

# **Ambient Air Toxics Data Review: NATTS and the Ambient Monitoring Archive for HAPs**

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# Acknowledgements

- EPA
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# Overview of the Presentation

- Part 1 - NATTS Network Assessment Update
  - First Assessment overview
  - AQS data reporting analysis updates
  - Planned activities
- Part 2 - Ambient Monitoring Archive for HAPs (Archive)
  - Overview/Purpose
  - Archive structure
  - Phase 9 updates
  - General QA/Maintenance



# Part 1 – NATTS Network Assessment Update



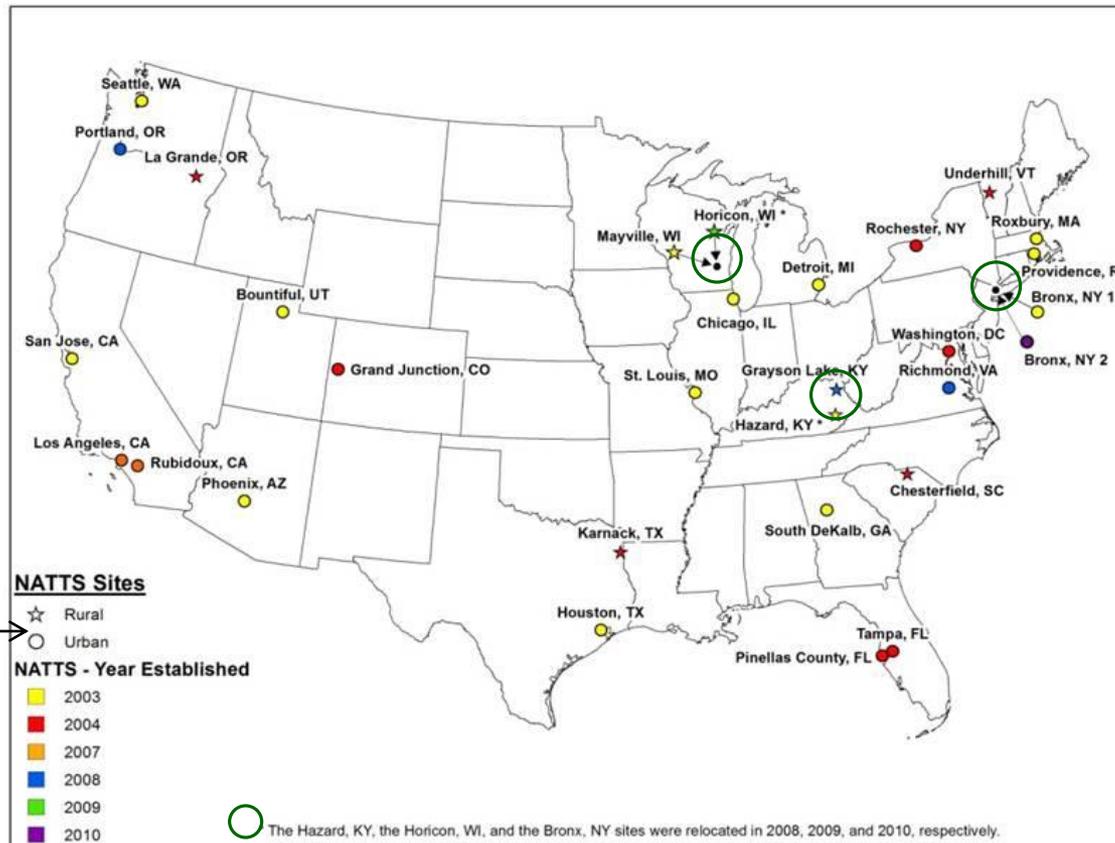
## Scope of the Assessment

- 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 and Years



6 Rural  
21 Urban



## First Assessment

- Provided Background/History of NATTS Program
- Covered measurements from 2003-2010
- Evaluated AQS data reporting
- Evaluated MQOs and scored each dataset
  - Completeness (40%)
  - Sensitivity (30%)
  - Bias (20%)
  - Precision (10%)
- Identified A-rated, B-rated, and “Does Not Meet MQO” datasets based on MQO scoring





## MQO Scoring

MQO	A rated	B rated	Original weighting	Adjusted weighting
Completeness	$\geq 85\%$	75%-85%	25%	40%
Sensitivity	Ratio $\leq 1.00$	Ratio 1.00-2.00	25%	30%
Bias	$\pm 25\%$	$\pm 25\%$ to $\pm 35\%$	25%	20%
Precision	$\pm 15\%$	$\pm 15\%$ to $\pm 25\%$	25%	10%

- Results: Total datasets evaluated = 2,827
  - A-Rated = 61%
  - B-Rated = 22%
  - Does Not Meet MQO = 17%



## First Assessment (cont.)

- Calculated Summary Statistics
- Calculated 3-year block (2008-2010 vs. 2005-2007), 3-year rolling, and annual averages
- Evaluated NATTS Trends DQO for 16 Core HAPs
- Conducted NATTS Site Operator Interviews
- Compiled equipment inventory (field and labs)
- Generated emission source maps, emission inventory tables, and windroses for each site
- Provided recommendations for improvement



## Second Assessment Rationale

- Include naphthalene and benzo(a)pyrene
- Include data from new sites
  - Los Angeles, CA
  - Rubidoux, CA
  - Portland, OR
- Include data from original sites
  - San Jose, CA (began 1-in-6 day sampling in 2008)
  - Seattle, WA (data issues in 2005)
  - Rochester, NY for PM<sub>10</sub> metals



## AQS Data Reporting Update

- NATTS Workplan requires AQS reporting 120 days after calendar quarter.
  - 2013 data complete by 4/30/2014
- EPA pulled all data for NATTS sites on 5/1/2014
  - 41 million records pulled
- Identified NATTS data by reviewing POCs using:
  - First NATTS Network Assessment
  - Operator interviews
  - EPA QAARs





# AQS Data Reporting Update

- Evaluated:
  - Missing MQO datasets (e.g., entire 2013 VOCs missing)
  - Missing pollutant datasets (e.g., missing 2012 benzene)
  - Missing concentrations within a dataset (e.g., missing 2<sup>nd</sup> quarter acetaldehyde)
  - Sample days vs. national calendar
  - Reported engineering units
  - Reporting of non-detects (report zero sample value, flag)
  - Miscoding of data elements
  - Reporting of Alternative Method Detectable Limits



## AQS Data Reporting Update (cont.)

- Other Metrics Evaluated:
  - Use of data qualifiers and null data codes
  - Under-MDL reporting of data
  - Reporting of collocated/replicate/duplicate data
  - Reporting of other (non-NATTS MQO Core) HAPs
  - Reporting of non-HAPs
  - Reporting of criteria pollutants
  - Reporting of meteorological measurements
  - Identification of NATTS monitors within AQS



## Common Reporting Issues

- Inconsistent POCs
- Missing data
  - e.g., Collection frequency codes, MDLs
  - Expected pollutant datasets or other HAPs
- Incorrect assignments of NATTS Monitor Network at the site-level:
  - e.g., 17-167-0006, 36-005-0083, 36-081-0124, 42-071-0007, 44-007-0026, and 55-079-0010 reported as NATTS sites





## Common Reporting Issues

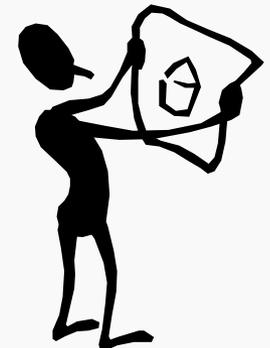
- Incorrect or no assignments of NATTS Monitor Network at the monitor-level (site-POC-parameter):
  - Criteria pollutants
  - Non-HAPs (e.g., SNMOCs)
  - Black carbon
  - HAPs with different POCs
  - Wrong designations (e.g. NATTS monitor assigned as PAMS)





## Upcoming Activities (Fall 2014)

- Finalize measurements database
  - Gather missing data
- Calculate pollutant dataset completeness (MQO 1)
- Assess reported MDLs (MQO 2)
- Review PT results (MQO 3)
- Calculate precision statistics (MQO 4)
- Apply MQO scoring routine
- Calculate Summary Statistics
- Calculate 3-year block averages





## Upcoming Activities (cont.)

- Calculate 3-year rolling and annual averages
- Update NATTS emission source maps/data
  - Include 2011 NEI, 2011-2013 TRI, RTR
- Update NATTS site windroses
- Assess TSA Instrument Performance Audits (IPAs)
- Update equipment inventory through 2013
- Present results to Stakeholders
- Prepare/finalize assessment report
- Prepare individual site reports





# Part 2 - Ambient Monitoring Archive

## Archive Overview

- **Primary** – Develop a centralized database of hazardous air pollutant (HAP) measurements. Although HAPs have been measured for 20+ years, they were not required in early monitoring programs to report to AQS.





## Archive Timeline (2001-2013)

- Phase 1 (2001) – LADCO, Battelle/STI
- Phase 2 (2003) – LADCO, Battelle/STI
- Phase 3 (2004) – LADCO, Sharon Nizich/EPA, STI
- Phase 4 (2005) – Joe Touma/EPA, ERG
- Phase 5 (2007) – James Hemby/EPA, STI
- Phase 6 (2009) – Barbara Driscoll/EPA, RTI/ERG
- Phase 7 (Feb. 2013) – Barbara Driscoll/EPA, ERG



## Archive Timeline (2013)

### Phase 8 (Oct. 2013) – Dennis Doll/EPA, ERG

- Brought AMA to 2012, includes data from:
  - AQS
  - NATTS Network Assessment
  - NADP
  - XAct
- 41 million for HAPs





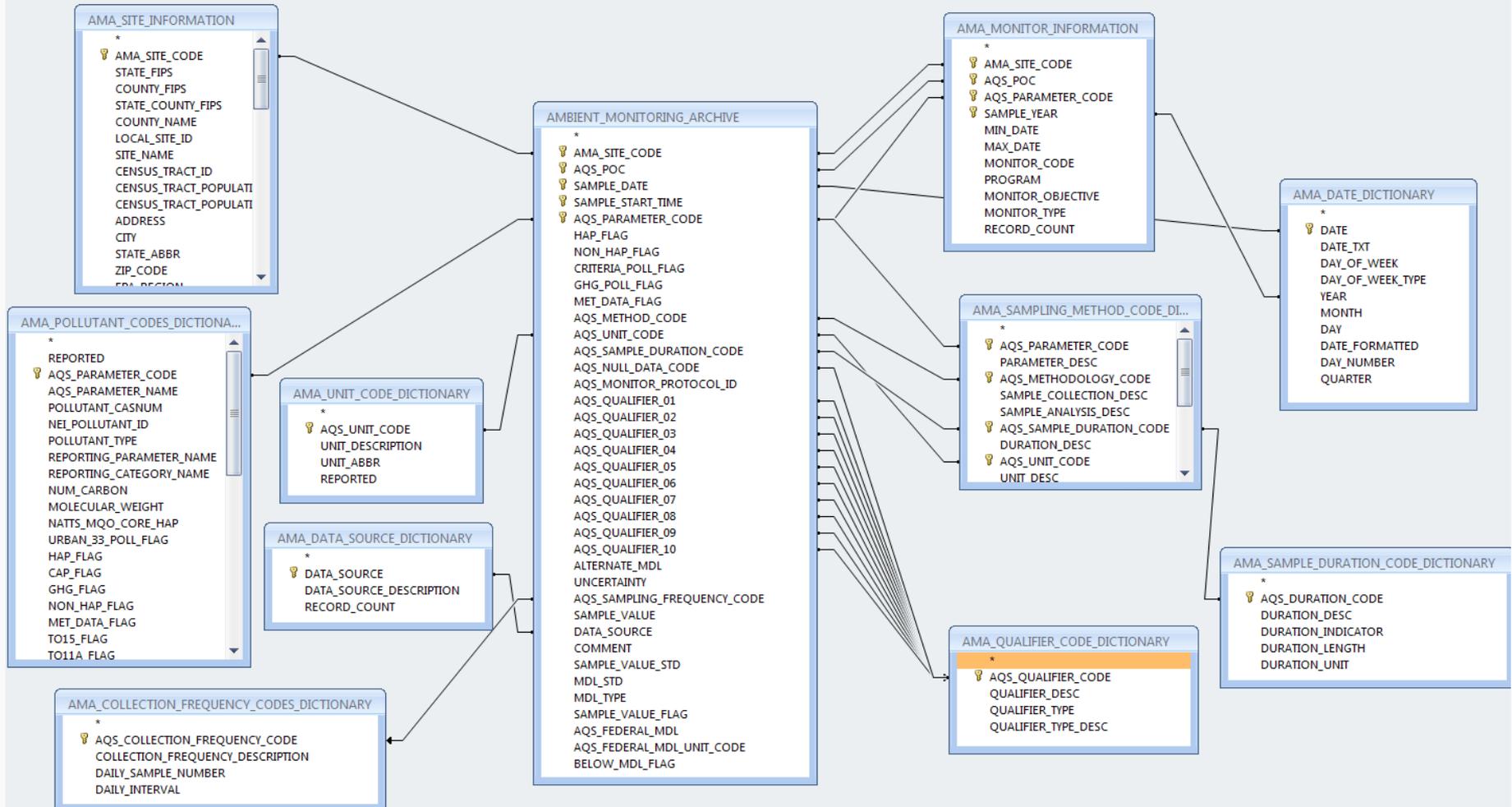
# Archive Structure

## Re-engineered Archive

- Retains concentrations at their original temporal level (e.g., 1-hour, 3-hour, 8-hour, etc.)
- Relational database in SQL Server
  - One master data file with concentrations
  - Ten supporting data dictionaries
- Increased metadata information
- Public release files are by year or by state



# Archive Structure





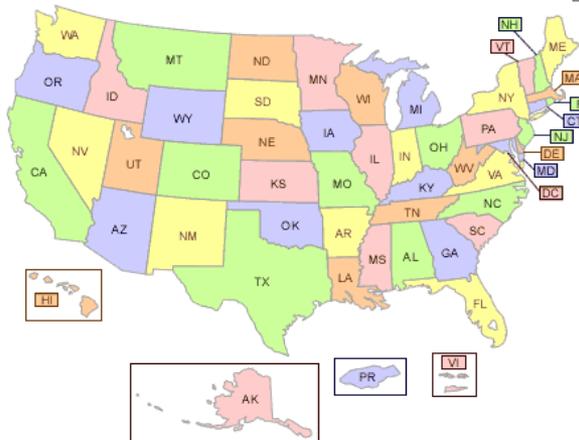
# Data Posted (By State)

## Ambient Monitoring Archive

EPA recently finalized Phase VIII of the Ambient Monitoring Archive (AMA) for hazardous air pollutants (HAPs), also referred to as the Historical Archive. The archive covers measurements from as early as 1973 to 2012. The AMA for HAPs currently houses 42 million data records from over 2,800 monitoring sites. Approximately 75% of the measurements are from 2001 to 2012, as a result of air toxic programs, such as the 10-City Pilot Study, the [NATTS Network](#), the [PAMS Network](#), and the [Urban Air Toxics Monitoring Program](#). Due to the size of the AMA for HAPs, the data have been split by state.

The AMA for HAPs data for each individual state are presented in zipped Microsoft Access databases. Simply click on the individual state in the map or the state name in the table below the map to obtain the data for that state.

Choose a state or territory from the map below or the list to the right.



<a href="#">Alabama</a> (zipped, 5.06 MB)	<a href="#">Alaska</a> (zipped, 1.83 MB)	<a href="#">Arizona</a> (zipped, 8.63 MB)	<a href="#">Arkansas</a> (zipped, 1.2 MB)
<a href="#">California</a> (zipped, 73.7 MB)	<a href="#">Colorado</a> (zipped, 13.6 MB)	<a href="#">Connecticut</a> (zipped, 23.3 MB)	<a href="#">Delaware</a> (zipped, 4.79 MB)

<http://www.epa.gov/ttn/amtic/toxdat.html#data>



# Data Posted (By Year)

Additionally, annual HAP data files are presented in zipped Microsoft Access databases. Simply click on the year in the table below to obtain the data for that year. Warning, these files are large.

<a href="#">2012</a> (zipped, 67.1 MB)	<a href="#">2011</a> (zipped, 78.6 MB)	<a href="#">2010</a> (zipped, 70.3 MB)	<a href="#">2009</a> (zipped, 94.3 MB)
<a href="#">2008</a> (zipped, 67.9 MB)	<a href="#">2007</a> (zipped, 71.4 MB)	<a href="#">2006</a> (zipped, 67.6 MB)	<a href="#">2005</a> (zipped, 66.9 MB)
<a href="#">2004</a> (zipped, 79.7 MB)	<a href="#">2003</a> (zipped, 52.6 MB)	<a href="#">2002</a> (zipped, 51.1 MB)	<a href="#">2001</a> (zipped, 49.2 MB)
<a href="#">2000</a> (zipped, 41.2 MB)	<a href="#">1999</a> (zipped, 38.1 MB)	<a href="#">1998</a> (zipped, 36.0 MB)	<a href="#">1997</a> (zipped, 27.7 MB)
<a href="#">1996</a> (zipped, 23.4 MB)	<a href="#">1995</a> (zipped, 19.9 MB)	<a href="#">1994</a> (zipped, 11.4 MB)	<a href="#">1993</a> (zipped, 5.97 MB)
<a href="#">1992</a> (zipped, 5.11 MB)	<a href="#">1991</a> (zipped, 4.08 MB)	<a href="#">1990</a> (zipped, 3.35 MB)	<a href="#">pre-1990</a> (zipped, 1.57 MB)

<http://www.epa.gov/ttn/amtic/toxdat.html#data>



## Planned Phase 9 Updates (2014)

### Phase 9 (Sept. 2014) – Dennis DoII/EPA, ERG

- Bring AMA to 2013 (AQS, NATTS Network Assessment, AMNET, IADN, Special Studies, etc.)
- Include all data HAPs since 1990
- Add Collection Frequency Code (currently populated in only ~25% of HAP records)
- Prepare Local Conditions concentrations
  - Apply temperature and pressure data from AQS/NWS





## Planned Phase 9 Updates (2014)

- QA/General Maintenance:
  - Identification of ½MDL records for Non-Detects
  - Conversion of negative concentrations to zero
  - Identification of invalidated datasets (e.g., acrolein prior to 2005)
  - Identification of below MDL values
  - Extreme/unusually high measurements
  - Duplicate data (e.g., SC and LC reported for same sample)
- Include Data Quality information (e.g., calculated precision and/or PT results for NATTS data)





## Planned Phase 9 Updates (2014)

- Identify Monitoring Programs/Networks, such as:
  - NATTS
  - PAMS/Unofficial PAMS
  - UATMP
  - Lead NAAQS
  - Community-Scale
  - IMPROVE
  - School Air Toxics
  - NADP
  - SLAMS
  - 10-City Pilot Study
  - AMNET
  - MATES
  - BP Oil Spill
  - Post-Katrina
  - IADN
  - Special (e.g., Ft. Worth, Tribal, XACT, Industrial)





## Planned Phase 9 Updates (2014)

- Integrate additional data and corrections from the Second NATTS Assessment
- Prepare Technical Memorandum
- Generate Access databases by State and by Year
- Prepare daily HAP concentration archive for 2011 NATA and other EPA programs (e.g., EPA/OC)





## THANK YOU!

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