

Ambient Air Monitoring Issues

U.S. EPA – OAR
Office of Air Quality Planning and Standards

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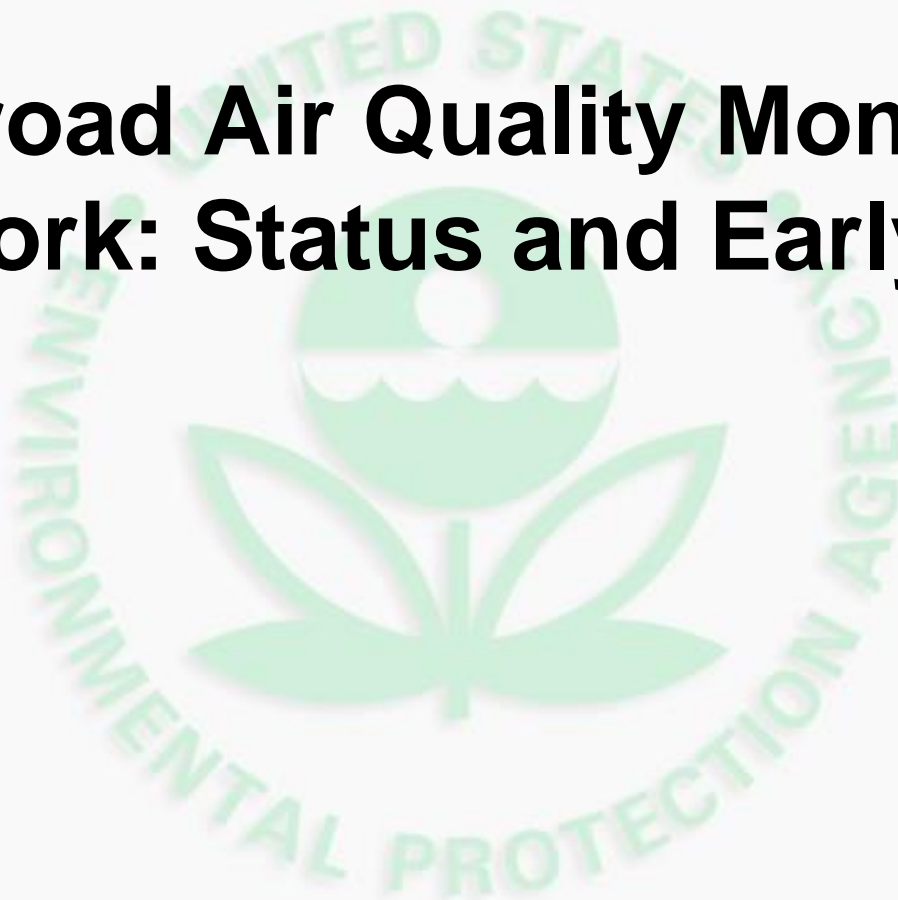
AAPCA Annual Meeting – 2015
Raleigh, NC



Major Developments and Issues in 2015

- Re-engineering of PAMS network to be finalized together with Ozone NAAQS
- Assessment of PM_{2.5} speciation network (CSN) completed and implemented – leading to savings for investment in improved methods and network
- Major focus on QA at NATTS air toxics labs to improve quality and consistency
- Major challenges with PM_{2.5} data quality – in some cases going back multiple years
 - Provided (re)-training on operation of grav labs
 - Developed TSA workgroup to improve practices
 - Regions emphasizing PM operations and moving up audit schedules
- Finalizing ambient monitoring rule to selectively reduce monitoring burden and clarify QA practices
 - Conducting a LEAN review of federal audit procedures to improve efficiency (NPAP and PEP)
- Completed Community Scale Air Toxics Grant program
 - awards underway

Near-road Air Quality Monitoring Network: Status and Early Data



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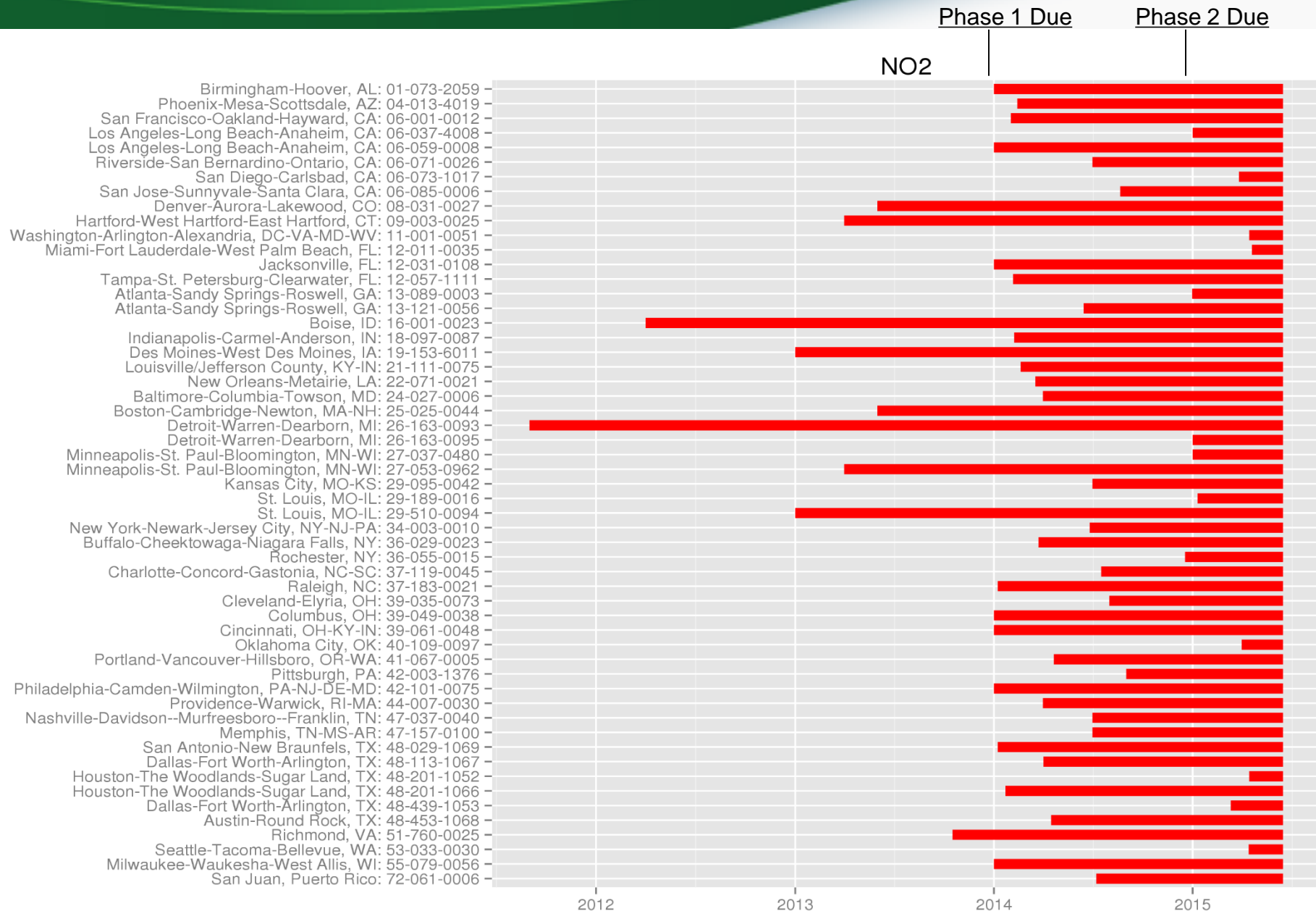
Near-Road Monitoring Timeline



Implementation Phase	CBSA Population	NO ₂	CO*	PM _{2.5} *
<u>Phase 1</u> 52 Sites [funded]	≥ 1 Million	Jan 1, 2014		
<u>Phase 2</u> 23 Sites (second sites) [funded]	≥2.5 Million OR road segment ≥250,000 AADT (NO ₂ only)	Jan 1, 2015 (second site)	Jan 1, 2015 for CBSAs ≥ 2.5M Jan. 1, 2017 for CBSAs ≥ 1M and ≤ 2.5M	Jan 1, 2015 for CBSAs ≥ 2.5M Jan. 1, 2017 for CBSAs ≥ 1M and ≤ 2.5M
<u>Phase 3</u> 51 Sites [unfunded]	Between 500K and 1 Million	Jan 1, 2017		

*Near-road CO and PM_{2.5} monitors are required to be co-located with an NO₂ monitor.

Near-road NO₂ Sites – Length of Operations

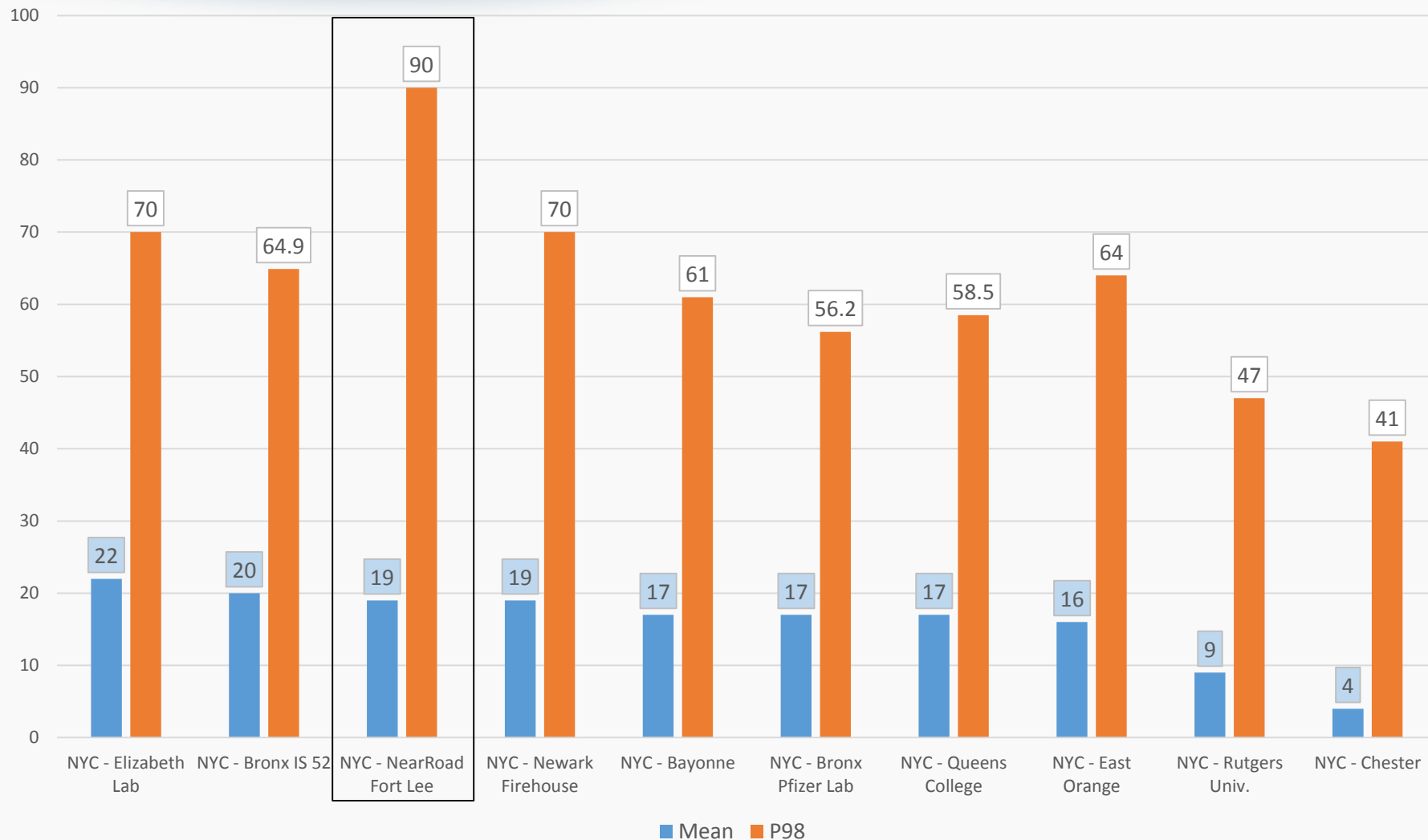




Near-road NO₂ Network Status

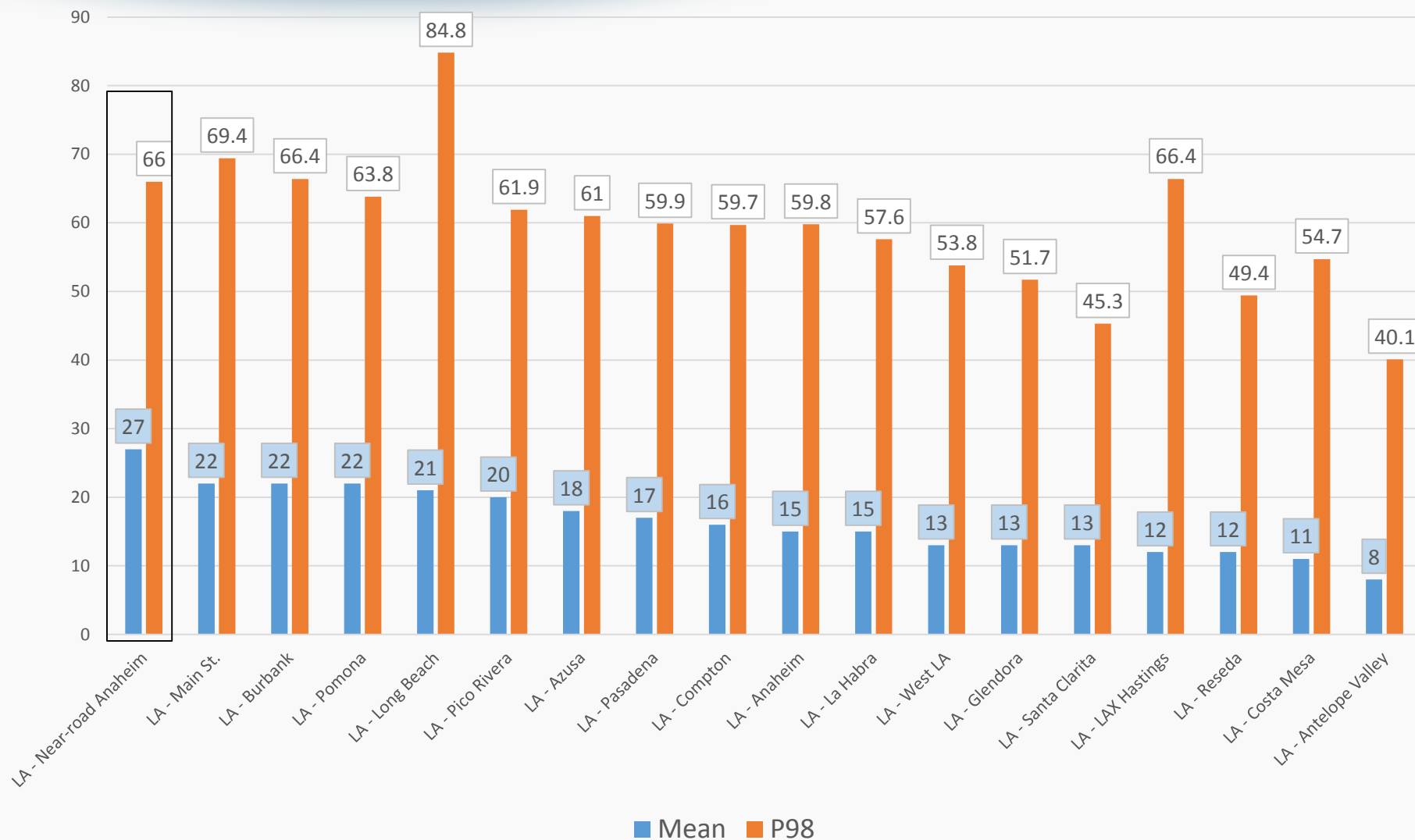
- Currently (July 2015), the EPA estimates that there are 56 operational near-road monitoring sites
- Phase 1 sites: 45 of 52 sites operational
 - Missing CBSAs: Chicago, Las Vegas, Orlando, Sacramento, Salt Lake City, Virginia Beach, Washington, D.C. {2nd D.C. site is operational}
- Phase 2 sites: 9 of 23 sites operational
 - Atlanta, Ft. Worth, Detroit, Houston, Los Angeles, Minneapolis, Riverside, St. Louis, Washington, D.C.
- Phase 3 sites: Boise and Des Moines are operational
 - Fresno and Bakersfield scheduled to come on-line early

New York CBSA-wide NO₂ (ppb)



UNITS in PPB - PRELIMINARY DATA ANALYSIS - DO NOT CITE OR QUOTE
Statistics calculated from available 2014 data

Los Angeles CBSA-wide NO₂ (ppb)



UNITS in PPB - PRELIMINARY DATA ANALYSIS - DO NOT CITE OR QUOTE
 Statistics calculated from available 2014 data



Near-road NO₂ Summary

- In about 88% of CBSAs, the NR site has the highest annual average value
- In about 45% of CBSAs, the NR site has the highest 98th percentile 1-hr daily max value
- In about 43% of CBSAs, the NR site is both the highest annual average site and the highest 98th percentile 1-hr daily max value
- During 2014, no near-road site had an estimated annual average for NO₂ (*of available data*) above 27 ppb
 - The 27 ppb value at the LA Near-road site in Anaheim, CA is the highest nationwide
- During 2014, no near-road site had an estimated daily max 1-hour 98th percentile value for NO₂ (*of available data*) above 90 ppb
 - The 90 ppb value at NYC Near-road Site in Fort Lee, NJ is the highest nationwide

Near-road Sites: Multi-pollutant



- In addition to NO₂ at all Near-road sites, we currently have:
 - 31 sites with PM_{2.5} instrumentation
 - 21 with continuous methods
 - 14 with filter-based FRMs
 - 4 of the 31 sites have collocated continuous & FRMs
 - 40 sites with CO instrumentation
 - 17 sites with black carbon instruments
- For a complete listing of current near-road site metadata, visit <http://www.epa.gov/ttnamti1/nearroad.html>

Near-road PM_{2.5} – Continuous FEM Data (ug/m³)



2014 Near-road Continuous PM_{2.5} FEM Data Reported to AQS

Year	CBSA	24-hr 98 th %ile	Mean	Start Date	2014 Data Record
2014	Baltimore	22	11.8	Apr. 1, 2014	~ 9 months
	Jacksonville	29	10.5	Jan. 1, 2014	~ 12 months
	Kansas City	20	7.6	Jul. 1, 2014	~ 6 months
	Minneapolis	24	9.6	Oct. 1, 2013	~ 12 months
	Phoenix	23	9.7	May 1, 2014	~ 7 months
	Providence	17	8.3	Apr. 1, 2014	~ 9 months
	Oakland	29	8.6	Feb. 1, 2014	~ 11 months
	San Jose	22	6.8	Aug. 1, 2014	~ 5 months
	Seattle	21	10.0	May 19, 2014	~ 6 months
	St. Louis	32	11.3	Jan. 3, 2013	~ 12 months

UNITS in ug/m³ - PRELIMINARY DATA ANALYSIS - DO NOT CITE OR QUOTE

Near-road PM_{2.5} – FRM Data (ug/m³)



2014 Near-road PM_{2.5} FRM Data Reported to AQS

Year	CBSA	24-hr 98 th %ile	Mean	Start Date	2014 Data Record
2014	Birmingham	22	11.2	Jan. 1, 2014	~12 months
	Boston	15	6.3	Oct. 1, 2013	~12 months
	Cincinnati	26	13.0	Jan. 1, 2014	~12 months
	Denver	25	9.4	Jan. 1, 2014	~12 months
	Hartford	18	7.6	Mar. 6, 2014	~ 10 months
	Indianapolis	33	13.1	Feb. 1, 2014	~ 11 months
	Louisville	26	12.3	Jan. 1, 2014	~ 12 months

UNITS in ug/m³ - PRELIMINARY DATA ANALYSIS - DO NOT CITE OR QUOTE



Near-road Next Steps

- Continue installation of Phases 1 & 2
 - EPA Regions and HQ are tracking installations & are available to assist
- Continue updating near-road site metadata
 - Characterizing the sites is critical to data analyses
- Real-time data reporting; AIRNOW
- Continue analyzing data as its reported
 - NO₂ NAAQS Review is utilizing the new NO₂ data
 - Planning more in-depth looks and analyses of CO, PM2.5, Black Carbon, and other data
 - EPA plans to continue providing periodic updates to stakeholders
- Review case for Phase 3 based on available data

SO₂ DRR – Monitoring Issues





SO₂ Data Requirements Rule

- Final rule was signed on August 10, 2015.

Information available on:

<http://www.epa.gov/oaqps001/sulfurdioxide/implement.html>

- The DRR was developed to address the need for additional air quality data to be used for implementing the 2010 1-hour SO₂ NAAQS.
 - The existing SO₂ monitoring network characterizes localized SO₂ source impacts in a limited set of areas.
 - Under the DRR, air agencies will provide additional air quality data characterizing 1-hour peak concentrations and source-oriented impacts.



SO₂ DRR Summary

- The DRR directs state and tribal air agencies to characterize current air quality in areas with large SO₂ sources (2,000 tons per year or greater). (See section 51.1202)
- The final rule sets a process and timetable for air agencies to either establish ambient monitoring sites or conduct air quality modeling, and to submit air quality data to the EPA.
 - Air agencies have flexibility to choose the most appropriate technical approach for each source.
 - The resulting air quality data may be used by EPA in future actions related to implementing the 2010 1-hr SO₂ NAAQS.
- Alternatively, an air agency can avoid the air quality characterization requirement for a source by establishing federally enforceable emission limit(s) and providing documentation of the limit and compliance to EPA by January 2017.



Timeline

- **August 2015:** EPA issues final rule.
- **Jan. 15, 2016:** Air agency identifies sources exceeding threshold and other sources for which air quality will be characterized.
- **July 1, 2016:** Air agency specifies (for each identified source) whether it will monitor air quality, model air quality, or establish an enforceable limit.
 - Air agency also accordingly submits a revised monitoring plan, modeling protocols, or descriptions of planned limits on emissions to less than 2,000 tpy.
- **January 2017**
 - New monitoring sites must be operational by Jan. 1, 2017.
 - Modeling analyses must be submitted to EPA by Jan. 13, 2017.
 - Documentation of federally enforceable emission limits and compliance must be submitted to EPA by Jan. 13, 2017.
- **Early 2020:** Monitoring sites will have 3 years of quality-assured data which must be submitted to EPA.



SO₂ Source Oriented Monitoring TAD

- Objective: To aid stakeholders electing to characterize the maximum concentration(s) of SO₂ around an identified SO₂ source through the use of monitoring to meet the DRR or other requirements for NAAQS compliance data
- Suggests three approaches to determine how many monitors might be needed and where.
- The EPA expects that in some cases existing, ambient air industrial monitoring or collaborative partnerships could be leveraged to produce air quality data around SO₂ sources
 - All monitoring conducted to produce data for use in designations must be in accordance with 40 CFR Part 58 data reporting and certification requirements, and requirements in Appendices A, C, and E
- Any monitoring to be conducted must be included in a State's Annual Monitoring Network Plan and be subject to EPA Regional Administrator approval
- <http://www.epa.gov/oaqps001/sulfurdioxide/pdfs/SO2MonitoringTAD.pdf>



Sample Monitoring FAQ's

- Can one monitor be sufficient in a network?
 - Yes, in certain situations one monitor *can* be enough, but states need to demonstrate that the one site is at or near the area(s) of expected maximum concentration
 - Issues to consider: emissions characteristics, topography, meteorology, other nearby sources
- Can my current SO₂ network be judged adequate w/o modification?
 - There must be documentation to show siting at maximum concentration location(s). Since source emission profiles that initially influenced network design may have changed over time, EPA will expect states to describe WHY their current site locations are appropriate to characterize maximum concentrations
 - This is explained further in the TAD



Sample Monitoring FAQ's

- Can industrial monitors be used to satisfy DRR?
 - The monitor needs to be “SLAMS-like” in their operation to satisfy the DRR
 - The state is still the responsible party for ensuring data are handled, reported and certified (per 40 CFR Part 58) like SLAMS data, and that the monitor meets requirements described in Appendices A (QA), C (Methods), and E (siting)
 - Site(s) must be:
 - Sited appropriately in ambient air
 - Utilizes an approved FRM/FEM
 - Operated under an approved QAPP (can be the state's)
 - Subjected to routine QA/QC (including audits)
 - Meets applicable siting/spacing requirements



Additional Perspective

- SO₂ monitoring is relatively simple
 - Robust method and hardware
 - QC/QA easily automated
 - Shelter requirements are minimal
- Network siting strategies have been around for decades w/r/t max concentration sites
- Long history of industrial monitoring in US
- Frameworks exist for states using 3rd party monitoring in lieu of minimum requirements
- Yes – the DRR monitoring timeline is somewhat aggressive for deployment



Supplemental Information



Final Consent Decree: 2010 SO₂ NAAQS

On March 2, 2015, the U.S. District Court for the Northern District of California, in issuing its final order, found that the consent decree between the EPA and plaintiffs Sierra Club and Natural Resources Defense Council is procedurally and substantively fair and reasonable, with the terms contained in the consent decree sufficient to meet the EPA's obligations under the Clean Air Act.

The court's final order "triggered" the following schedule:

- ❖ By July 2, 2016, the EPA must complete designations for any area with a violation of the 2010 SO₂ NAAQS based on ambient air quality data collected between 2013 and 2015, as well as selected areas associated with power plants
- ❖ By December 31, 2017, the EPA must complete an additional round of designations for all remaining areas *except* where states have established new monitoring networks by January 1, 2017 *if* executed under the anticipated final SO₂ Data Requirements Rule¹
- ❖ By December 31, 2020, the EPA must complete designations of all remaining areas.



July 2, 2016 Designations: What Areas are Impacted?

Group 1 that the EPA must designate:

Areas where there are violations of the 2010 SO₂ NAAQS based on ambient air quality data collected between 2013 and 2015.

- Design Values (based on 2012 - 2014):
 - ❖ R4: Chatham County, Georgia (DV 78 ppb)
 - ❖ R9: Hawaii County, Hawaii (DV ~1400 ppb)
 - ❖ R7: Iron County, Missouri (DV 76 ppb)
 - ❖ R8: Williams County, North Dakota (DV 202 ppb)
 - ❖ R5: Brown County, Wisconsin (DV 76 ppb)
 - ❖ R8: Carbon County, Wyoming (DV 123 ppb)

Group 2 that the EPA must designate:

- Areas where there are sources (electric power plants) that as of March 2, 2015, have not been “announced for retirement,” and meet one of the following emissions thresholds:
 1. 16,000 tons of SO₂ emitted in 2012 or
 2. 2,600 tons of SO₂ emitted in 2012 with an average emission rate of at least 0.45 pounds of SO₂ per mmBtu



July 2, 2016 Designations: Regional Office Scoping

Breakdown of CD Sources by Regional Office	
Regional Office	Number of Sources
Region 2	2
Region 3	1
Region 4	6
Region 5	21
Region 6	20
Region 7	12
Region 8	6
Region 1, Region 9, Region 10	No sources meeting CD emissions criteria



July 2, 2016 Designations: Schedule

Milestones and Schedule for Completing the July 2, 2016, Round of SO₂ Designations	
Court Order	March 2, 2015
Impacted states may submit updated recommendations and supporting information for area designations to the EPA	No later than September 18, 2015
The EPA notifies impacted states concerning any intended modifications to their recommendations (120-day letters)	On or about January 22, 2016, but absolutely no later than 120 days prior to final designations (March 2, 2016)
The EPA publishes public notice of state recommendations and the EPA's intended modifications and initiates 30-day public comment period	On or about February 3, 2016
End of 30-day public comment period	On or about March 4, 2016
Impacted states provide additional information to demonstrate why an EPA modification is inappropriate	On or about April 8, 2016
The EPA promulgates final SO ₂ area designations (no later than 16 months from Court Order)	No later than July 2, 2016