Assessment of the National Air Toxics Trends Stations (NATTS) Network (DRAFT)

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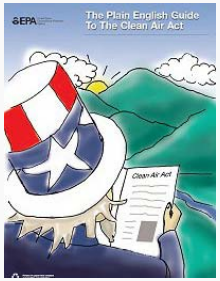
What is the NATTS Network?

- An ambient air monitoring network created to generate long-term, quality assured, standardized ambient air toxics data to:
  - Identify trends in air toxic concentrations
  - Evaluate the effectiveness of national hazardous air pollutant (HAP) reduction efforts
  - Ground truth air quality and human exposure models
  - Direct input into source-receptor models
  - Assess population exposure and background-level concentrations

How Does the NATTS Fit In?

- CAA amendments of 1990 - listed 189 HAPs to be controlled
- National-Scale Air Toxics Assessment (NATA) began in 1996 to evaluate air toxics and their potential health impacts

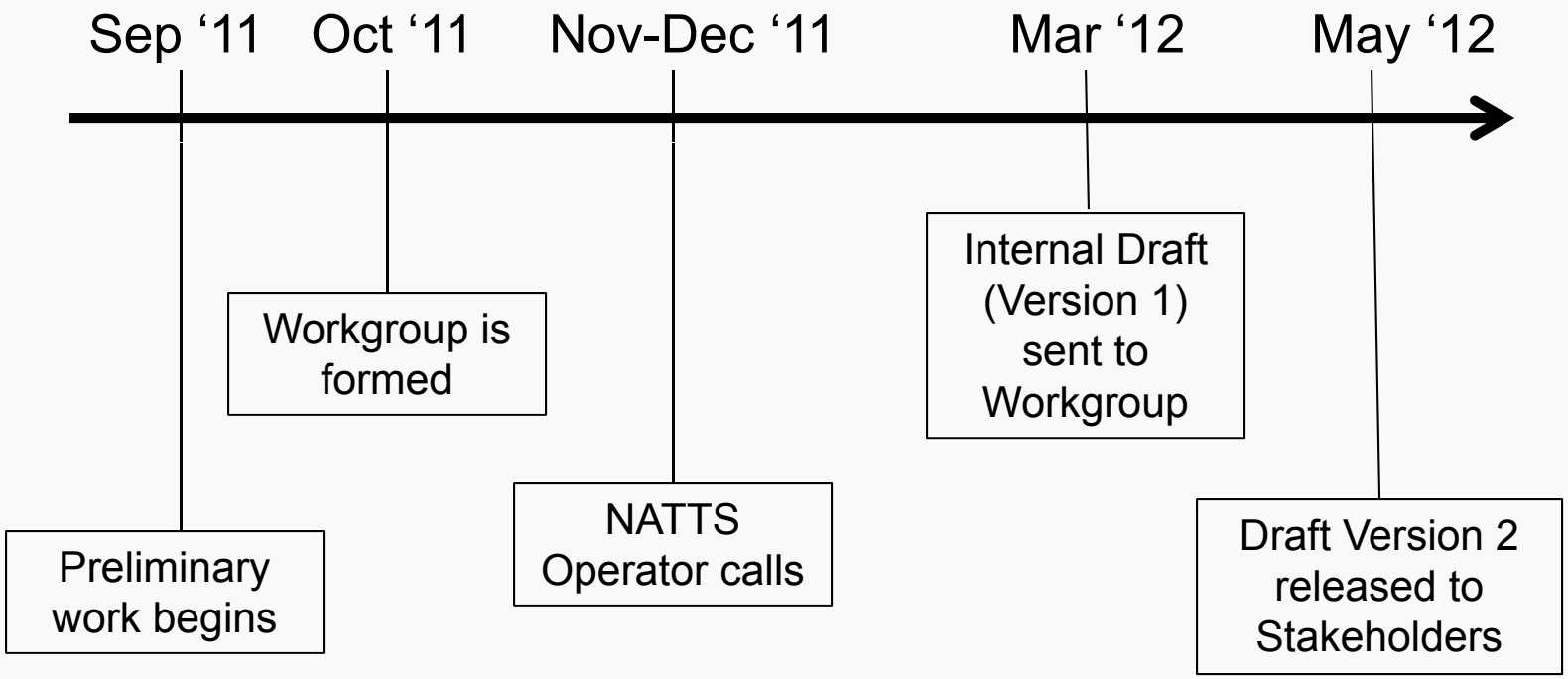


- Urban Air Toxics Strategy finalized in 1999 after Congress instructed EPA to develop a strategy for air toxics in urban areas.
  - Identified 33 air toxics presenting greatest threat to the public ("urban air toxics")
  - Strategy states that ambient monitoring data necessary to understand the behavior of air toxics in the atmosphere after they are emitted - *NATTS Network was developed*

Why is an Assessment Necessary & Why Now?

- Review of the NATTS network required in the final draft of the *National Monitoring Strategy, Air Toxics Component*
  - "Although the longevity of trends sites typically extends over a decade or more, the NATTS must be evaluated, and modified as needed, on 6-year intervals to assure continued relevancy, consistent with the procedures established under the national strategy"
- Although the Network is older than 6 years, many of the 23 original sites did not begin to fully sample the 16 initial core HAPs consistently until 2005
  - Assessment covers data from 2003-2010

Project Timeline (How we got here)

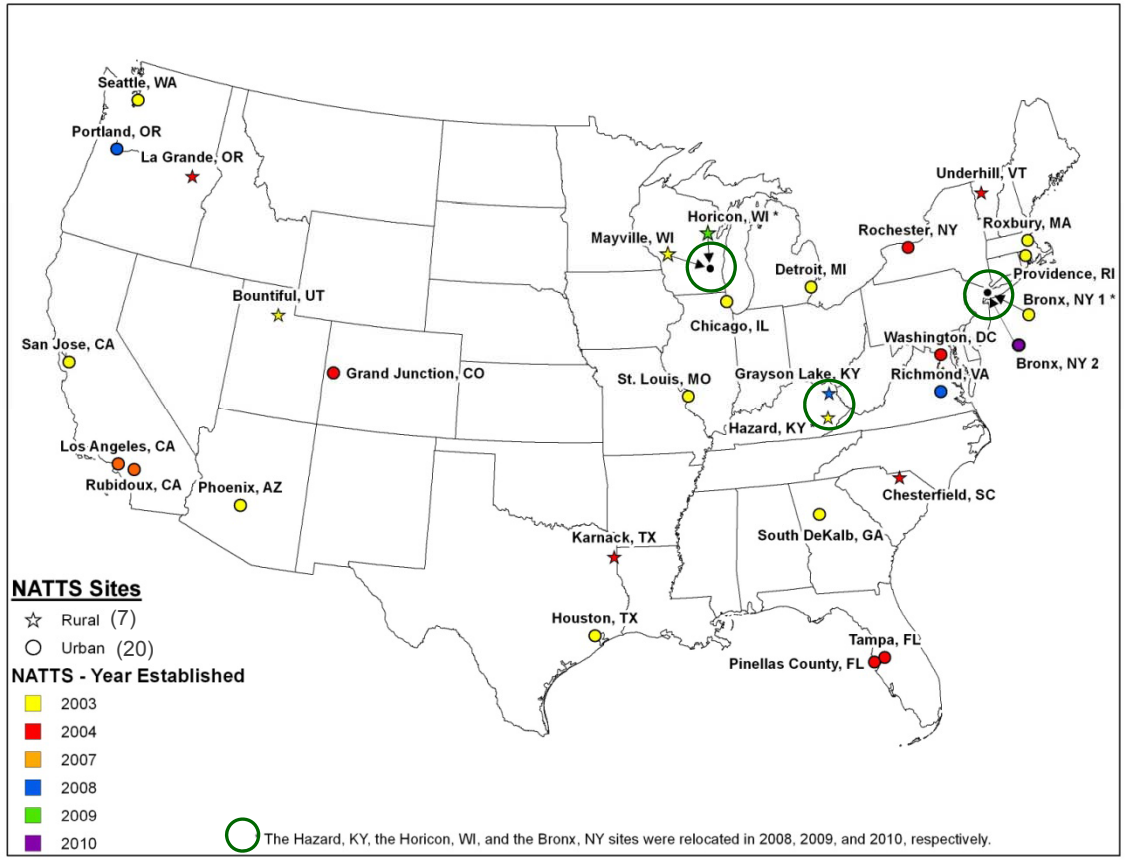


What is the Scope of the Draft Assessment?

- Goal is to determine the degree to which the NATTS Network objectives are being met

- Policy-relevant questions to be addressed using the assessment:
  - Is the network design appropriate/optimal to achieve the goals and objectives?
  - Are the NATTS goal and objectives still relevant?
  - Are the data collected adequate to meet the program goals?
  - What changes to the current network design would be appropriate to improve the NATTS

NATTS Sites & Years Established



Minimum Required NATTS Analytes

VOCs
Acrolein[1]
Benzene
Chloroform
1,3-butadiene
Vinyl Chloride
Perchloroethylene
Carbon Tetrachloride
Trichloroethylene

Carbonyls
Formaldehyde
Acetaldehyde

PAHs
*Benzo(a)pyrene**
*Naphthalene**

PM_{10} Metals
Nickel compounds
Arsenic compounds
Cadmium compounds
Manganese compounds
Beryllium compounds
Lead compounds

*TSP Hexavalent Chromium**

[1]Acrolein not included in data analysis due to data quality issues (canister cleaning & gas standards)
* Not an original Core HAP

Draft Network Assessment Presentation Outline

- Overview of the Assessment Report structure
- Data quality requirements
- Scoring of NATTS data
- AQS reporting assessment
- Statistical overview of data (preliminary)
- Trends results (preliminary)
- Site operator interviews
- Observations, recommendations & future plans

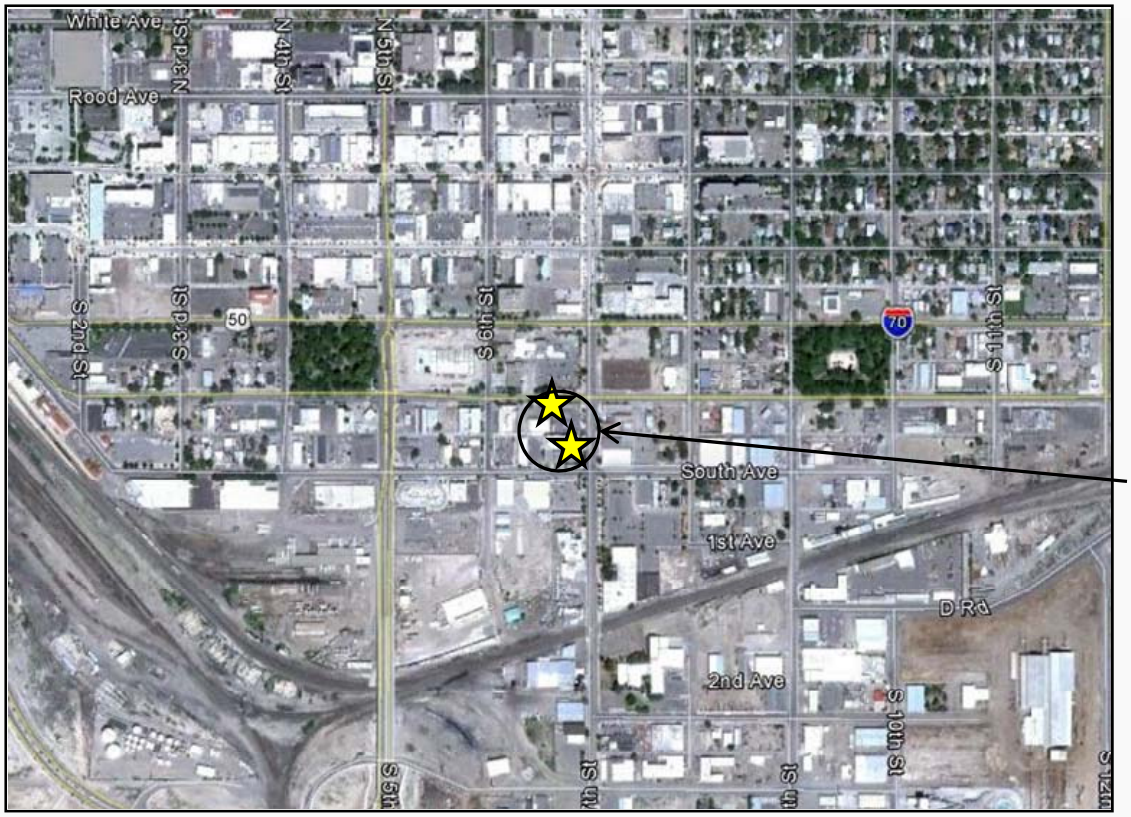
What is in the Report?

- Detailed history of the Air Toxics and NATTS Program (Section 2)

- Detailed site information (Section 3)
  - Google Earth site maps
  - Site Descriptions
  - Site Characteristics (coordinates, population, average daily traffic, VMT, land use, location setting)

Example of Site Maps in Draft Network Assessment

Grand Junction, CO

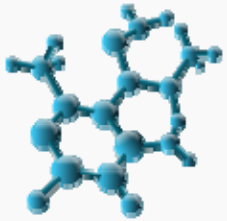


Metals & hexavalent chromium monitors are at a separate, but adjacent, location due to space constraints

Google Earth Image of Grand Junction NATTS Site

What is in the Report? (cont.)

- NATTS Program requirements (Section 4)
  - NATTS pollutants, methods, MDLs
  - Method Quality Objectives (MQOs)
  - QA Program requirements (TSAs, IPAs, PTs, QAAR)
  - Workplan and QAPP requirements
  - AQS reporting requirements
  - Meteorological measurements information

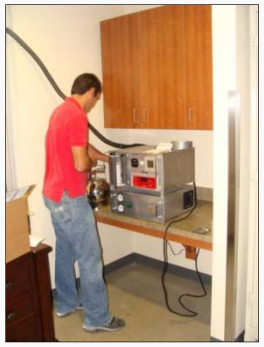


What is in the Report? (cont.)

- Thorough assessment of reporting to AQS (Section 5):
  - NATTS POCs over time
  - Expected data that are missing from AQS
  - Reporting of :
    - Data quality information
    - Other HAPs w/assoc. methods
    - Non-HAPs w/assoc. methods
    - Criteria pollutants
    - Meteorological data

What is in the Report? (cont.)

- NATTS Site Operator Interviews (Section 6)
  - Equipment Survey (sampling and analytical) and age
  - Analytical laboratories over time
  - Operator comments



What is in the Report? (cont.)

- Data! Data! Data! (Section 7)
  - Additional datasets provided outside AQS
  - Data Treatments
  - Summary Statistics
  - Inter-comparison of close proximity sites

What is in the Report? (cont.)

- MQO Scoring Procedure (Section 8)
  - A-rated, B-rated, Does Not Meet, and Not-rated
  - Common reasons why a pollutant dataset was "not suitable"
  - Identification of "trends suitable" pollutant datasets

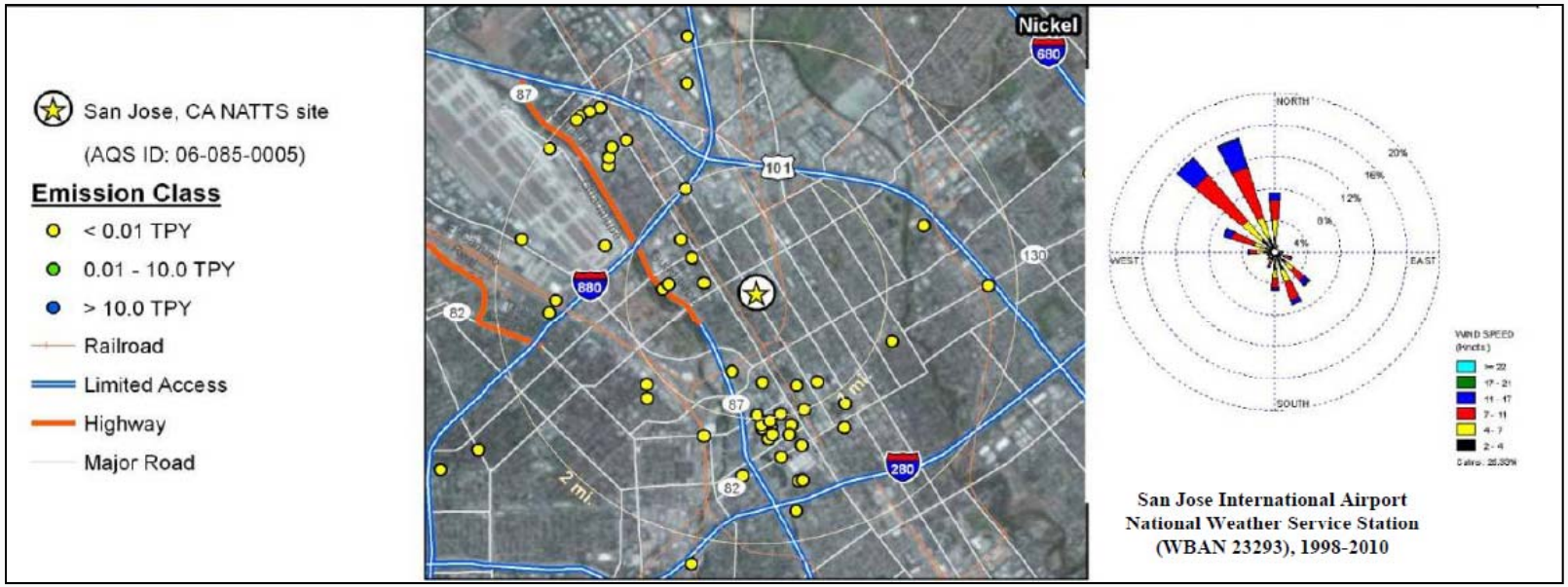
What is in the Report? (cont.)

- Trends Calculations (Section 9)
  - Annual Averages by site and pollutant
  - 3-Year Blocked Averages by pollutant (to satisfy the Trends DQO)
  - 3-Year Rolling Averages by site and pollutant

- Observations and recommendations (Section 10)

What is in the Report? (cont.)

- Appendices
  - Concentration and precision data
  - Emission source maps, emission inventory data, and historical windrose profiles



What is in the Report? (cont.)

- Appendices (cont.)
  - Sampling and analytical equipment inventory
  - MQO Scoring tables by site and pollutant
  - Annual average and 3-year rolling averages by site and pollutant

- Combined – nearly 2,000 pages!

Data Quality Requirements

What are the data quality requirements?

How do the NATTS data compare to the data quality requirements?

DQO

MQOs

Suitable Data

What is the NATTS Network?

- An ambient air monitoring network created to generate long-term, quality assured, standardized ambient air toxics data to:
  - ***Identify trends in air toxic concentrations***
  - Evaluate the effectiveness of national hazardous air pollutant (HAP) reduction efforts
  - Ground truth air quality and human exposure models
  - Direct input into source-receptor models
  - Assess population exposure and background-level concentrations

NATTS DQO

To be able to detect a
15 percent difference (trend) between
the annual mean concentrations of
successive 3-year periods
within acceptable levels of decision error

$$\overline{X} = \left(\frac{\overline{X}_{2005} + \overline{X}_{2006} + \overline{X}_{2007}}{3} \right)$$

$$\overline{Y} = \left(\frac{\overline{Y}_{2008} + \overline{Y}_{2009} + \overline{Y}_{2010}}{3} \right)$$

$$T = \left(\frac{\overline{Y} - \overline{X}}{\overline{X}} \right) \times 100$$

DQO Development

- Directed by NACAA Monitoring Steering Committee in 2002 (was STAPPA/ALAPCO—US EPA Monitoring Steering Committee)
- Followed *Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4*
- Used data collected and analyzed by a10-city Pilot Monitoring Project
- Six high risk pollutants: Acrolein, arsenic, benzene, 1,3-butadiene, chromium, and formaldehyde
- *Draft Report on Development of Data Quality Objectives for the National Air Toxics Trends Monitoring Network*

DQO

MQOs

Suitable Data

MQOs

- Completeness: ≥85% (1-in-6 day sampling)
- Precision: Collocated samples ≤15% CV
- Sensitivity: Target MDLs (based on health risk)
- Bias: Proficiency tests (PTs) ≤ 25% vs. true concentration

Pollutant dataset

The set of ambient air concentrations of one pollutant, at one site, for one calendar year

- Benzene concentrations at Phoenix for 2010
- Acetaldehyde concentrations at San Jose for 2006
- Arsenic concentrations at Grand Junction for 2008

NATTS data vs. MQOs

- Some pollutant datasets were *just outside* of the respective MQO
- Nearly all datasets had data for completeness and sensitivity (MDLs)
- Bias measurements (PT data) were available for 88% of the datasets (PT frequency varied)
- Precision measurements were available for 74% of the datasets (precision was not required)

MQO Scoring

1) Identifies pollutant datasets that are *just outside* of the MQO

2) Applies a weighting scheme to reflect how the MQOs applied during the assessment period

MQO Scoring

MQO	A rated	B rated	Original weighting	Adjusted weighting
Completeness	≥ 85%	75%-85%	25%	40%
Sensitivity	Ratio ≤ 1.00	Ratio 1.00-1.50	25%	30%
Bias	± 25%	± 25% to ± 35%	25%	20%
Precision	± 15%	± 15% to ± 25%	25%	10%

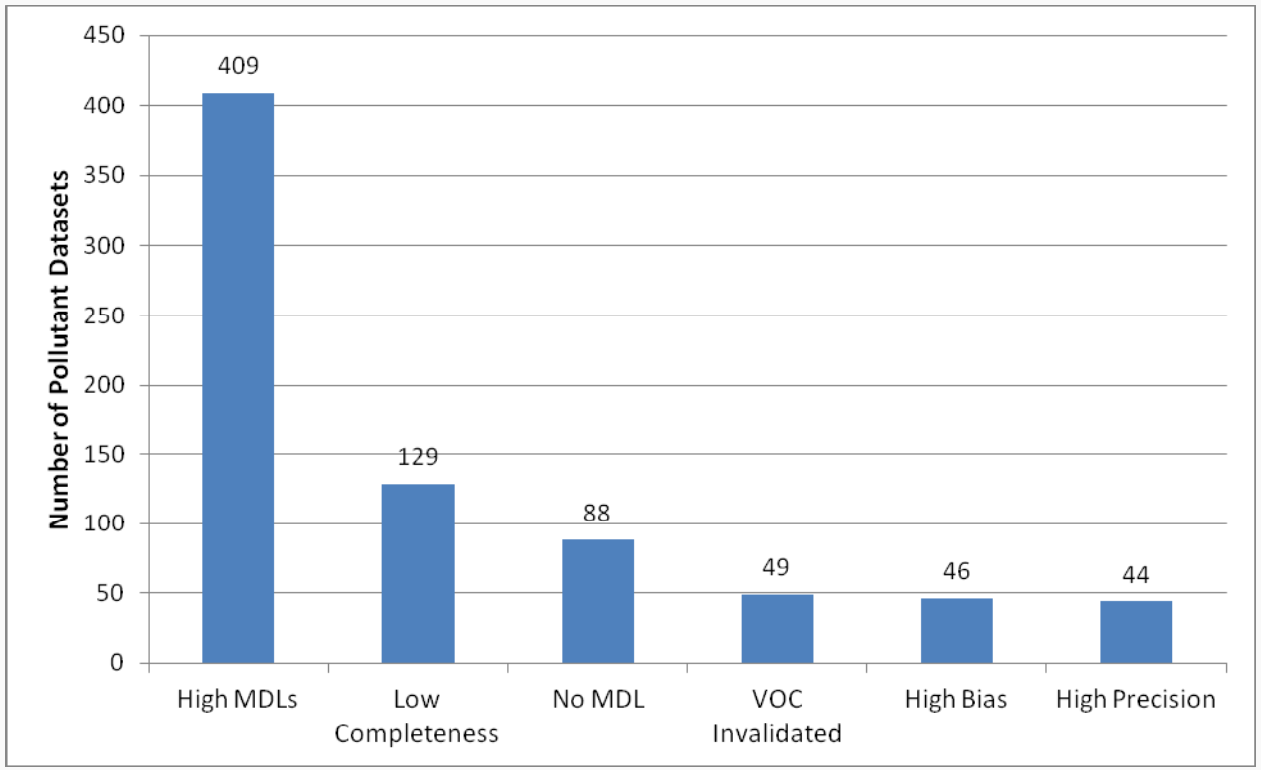
Benefits of MQO Scoring

1) Includes a larger number of pollutant datasets
2) Emphasizes the data in hand (completeness and sensitivity)
3) De-emphasizes data that were not required (precision) or that were not uniformly applied (precision and bias)

Results of MQO Scoring

Pollutant Group	# Pollutant Datasets Scored	A-rated		B-rated		Does Not Meet MQO	
		#A	%A	#B	%B	# Not	% Not
VOCs	1,259	662	53%	190	15%	407	32%
Carbonyls	362	228	63%	59	16%	75	21%
PM_{10} Metals	946	535	57%	284	30%	127	13%
Hex Chrome	128	94	73%	20	16%	14	11%
PAHs	132	113	86%	7	5%	12	9%
Total	2,827	1,632	58%	560	20%	635	22%
		2,192 pollutant datasets (78%) are suitable for assessing trends					

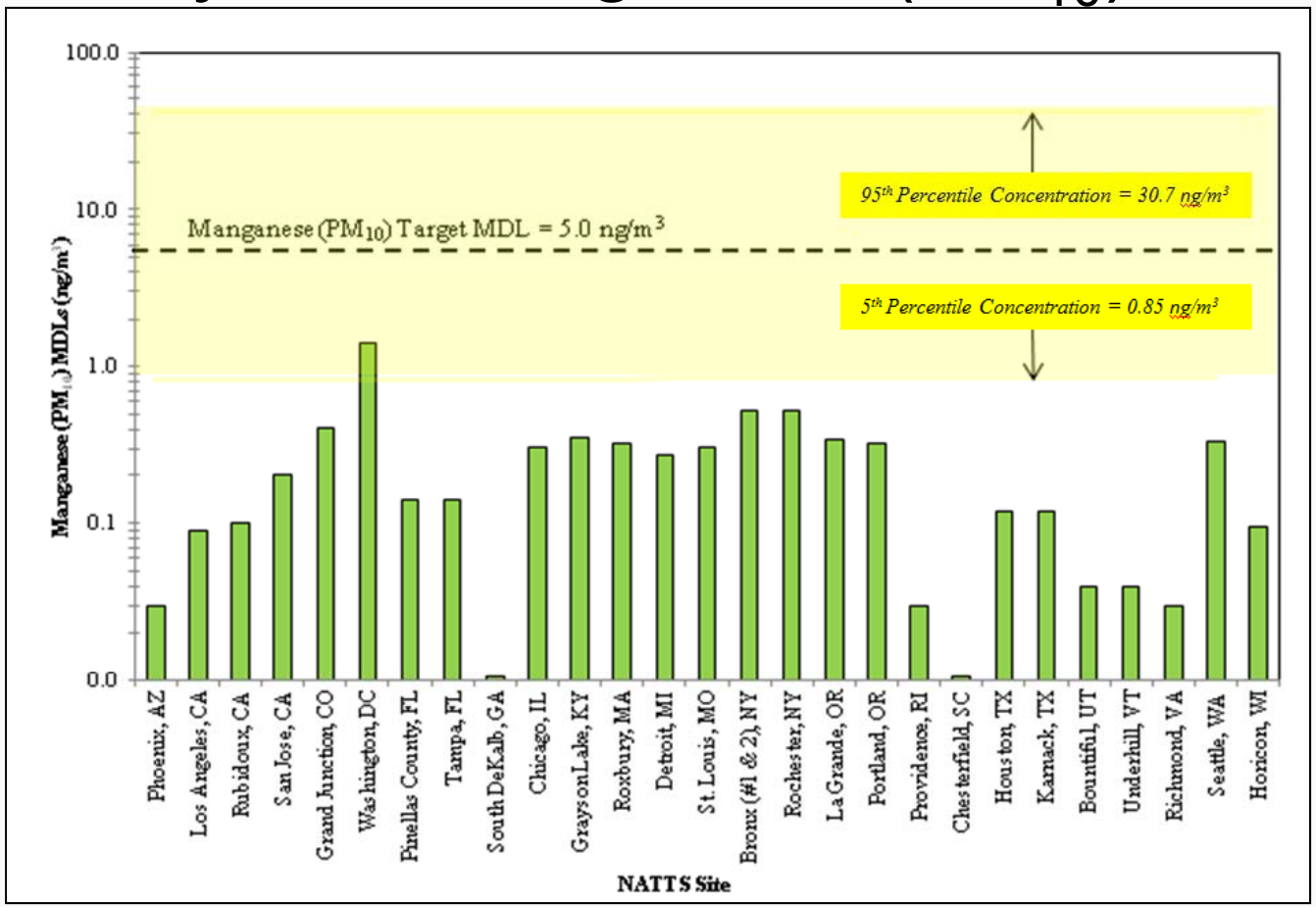
Most Frequent Reasons That Pollutant Datasets Were Not Suitable



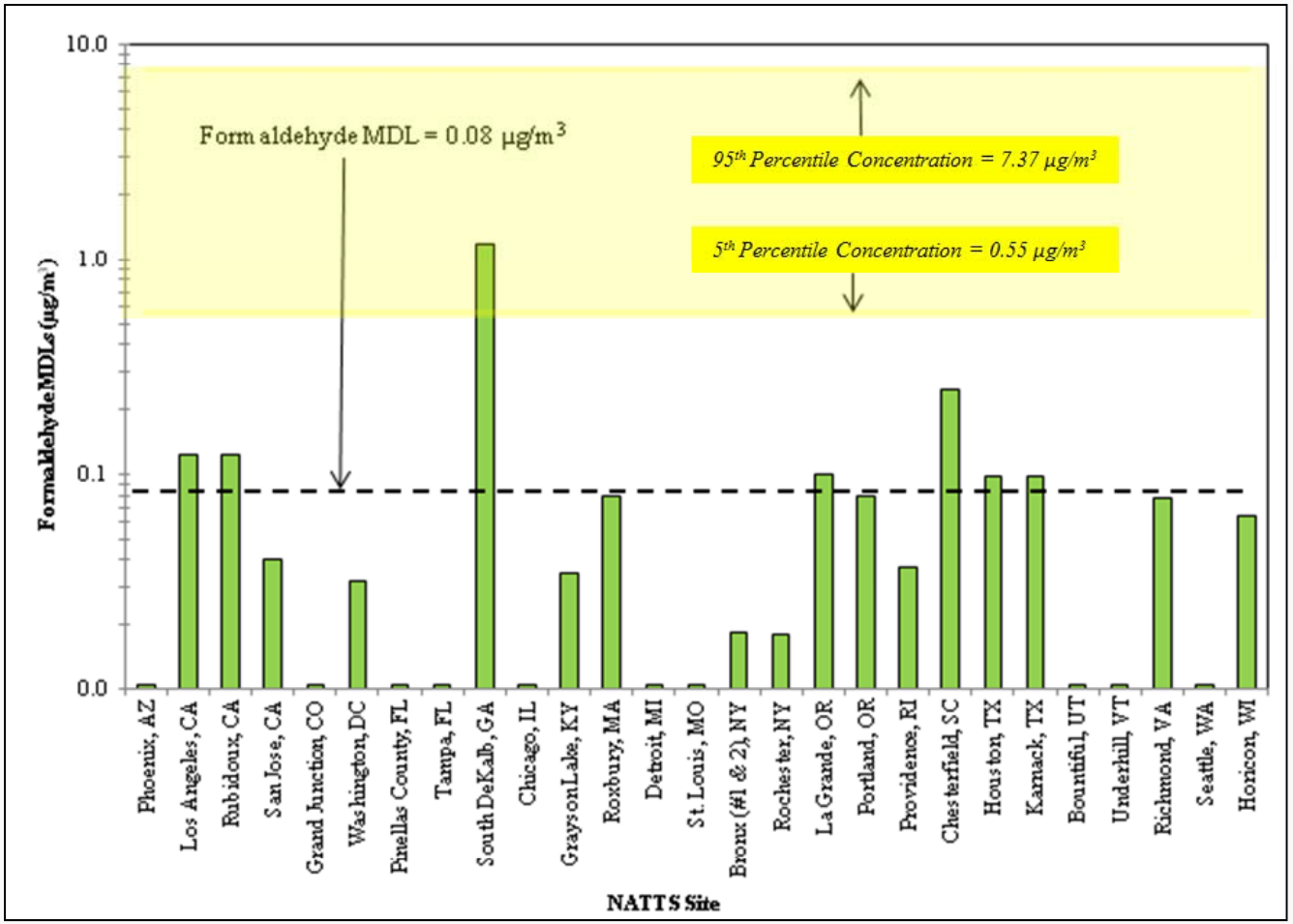
2010 MDLs

Meeting MDLs (all sites)	Not Meeting MDLs (# labs/# sites)	
Benzo(a)pyrene	Acetaldehyde (1/1)	Carbon tetrachloride (6/9)
Cr+6	Arsenic (4/6)	Chloroform (2/3)
Lead	Benzene (5/8)	Formaldehyde (5/7)
Manganese	Beryllium (2/2)	Tetrachloroethylene (7/10)
Naphthalene	1,3-butadiene (6/10)	Trichloroethylene (4/6)
Nickel	Cadmium (1/1)	Vinyl chloride (7/10)

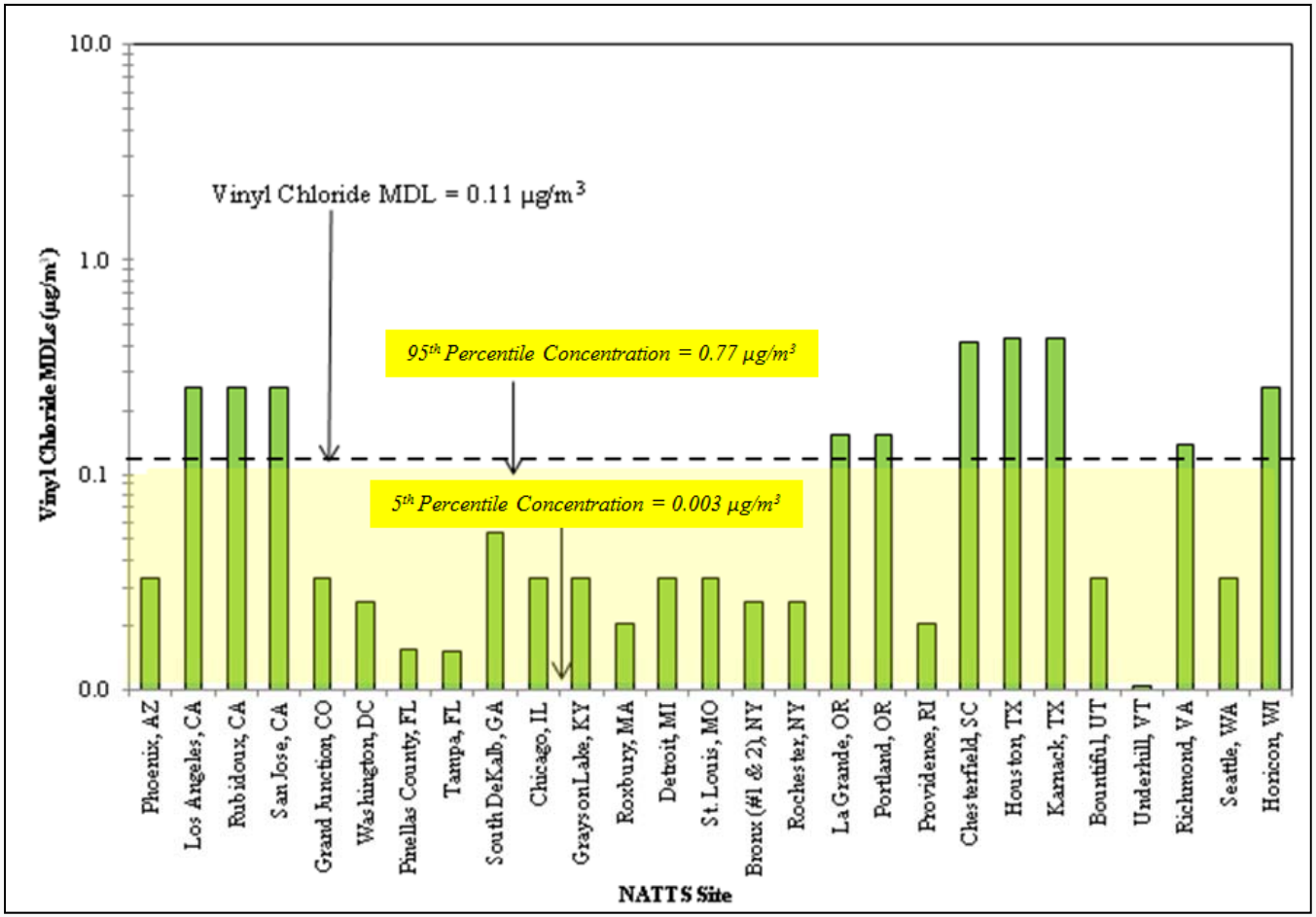
MDL Analysis – Manganese (PM_{10}) for 2010



MDL Analysis – Formaldehyde for 2010



MDL Analysis – Vinyl Chloride for 2010



From the Universe to Suitable Data

3,343 pollutant datasets were scheduled for collection

- 133 were not reported (but were expected)
- 149 were acrolein (not assessed)
- 214 were not rated (due to mid-year start/end)

2,827 pollutant datasets that were scored

- 635 did not meet the scoring criteria (not suitable for trends)

2,192 pollutant datasets met the scoring criteria (suitable for Trends)

Cliff Notes Summary

- EPA needs quality data to assess trends
- Measure that data quality with MQOs
- MQO data were not always available
- Workgroup developed a scoring system to identify data that are suitable for assessing trends
- 78% of the pollutant datasets are suitable
- High MDLs are the most common reason for unsuitable data
- EPA calculated trends using 2,827 suitable datasets

Data Assessment

Examined Through:

- AQS Data Reporting
- National Summary Statistics
- Inter-Site Comparison
- Annual Averages
- Three-Year Averages (Blocked and Rolling)
- Site Operator Interviews

AQS Data Reporting

Database Preparation:

- AQS Data Pull: December 2011
- 27 million records (RD and RP formats) pulled for NATTS Sites AQS Site IDs from 2003-2010
- Data stored in Microsoft SQL Server and Access
- Significant investment identifying applicable POCs:
    - EPA's QAAR
    - NATTS Operating Agencies
    - EPA's National Monitoring Program

AQS Data Reporting – Reported Datasets

Reporting Completeness:

- 95% of method-specific (VOC, carbonyls, etc.) were reported to AQS.
- EPA was able to obtain some additional datasets from NATTS Operating Agencies
- EPA received clarification on some of the missing datasets

AQS Data Reporting – Reported Datasets

Reporting Completeness (cont.)

100% completeness	90-100% completeness	<90% completeness
Benzo(a)pyrene	Acetaldehyde	Acrolein
Butadiene, 1,3-	Arsenic (PM_{10})	Beryllium (PM_{10})
Carbon tetrachloride	Benzene	Hexavalent chromium
Chloroform	Formaldehyde	Cadmium (PM_{10})
Naphthalene	Vinyl chloride	Lead (PM_{10})
Trichloroethylene		Manganese (PM_{10})
Tetrachloroethylene		Nickel (PM_{10})

AQS Data Reporting – Sampling Consistent With National Calendar

- EPA prepares a national calendar annually
  - Consistent sampling days is useful in conducting spatial variability analysis
- Results:
  - Most sites did well to stick with the national calendar
  - Most sites made up samples within the quarter
  - Most sites reported voided samples that occurred on national sampling days.

AQS Data Reporting – Data Quality Information

Data Quality Information Metric	# Sites Reporting in 2005	# Sites Reporting in 2010
Under-MDL Reporting	19 / 23	27 / 28
ND Reporting	7 / 23	27 / 28
Null Data Code Reporting	21 / 23	26 / 28
Pollutant-Specific MDLs	19 / 23	28 / 28
Data Qualifier Reporting	11 / 23	28 / 28
Precision Data Reporting	18 / 23	26 / 28

AQS Data Reporting – Engineering Units

Pollutant Group	Primary Engineering Unit	Secondary Engineering Unit
Carbonyls	ppbv (60%)	µg/m^3 SC (26%)
Hexavalent chromium	ng/m^3 SC (100%)	--
PAHs	ng/m^3 SC (100%)	--
PM_{10} Metals*	ng/m^3 SC (64%)	µg/m^3 SC(22%)
VOCs	ppbv (91%)	µg/m^3 SC (9%)

*: local conditions (LC) reported 14% of data

AQS Data Reporting – Additional Reporting

Reporting Metric	# Sites Reporting in 2005	# Sites Reporting in 2010
Other HAP Reporting	23 / 23	28 / 28
Non-HAP Reporting	21 / 23	26 / 28
Criteria Air Pollutant Reporting	22 / 23	27 / 28
Meteorological Data Reporting	21 / 23	25 / 28

Data Treatments

Data	Treatment
Primary null or 0	Replaced with secondary, if available
Non-Detects	Replaced with 0 as a surrogate
½ MDL substitution	Identified records that were suspected as being ½ MDL. Replaced with 0
Units conversion	VOCs, Carbonyls = $\mu g/m^3$ PM_{10} Metals, PAHs, Hexavalent Chromium = ng/m^3
Invalidated data	Three agencies invalidated large portions of data
Additional data	Three agencies provided data not in AQS
Questionable data	Out-of-range data were identified, and the appropriate agency/lab was contacted.

NATTS Data Records Overview

Year	# Primary	# Secondary	# Replicates	Total for Year
2003	7,829	1,182	361	**9,372**
2004	15,787	2,904	486	**19,177**
2005	19,115	3,544	1,030	**23,689**
2006	19,394	4,371	1,406	**25,171**
2007	23,219	6,356	2,538	**32,113**
2008	27,370	6,579	2,322	**36,271**
2009	29,501	7,783	2,409	**39,693**
2010	29,595	7,338	2,769	**39,702**
TOTAL	**171,810**	**40,057**	**13,321**	**225,188**

National, and Urban/Rural Summary Statistics

Analyte	Units	Site Type	# AQS Records	% Detections	Arithmetic Mean[a]	Percentile Value						
						5th	10th	25th	50th	75th	90th	95th
Acetaldehyde	µg/m³	Urban	7,442	100%	1.88 ± 0.05	0.47	0.63	0.92	1.46	2.36	3.55	4.37
		Rural	2,831	98%	1.57 ± 0.06	0.35	0.47	0.71	1.11	1.81	3.06	4.13
		All Sites	10,273	99%	1.79 ± 0.04	0.42	0.56	0.86	1.37	2.25	3.44	4.32
Arsenic (PM_{10})	ng/m³	Urban	6,693	88%	1.14 ± 0.08	ND[b]	ND[b]	0.32	0.63	1.13	2.20	3.38
		Rural	2,817	88%	0.60 ± 0.04	ND[b]	ND[b]	0.17	0.48	0.68	1.16	1.63
		All Sites	9,510	88%	0.98 ± 0.06	ND[b]	ND[b]	0.27	0.55	1.01	1.89	2.96
Benzene	µg/m³	Urban	7,611	100%	1.14 ± 0.02	0.31	0.38	0.57	0.86	1.37	2.20	3.00
		Rural	2,467	80%	0.64 ± 0.03	ND[b]	ND[b]	0.16	0.46	0.86	1.47	1.98
		All Sites	10,078	95%	1.01 ± 0.02	ND[b]	0.26	0.47	0.78	1.28	2.04	2.78
Benzo(a)pyrene	ng/m³	Urban	3,185	64%	0.123 ± 0.030	ND[b]	ND[b]	ND[b]	0.04	0.12	0.27	0.41
		Rural	1,167	46%	0.086 ± 0.014	ND[b]	ND[b]	ND[b]	ND[b]	0.06	0.23	0.47
		All Sites	4,352	59%	0.113 ± 0.023	ND[b]	ND[b]	ND[b]	0.03	0.11	0.26	0.42
Beryllium (PM_{10})	ng/m³	Urban	6,614	70%	0.109 ± 0.014	ND[b]	ND[b]	ND[b]	0.004	0.02	0.10	0.50
		Rural	2,483	39%	0.038 ± 0.005	ND[b]	ND[b]	ND[b]	ND[b]	0.004	0.05	0.27
		All Sites	9,097	62%	0.090 ± 0.010	ND[b]	ND[b]	ND[b]	0.002	0.02	0.10	0.50
Butadiene, 1,3-	µg/m³	Urban	7,625	84%	0.129 ± 0.006	ND[b]	ND[b]	0.04	0.07	0.15	0.29	0.42
		Rural	2,477	19%	0.011 ± 0.003	ND[b]	ND[b]	ND[b]	ND[b]	ND[b]	0.01	0.06
		All Sites	10,102	68%	0.100 ± 0.005	ND[b]	ND[b]	ND[b]	0.05	0.12	0.24	0.38
Cadmium (PM_{10})	ng/m³	Urban	6,693	86%	0.28 ± 0.02	ND[b]	ND[b]	0.06	0.12	0.29	0.61	1.00
		Rural	2,481	83%	0.13 ± 0.01	ND[b]	ND[b]	0.03	0.07	0.14	0.27	0.46
		All Sites	9,174	85%	0.24 ± 0.01	ND[b]	ND[b]	0.05	0.10	0.24	0.50	0.89
Carbon Tetrachloride	µg/m³	Urban	7,550	97%	0.587 ± 0.004	0.34	0.44	0.50	0.57	0.68	0.77	0.87
		Rural	2,451	66%	0.368 ± 0.012	ND[b]	ND[b]	ND[b]	0.44	0.59	0.69	0.77
		All Sites	10,001	89%	0.534 ± 0.005	ND[b]	ND[b]	0.49	0.57	0.65	0.75	0.83

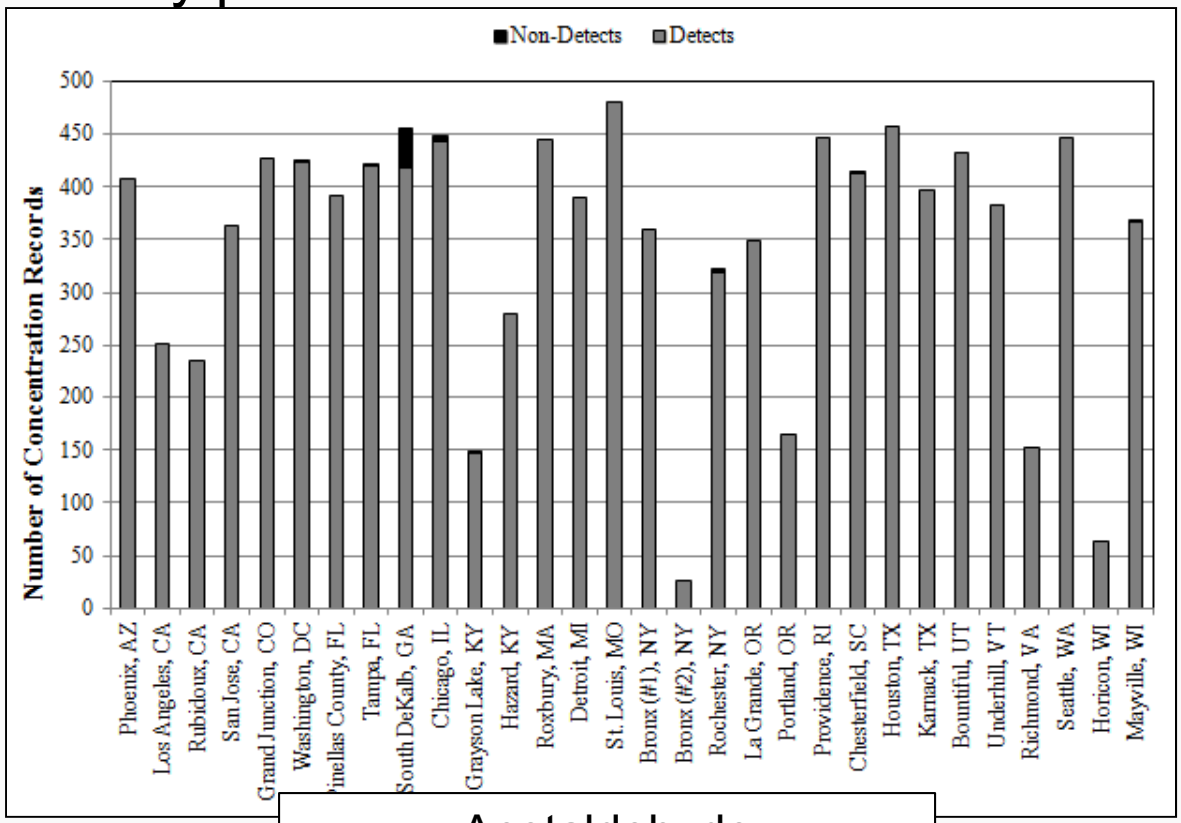
Summary Observations (2003-2010)

- Formaldehyde and acetaldehyde had the <u>greatest</u> number of detects (10,325 and 10,213, respectively). Greater than 90% detects for:
  - Acetaldehyde (99%)
  - Benzene (95%)
  - Formaldehyde (100%)
  - Lead (PM_{10}) (99%)
  - Manganese (PM_{10}) (99%)
  - Naphthalene (100%)
  - Nickel (PM_{10}) (92%)

- Vinyl chloride had the <u>least</u> number of detects (1,789)

Summary Observations (cont.)

- Detects by pollutant and site are examined



Acetaldehyde

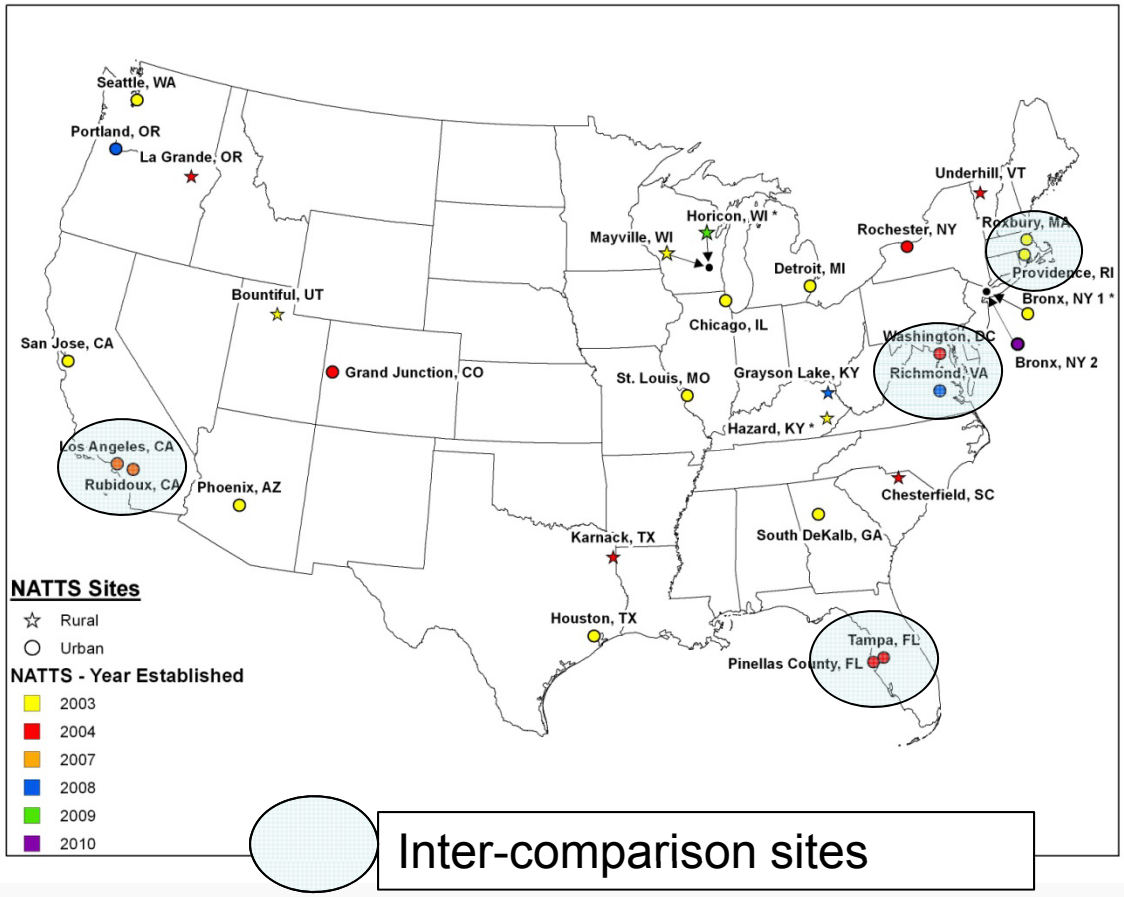
Summary Observations (cont.)

- For all pollutants, except for vinyl chloride and formaldehyde, concentrations at urban sites were statistically significantly higher than rural sites.
- Assessment includes similar site-level information

Table D.2-2. Summary Statistics for Los Angeles, CA

Analyte	Units	# AQS Records	% Detection	Average Concentration	Standard Deviation	Maximum Concentration	Percentile Value						
							5th	10th	25th	50th	75th	90th	95th
Acetaldehyde	$\mu g/m^3$	247	100%	2.64	1.48	7.75	0.72	0.90	1.62	2.34	3.42	4.68	5.59
Arsenic (PM_{10})	ng/m^3	205	94%	1.58	6.66	94.60	ND	0.10	0.30	0.60	1.40	3.16	4.16
Benzene	$\mu g/m^3$	227	100%	1.47	0.83	4.76	0.58	0.64	0.86	1.25	1.87	2.66	3.14
Benzo(a)pyrene	ng/m^3	219	56%	0.09	0.16	1.26	ND	ND	ND	0.04	0.12	0.26	0.31
Beryllium (PM_{10})	ng/m^3	205	41%	0.94	2.09	14.00	ND	ND	ND	ND	0.50	4.26	5.44
Butadiene, 1,3-	$\mu g/m^3$	227	93%	0.17	0.14	0.69	ND	0.04	0.07	0.13	0.24	0.38	0.44
Cadmium (PM_{10})	ng/m^3	205	74%	0.23	0.32	2.00	ND	ND	ND	0.10	0.30	0.50	1.16
Carbon tetrachloride	$\mu g/m^3$	224	99%	0.49	0.08	0.82	0.38	0.38	0.44	0.50	0.50	0.57	0.57
Chloroform	$\mu g/m^3$	227	94%	0.15	0.08	0.44	ND	0.10	0.10	0.15	0.20	0.29	0.34
Formaldehyde	$\mu g/m^3$	252	100%	4.45	2.37	14.74	1.17	1.72	2.95	4.05	5.68	7.60	8.78
Hexavalent Chromium	ng/m^3	235	100%	0.11	0.08	0.55	0.03	0.04	0.06	0.09	0.14	0.19	0.25
Lead (PM_{10})	ng/m^3	205	100%	8.17	7.25	70.00	2.22	3.00	4.50	6.80	9.70	13.30	17.44
Manganese (PM_{10})	ng/m^3	205	97%	13.77	13.08	95.80	0.10	0.34	4.60	10.00	20.00	29.88	33.96
Naphthalene	ng/m^3	219	100%	130.81	99.04	736.00	36.80	48.56	70.00	106.00	162.00	240.20	302.40
Nickel (PM_{10})	ng/m^3	205	99%	3.72	10.54	143.50	0.20	0.40	1.00	2.20	3.90	5.52	8.80
Tetrachloroethylene	$\mu g/m^3$	227	97%	0.25	0.19	1.15	0.07	0.07	0.14	0.20	0.27	0.47	0.66
Trichloroethylene	$\mu g/m^3$	227	88%	0.14	0.18	1.40	ND	ND	0.05	0.11	0.16	0.32	0.38
Vinyl chloride	$\mu g/m^3$	220	0%	ND	0.00	0.00	ND	ND	ND	ND	ND	ND	ND

Inter-comparison of Close Proximity Sites



Inter-comparison sites

Inter-comparison of Close Proximity Sites

Paired Sites	# Pollutants, no sig. diff.	# Pollutants, sig. diff.
Los-Angeles, CA – Rubidoux, CA	12	6
Pinellas County, FL – Tampa, FL	6	12
Providence, RI – Roxbury, MA	11	7
Richmond, VA – Washington, DC	8	10

Time Period Averaging - Annual

- Using the results from the MQO Scoring, annual averages were calculated for “suitable” datasets (2,192)
- Averaged detects and non-detects (substituted with 0).
- Confidence Interval at α = 0.05

Annual Average Examples

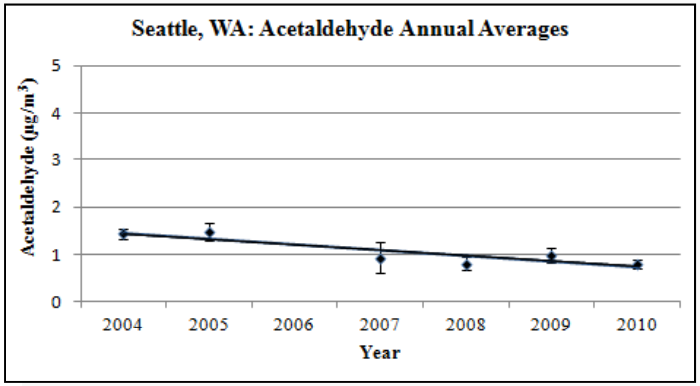
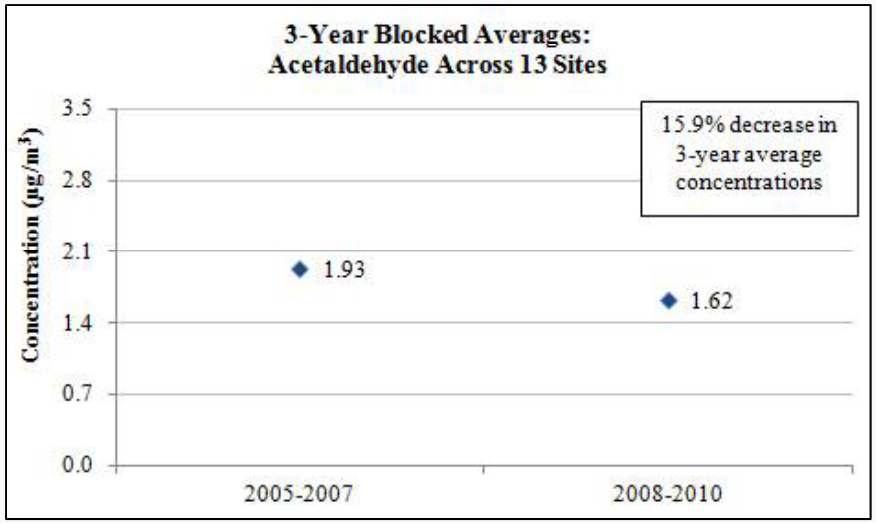


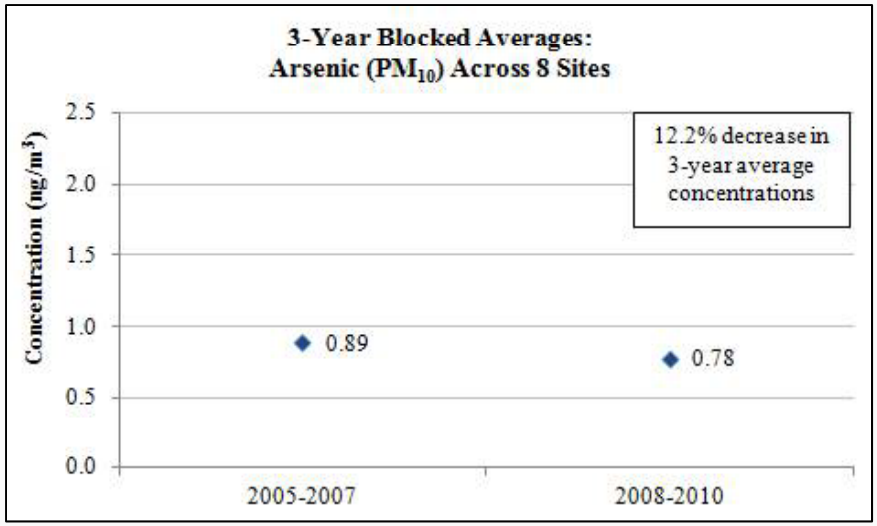
Table F1-1. Acetaldehyde Annual Average Concentration by Site.

Site Name	2003	2004	2005	2006	2007	2008	2009	2010
Acetaldehyde (µg/m³)								
Phoenix, AZ	--	3.23 ± 0.30	3.01 ± 0.29	3.29 ± 0.47	3.03 ± 0.30	2.69 ± 0.24	2.85 ± 0.30	--
Los Angeles, CA	--	--	--	--	2.75 ± 0.39	2.99 ± 0.43	2.48 ± 0.33	2.30 ± 0.30
Rubidoux, CA	--	--	--	--	2.67 ± 0.33	2.60 ± 0.44	2.70 ± 0.34	2.28 ± 0.35
San Jose, CA	--	--	--	--	1.65 ± 0.28	1.77 ± 0.25	1.64 ± 0.24	1.49 ± 0.25
Grand Junction, CO	--	5.80 ± 3.61	2.99 ± 0.53	2.36 ± 0.21	2.79 ± 0.27	2.49 ± 0.22	2.89 ± 0.22	2.00 ± 0.20
Washington, DC	--	0.76 ± 0.08	--	1.14 ± 0.20	--	--	0.71 ± 0.12	0.94 ± 0.20
Pinellas County, FL	--	--	1.59 ± 0.25	1.27 ± 0.11	1.98 ± 0.22	2.43 ± 0.25	2.87 ± 0.29	3.36 ± 0.49
Tampa, FL	--	1.60 ± 0.29	1.25 ± 0.16	1.16 ± 0.11	2.80 ± 0.61	1.20 ± 0.24	1.15 ± 0.10	1.50 ± 0.18

Time Period Averaging – 3-Year Blocked

- Procedure:
  - Only considered "suitable" pollutant datasets with all six years (2005-2010)
  - Averaged by site, pollutant, and block (2005-2007 and 2008-2010)
  - Averaged by pollutant and block
  - Calculated % difference between pollutant-blocks



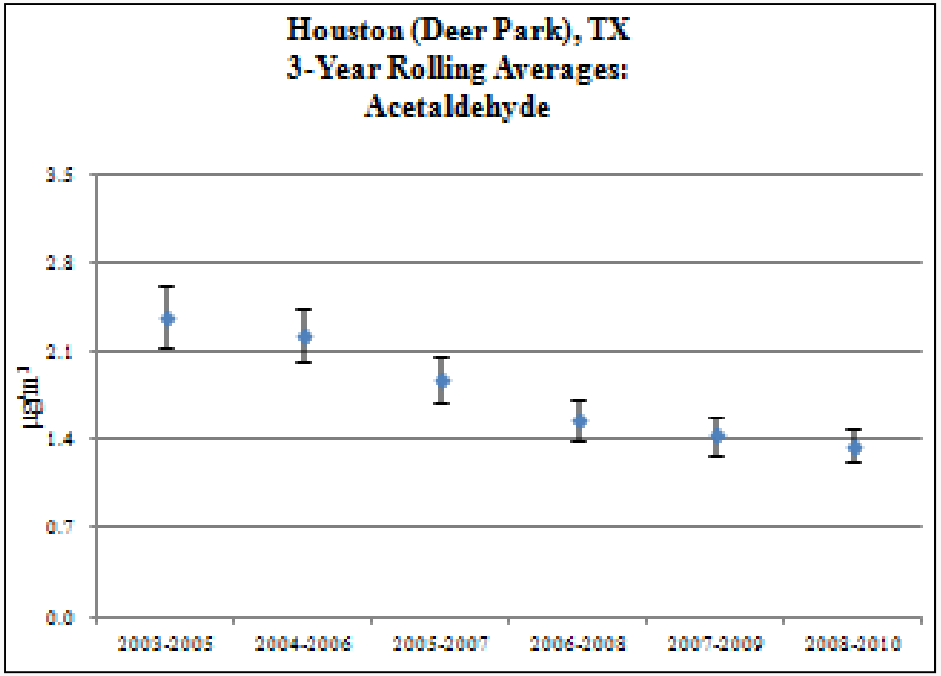


Time Period Averaging – 3-Year Blocked (cont.)

Pollutant	Pollutant Group	Number of Sites Used in Averaging	2005-2007	2008-2010	%Difference
Acetaldehyde	Carbonyl	13	1.93	1.62	-15.9%
Arsenic (PM_{10})	PM_{10} Metals	8	0.89	0.78	-12.2%
Benzene	VOC	14	1.07	0.87	-18.2%
Beryllium (PM_{10})	PM_{10} Metals	12	0.056	0.043	-22.2%
Butadiene, 1,3-	VOC	12	0.119	0.086	-28.3%
Cadmium (PM_{10})	PM_{10} Metals	14	0.27	0.19	-28.6%
Carbon tetrachloride	VOC	10	0.57	0.62	8.7%
Chloroform	VOC	15	0.21	0.24	16.5%
Formaldehyde	Carbonyl	12	2.87	2.34	-18.6%
Hexavalent Chromium	Hexavalent Chromium	12	0.026	0.016	-37.4%
Lead (PM_{10})	PM_{10} Metals	12	4.63	3.02	-34.6%
Manganese (PM_{10})	PM_{10} Metals	13	6.20	5.30	-14.6%
Nickel (PM_{10})	PM_{10} Metals	11	1.85	1.25	-32.4%
Tetrachloroethylene	VOC	12	0.39	0.22	-42.6%
Trichloroethylene	VOC	15	0.057	0.038	-33.5%
Vinyl chloride	VOC	13	0.0029	0.0034	15.9%

Time Period Averaging – 3-Year Rolling Averages

- Procedure:
  - Only considered "suitable" pollutant datasets with three successive years (2003-2005, 2004-2006, 2005-2007, etc.)
  - Averaged by site, pollutant, and "rolling" block
  - Allows for trends examination for more pollutant datasets (>1,200).



NATTS Site Operator Interviews

- 22 Interviews conducted over 4-week period
- 14-page survey sent to each operator (pre-filled as much as possible) prior to call:
  - Background Information
  - General Site Operations
  - Site Operations – TO-15 (VOCs)
  - Site Operations – TO-11A (carbonyls)
  - Site Operations – IO-3.5 (PM_{10} metals)
  - Site Operations – Modified CARB039 (hexavalent chromium)
  - Site Operations – TO-13 (PAHs)

- Operators shared successes/challenges

NATTS Site Operator Interviews (cont.)

- Equipment Surveys

Equipment Information	VOCs	Carbs	PM_{10} Metals	Hex Chrome	PAHs
Sampler model and age	X	X	X	X	X
Analytical instrumentation and age	X	X	X	X	X
Preconcentrator unit and age	X				
Standards preparation	X				
Dilution equipment and age	X				
Canister cleaning equipment and age	X				
Canister hot or cold cleaning	X				
Extraction technique used			X	X	X
Extraction unit and age			X	X	X

NATTS Site Operator Interviews (cont.)

- Survey completeness:
  - Most operators could provide information about equipment, age, and technique
  - Due to staffing turnover, some information could not be identified
- Equipment Age

Equipment	% Older than 10 years
Samplers	~35-40%
Analytical	~20-25%
Preconcentrators	~18-20%
Standards Preparation	~32-45%
Canister Cleaning	~25-30%
Extraction-metals	~13-20%
Extraction-hex chrome	~0-10%
Extraction-PAHs	~0-5%

NATTS Site Operator Interviews (cont.)

- Operator Comments
  - Beneficial for the agency and EPA
  - Some concerns that were raised were corrected immediately
  - Grouped into:
    - Program Office
      - e.g., recommend setting aside resources for equipment replacement
    - Data Reporting
      - e.g., issues with uploading data to AQS
    - Logistical
      - e.g., difficulty picking up samples on weekends/holidays
    - Methods
      - e.g., recommend periodic review of sampling and analytical methods
    - Sampling:
      - e.g., some equipment is old, and needs to replaced
    - Proficiency Testing
      - e.g., suggest that non-NATTS laboratories be involved in the NATTS PT Program

Observations & Recommendations

- DQO trends analysis indicates 13 pollutants decreasing and 3 increasing
  - Important to continue monitoring to determine if increase is due to lowering of MDLs (fewer substitutions of 0 for NDs), or is an actual trend
- High MDLs accounted for the majority of datasets that were excluded from trends analysis
  - NATTS participants should use report to determine if any data excluded from trends analysis and what can be done to prevent this in the future (e.g., working with labs to lower MDLs)
- Many data reporting issues were identified and resolved during careful review of data in AQS for use in the assessment
  - More frequent review of NATTS data by OAQPS & regional office
- Important for network to monitor pollutants with chronic health benchmark levels & NATA risk drivers
  - Continue encouraging reporting all monitoring data

Observations & Recommendations

- NATTs Proficiency Testing (PT) program has been extremely beneficial in improving laboratory performance
  - Increase proficiency testing samples to twice annually
- Many sites and laboratories operating sampling and analytical equipment purchased prior to 2001
  - Work with regional offices to re-task residual funds for equipment upgrades
- Some sampling and analysis methods approved for the NATTs program have not been revised in over 10 years
  - Refine sampling and analytical methods (e.g. TO methods)

Future Plans for Network Assessment

- Determine whether:
  - Sites should be added or removed
  - Required analytes should be added or removed
  - Determination of target MDLs should be modified
  - Program-level DQOs should be refined
  - MQOs should be refined
  - Current analytical and/or method precision calculations should be revised

- Use assessment findings to update NATTS TAD

Going Forward…

Proposed Timeline:

- Now through early June - conference calls with NACAA monitoring steering committee, regions & states to review document & address comments
- **June 18th - comments due from stakeholders**
- July 9th - comments incorporated & next draft completed

Ongoing:

- Weekly/bi-weekly meetings with NATTS workgroup to begin addressing addition/reduction of sites & pollutants, MDLs, DQOs & MQOs, etc.
- Reinitiate quarterly air toxics calls with regions & states to review document & other NATTS issues

We are currently seeking S/L volunteers to join the NATTS Network Assessment Workgroup. If interested, please contact Beth Landis (landis.elizabeth@epa.gov)

At this time our panel would be happy to address any questions regarding NATTS QA, the NATTS TAD & the Draft Network Assessment

Panel Participants

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