - affected, partial county areas

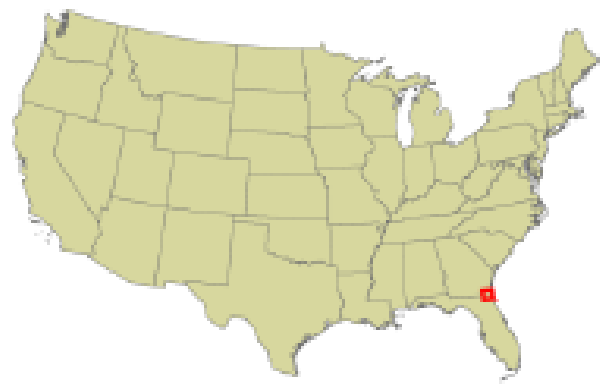
Hillsborough County, FL



Nassau County, FL



- Legend**
- EPA designated whole county as nonattainment
 - EPA designated partial county as nonattainment
 - Counties designated as a different SO2 nonattainment area
 - Monitor violating 2010 SO2 NAAQS (2009-2011)
 - Monitor attaining 2010 SO2 NAAQS (2009-2011)
 - EPA's designated SO2 nonattainment area
 - Areas of Indian country
 - National highway
 - Water body
- SO2 emission source (NEI 2008v3.0)
- 100 - 1,000 tons/year
 - 1,000 or more tons/year



Data Requirements Rule for 1-hr SO₂ NAAQS



FEDERAL REGISTER

Vol. 79 Tuesday,
No. 92 May 13, 2014

Part IV

Environmental Protection Agency

40 CFR Part 51
Data Requirements Rule for the 1-Hour Sulfur Dioxide (SO₂) Primary
National Ambient Air Quality Standard (NAAQS); Proposed Rule

- > Rule was proposed by EPA on April 17, 2014
- > Formally released in the Federal Register on May 13, 2014
- > Goal: to assist states in implementing the 1-hr SO₂ NAAQS
- > Comment period ended last week

www.gpo.gov/fdsys/pkg/FR-2014-05-13/pdf/2014-09458.pdf

Background of the Proposed Rule

- > CAA requires EPA to issue attainment and nonattainment designations after a new NAAQS is set
- > 6/2/2010 - 1-hr SO₂ NAAQS
- > 9/21/2011 - EPA sought public comment on draft guidance for implementing the NAAQS

Background of the Proposed Rule

- > 2/2013 - EPA developed an implementation strategy requiring states to further characterize air quality near large sources of SO₂
- > 8/5/2013 - EPA designates 29 areas in 16 states as nonattainment; all based on certified monitoring; areas must develop SIPs
- > 1/2014 - EPA released two Technical Assistance Documents (TADs), one for modeling and one for monitoring

Focus of the Proposed Rule

- > Allow characterization of non-designated areas for future strategic implementation of the 1-hr SO₂ NAAQS
- > Focus on two types of areas:
 - ❖ Areas with large sources of SO₂ emissions
 - ❖ Areas with smaller SO₂ sources but larger populations
- > Why focus on specific SO₂ sources?
- > How is the EPA goal achieved?

Proposed Rule Options

TABLE 1—SUMMARY OF SOURCE THRESHOLD OPTIONS ^a

Option	Threshold for sources		Number of sources ^{**}	Percent of national emissions [†] (%)	Plus sources in 2013 desig. nonatt. areas [‡]	Total source coverage	Total emissions coverage (%)
	Inside CSAs greater than 1M	Outside CSAs greater than 1M					
1*	1,000 TPY	2,000 TPY	443	75	53	496	90
2	2,000 TPY	5,000 TPY	270	66	53	323	82
3	3,000 TPY	10,000 TPY	158	54	53	211	69

^aThe emissions in this table are based on the 2011 National Emissions Inventory (NEI) and differ from the information in the February 2013 Strategy Paper, which was based on the 2008 NEI and preliminary 2011 data. These numbers are also based on the 2013 CSA definitions.

* Preferred option.

** These do not include sources located in nonattainment areas designated in 2013.

[†] Total SO₂ emissions in 2011 were 5.8 million tons.

[‡] There are 53 sources with annual emissions greater than 1,000 tpy in nonattainment areas designated in 2013.

SO₂ Data Requirements and Implementation Timeline

- Up to Jan 16, 2016: Agencies submit sources + model or monitor
- Jan 16, 2016: Modeling protocols due for sources to be modeled
- July 2016: Monitoring plans due for sources to be monitored
- Jan 1, 2017: SO₂ monitors should be operational
- Jan 13, 2017: Modeling studies should be submitted to RAs
- Aug 2017: States notified of intended designations
- Dec 2017: Final designation date
- Aug 2019: Due date for SIPs - 2017 model-based designations
- May 2020: Certification of 2019 monitoring data
- Aug 2020: States notified of intended designations for remainder of U.S.
- Dec 2020: Finalize all other designations
- Aug 2022: Due date for SIPs for 2020 designations

Implications - SO₂ NAAQS Implementation

- > For sources in monitored nonattainment areas, the SIP process is moving ahead now
- > For other sources, modeling may be required if:
 - ❖ The state chooses modeling
 - ❖ The source emits SO₂ > final threshold, or is located near large SO₂ sources
 - ❖ Activities should begin in 2015-2016 period
- > Sources may end up near a monitor if modeling indicates the need (from modeling above) or the state opts not to conduct modeling
- > Modeling required for permitting (by you or nearby facilities)
- > Modeling conducted by NGOs may force you to demonstrate compliance with the NAAQS

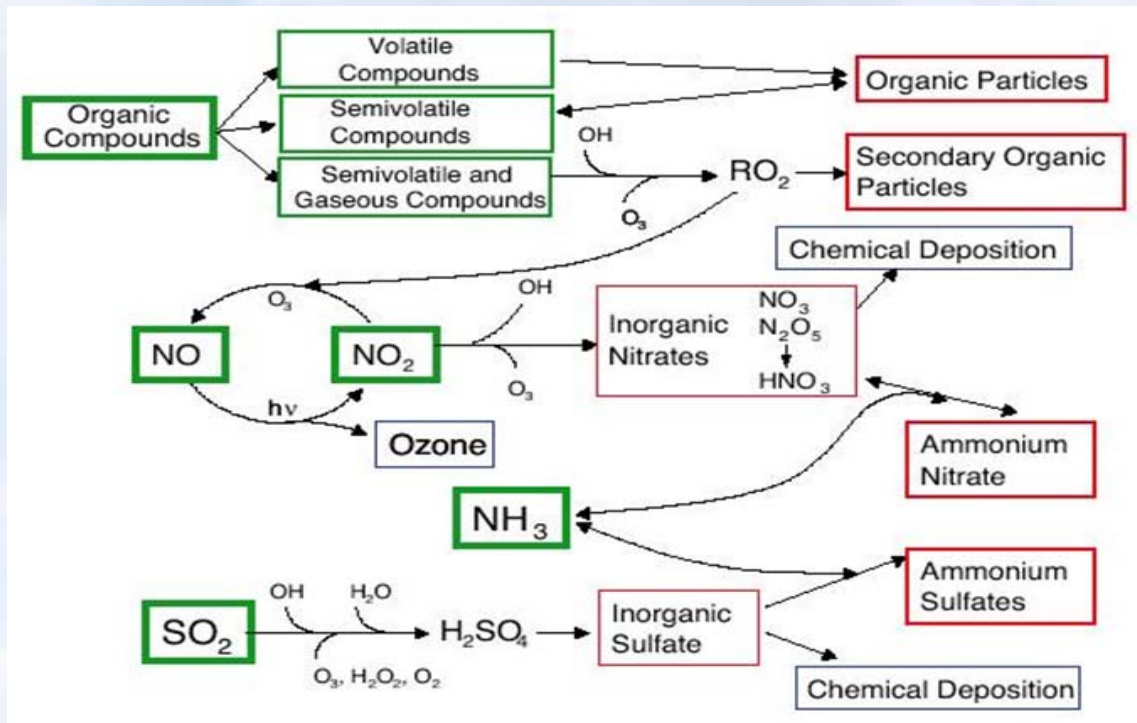
PM_{2.5} NAAQS - Attainment in FL

- > PM_{2.5} Annual NAAQS - 12 ug/m³
- > PM_{2.5} 24-hr NAAQS - 35 ug/m³
- > State Nonattainment Areas - none
- > When will your client/company need to demonstrate compliance with PM_{2.5} annual NAAQS?
 - ❖ New major facility
 - ❖ Change at existing major facility

PM_{2.5} Background

PM_{2.5} = Particulate Matter < 2.5 μm

- ❖ “Primary” PM_{2.5} emissions
 - ❖ Directly emitted as PM_{2.5}
- ❖ “Secondary” PM_{2.5} emissions
 - ❖ NO_x + SO₂ emitted as precursors
 - ❖ Form nitrate and sulfate salts



Source: Particulate Matter Science for Policy Makers
– A NARSTO Assessment, 2003.

Modeling for Air Permit Actions

- > Modeling to demonstrate compliance with NAAQS only required for ...
 - ❖ New major sources (> 100 or 250 tpy depending on “List of 28” status)
 - ❖ Major modifications to existing sources
 - ◆ Existing minor sources... emissions increase > 100 or 250 tpy
 - ◆ Existing major sources... emissions increase > PSD Significant Emission Rate (“SER”), for example:

PM₁₀: 15 tpy

NO_x: 40 tpy

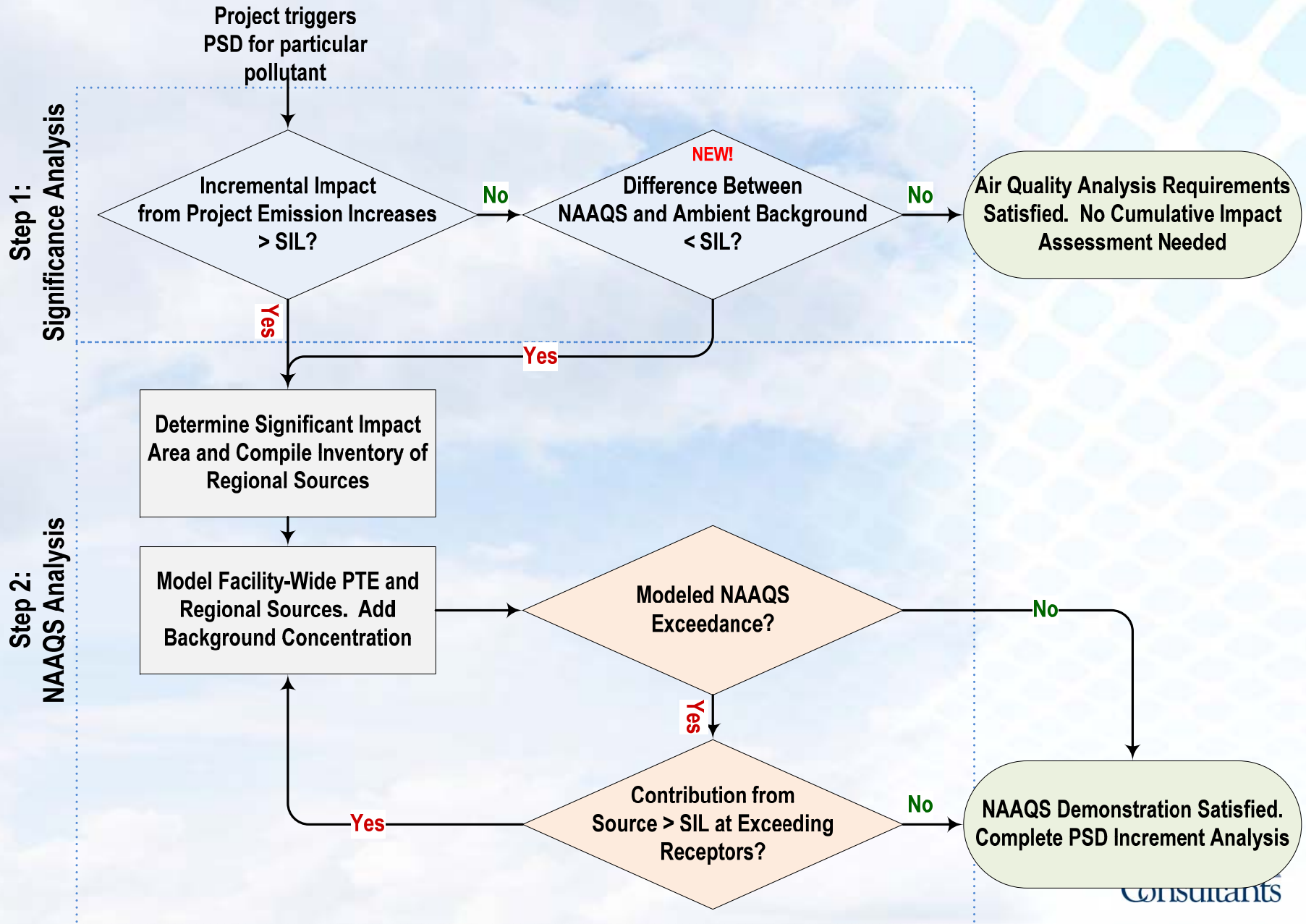
PM_{2.5}: 10 tpy

SO₂: 40 tpy

CO: 100 tpy

VOC: 40 tpy

Modeling Analysis Steps...



Assessment of Incremental Impacts from Project in the “Significance Analysis”

> Compare results to **Significant Impact Levels (SIL)**:

Pollutant	Annual ($\mu\text{g}/\text{m}^3$)	24-hour ($\mu\text{g}/\text{m}^3$)	8-hour ($\mu\text{g}/\text{m}^3$)	3-hour ($\mu\text{g}/\text{m}^3$)	1-hour ($\mu\text{g}/\text{m}^3$)
PM _{2.5}	0.3	1.2 [†]	-----	-----	-----
PM ₁₀	1	5	-----	-----	-----
SO ₂	1	5	-----	25	7.8*
NO ₂	1	-----	-----	-----	7.5*
CO	-----	-----	500	-----	2,000

* Interim values

[†] Vacated on 12/9/13 but still applied on case-by-case basis

Primary and Secondary NAAQS

Pollutant	Calendar Quarter ($\mu\text{g}/\text{m}^3$)	Annual ($\mu\text{g}/\text{m}^3$)	24-hour ($\mu\text{g}/\text{m}^3$)	8-hour ($\mu\text{g}/\text{m}^3$)	3-hour ($\mu\text{g}/\text{m}^3$)	1-hour ($\mu\text{g}/\text{m}^3$)
PM ₁₀	-----	50	150	-----	-----	-----
PM _{2.5}	-----	12	35	-----	-----	-----
SO ₂	-----	80 (30 ppb)	365 (140 ppb)	-----	1,300 (500 ppb)	196 (75 ppb)
NO ₂	-----	100 (53 ppb)	-----	-----	-----	188 (100 ppb)
CO	-----	-----	-----	10,000 (9 ppm)	-----	40,000 (35 ppm)
Lead	0.15	-----	-----	-----	-----	-----
Ozone	-----	-----	-----	147 (75 ppb)	-----	235 (120 ppb)

NAAQS Analysis (Class II Area)

- > NAAQS analysis is based on the total estimated air quality - the sum of ambient impacts resulting from existing sources
- > Consists of the following:
 - ❖ Existing facility sources
 - ❖ Proposed new sources/emissions
 - ❖ Existing regional sources contributing to Significant Impact Area (SIA)
 - ❖ Measured ambient background concentrations

PM_{2.5} Modeling Realities...

- > Very small SER... any project with net emissions increases > 10 tpy triggers need for modeling analysis (at major sources)
- > Annual NAAQS Reduced in January 2013
 - ❖ 15.0 → 12.0 µg/m³
- > Areas with high Background Values in State
- > Very small SIL
 - ❖ 0.3 µg/m³ for annual NAAQS
- > Secondary Formation
 - ❖ NO_x/SO₂ → PM_{2.5}
 - ❖ Final permit modeling guidance document in May 2014

Hypothetical Case...

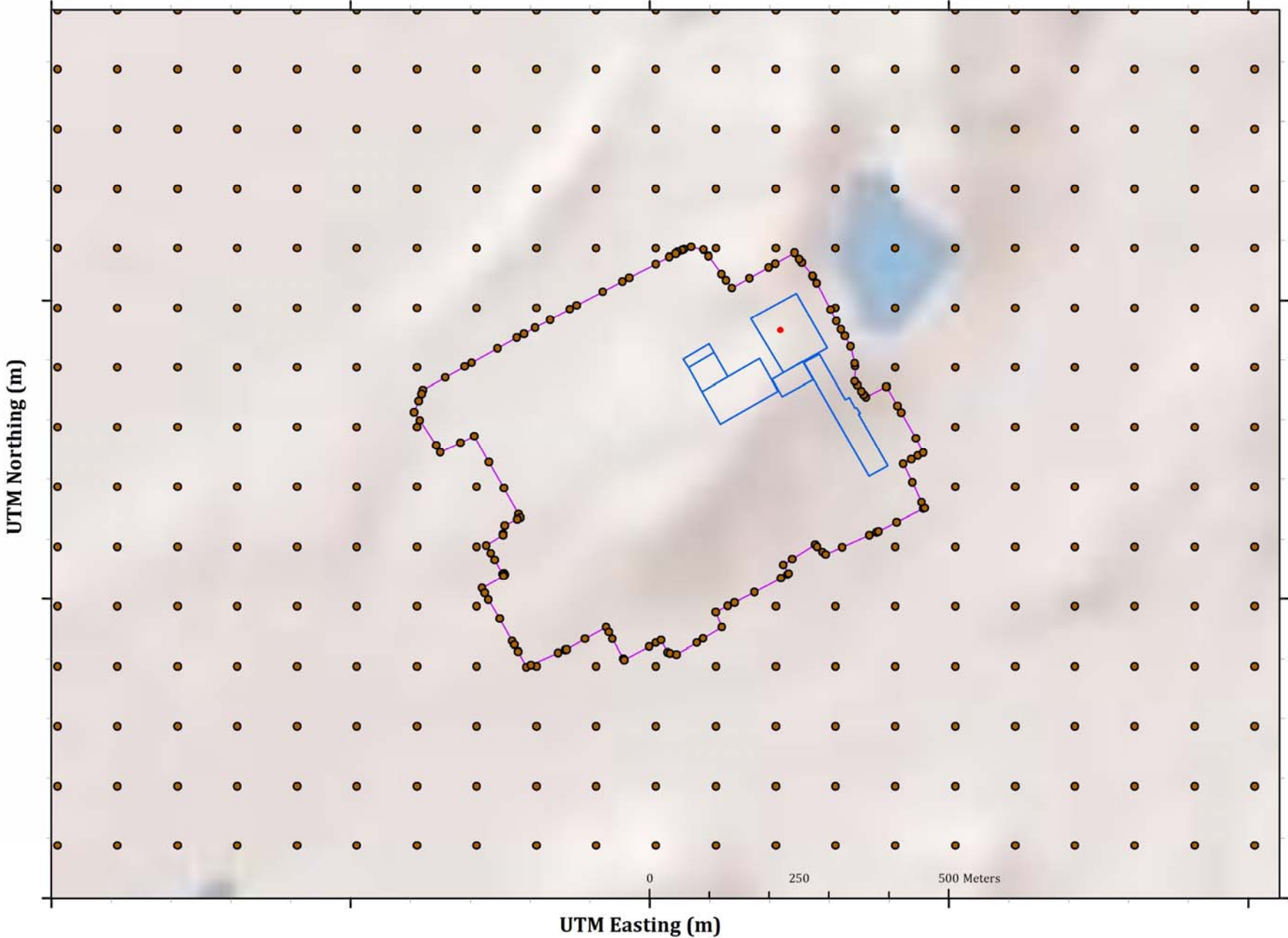
- > Project at existing plant involving new combustion or process source
- > Consider four project emission increase scenarios:
 - ❖ 0.5x SER 5 tpy
 - ❖ 1x SER 10 tpy
 - ❖ 2x SER 20 tpy
 - ❖ 3x SER 30 tpy

Hypothetical Case...

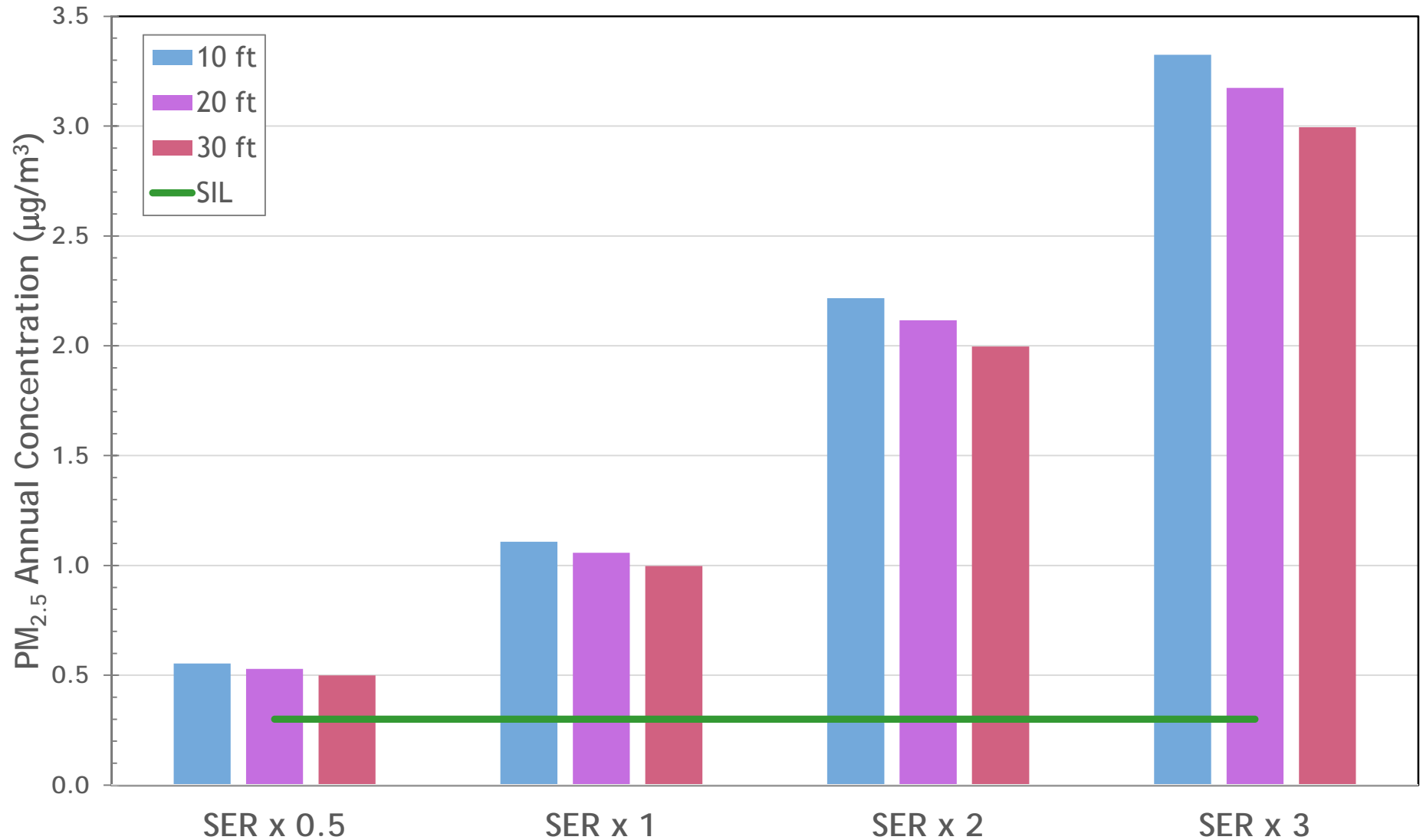
- > Typical facility footprint and building configuration
- > Stack parameters:

Building Height	80 ft
Stack Height	10, 20, and 30 ft above roof
Stack Diameter	5 ft
Exit Temperature	500 °F
Exit Velocity	40 ft/s (\approx 26,000 scfm)
Vertically Unobstructed Release	

ACME Facility

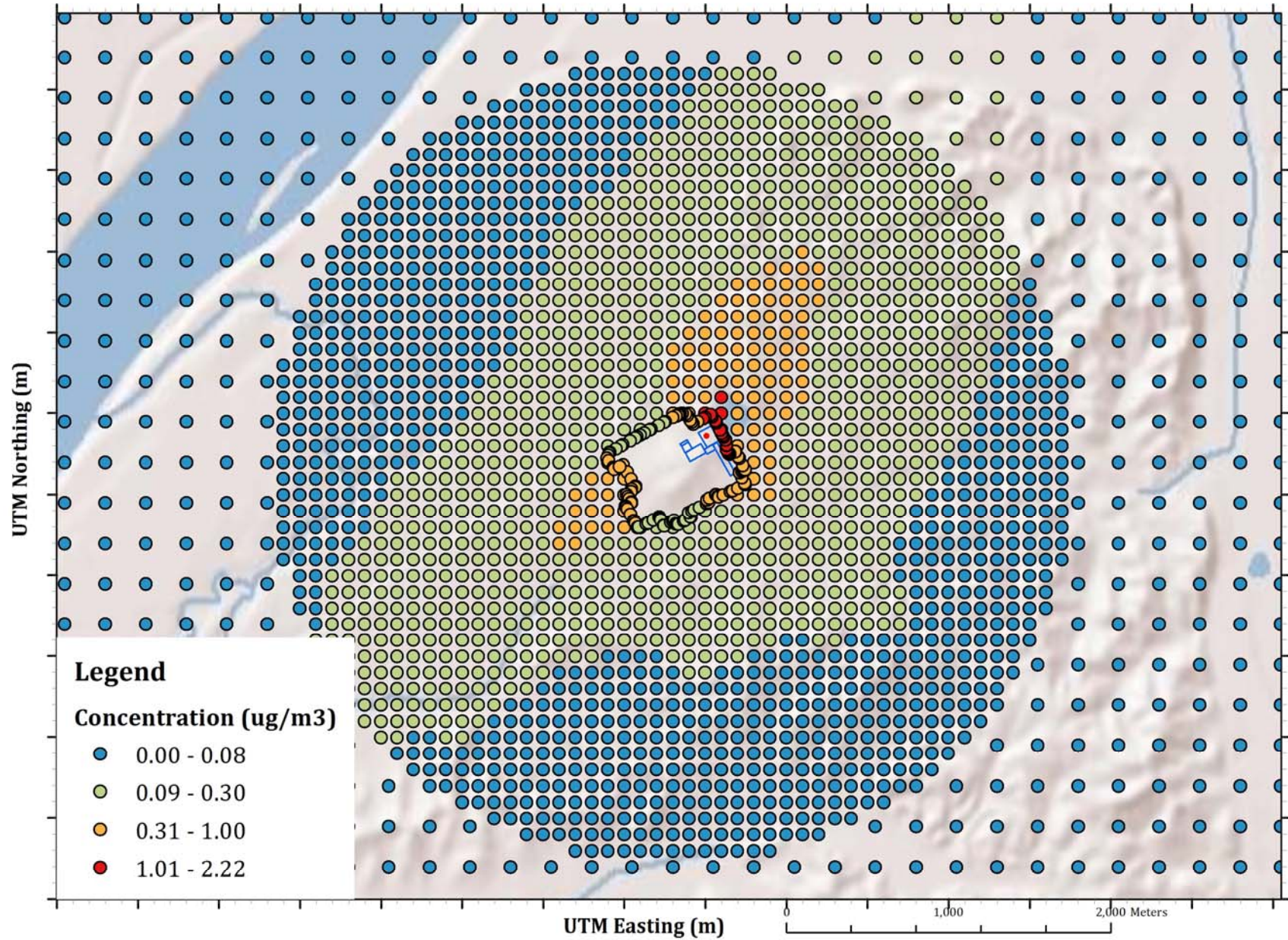


Maximum Ambient PM_{2.5} Impacts from Project, Annual Average



Color bars are results at different stack heights (height above building roof)

Maximum Ambient PM2.5 Annual Impact



Scenario: 2x SER (20 tpy emissions); Stack 10 ft above roof

Implications of New NAAQS

- > Triggering PSD for $PM_{2.5}$ will now almost always involve conducting a full NAAQS (and Increment) analysis
- > Spread between current ambient concentrations and NAAQS, combined with conservatism of models, means modeling demonstrations will be challenging
- > NAAQS are leading to difficulties in permitting major expansions at existing industrial sites