Gap Filling HAPs
--and other HAP additions by EPA--

For **Point Sources** in the 2008

National Emissions Inventory

Pollutants Included in the NEI

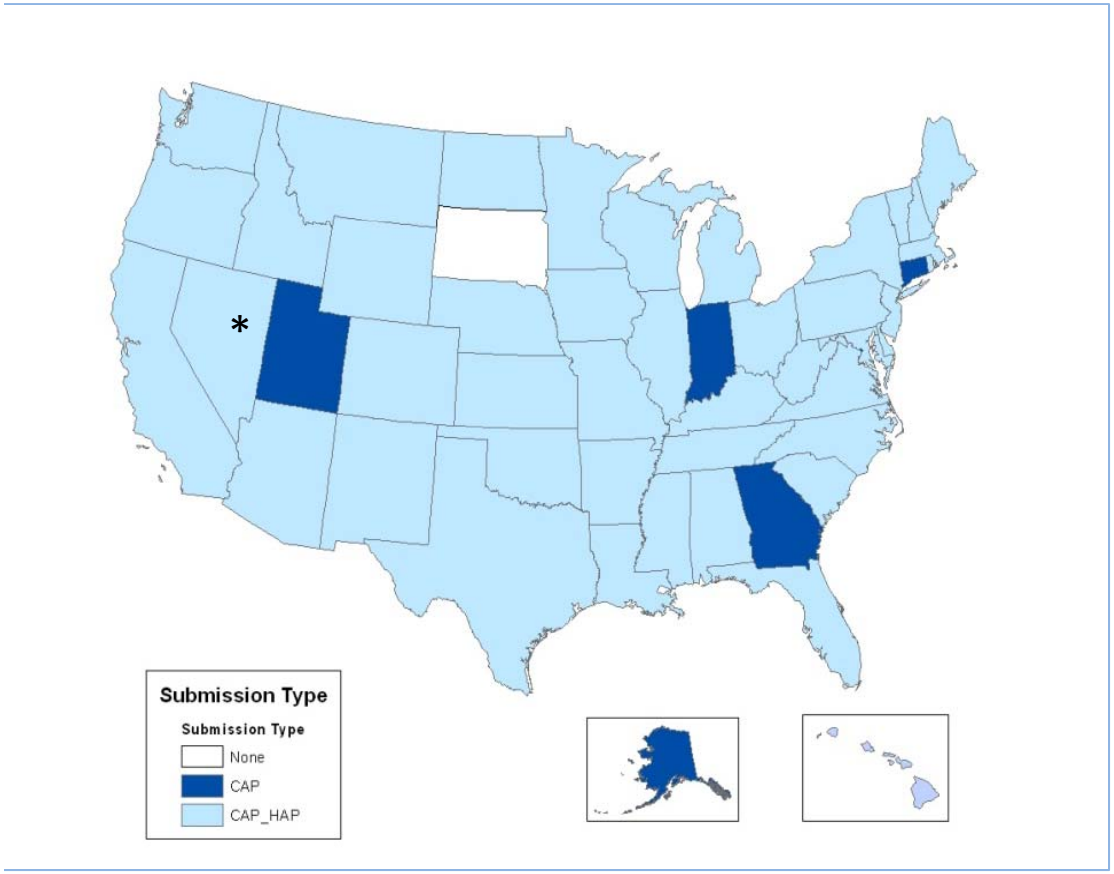
Criteria Pollutants/Precursors (CAPs) Required To Be Reported By the Air Emissions Reporting Rule

- Sulfur dioxide (SO2)
- Nitrogen Oxides (NOX)
- Volatile Organic Compounds (VOC)
- Carbon Monoxide(CO)
- Primary $PM_{2.5}$ and PM_{10} (and filterable and condensible components, as applicable)
- Ammonia (NH3)
- Lead and Lead Compounds

Hazardous Air Pollutants (HAPs) – encouraged to be submitted voluntarily

- 187 pollutants/pollutant groups on current list (http://www.epa.gov/ttn/atw/orig189.html)
- benzene, toluene, xylenes, ethyl benzene, acrolein, formaldehyde, acetaldehyde, vinyl chloride, carbon tetrachloride, other HAP VOC
- mercury, arsenic, chromium, manganese, nickel, cadmium, selenium, beryllium, lead, other metals
- hydrochloric acid, hydrogen fluoride, hydrogen cyanide, and other acid gases
- tetrachloroethylene, methylene chloride, methyl chloroform and other HAP
- Glycol Ethers, Polycylic Organic Matter and other groups

HAPs Reported Voluntarily by Most States – differing levels of completeness



* Local Agencies in NV reported HAPs but NV state agency did not

Number of HAPs reported – Point Source Data Category

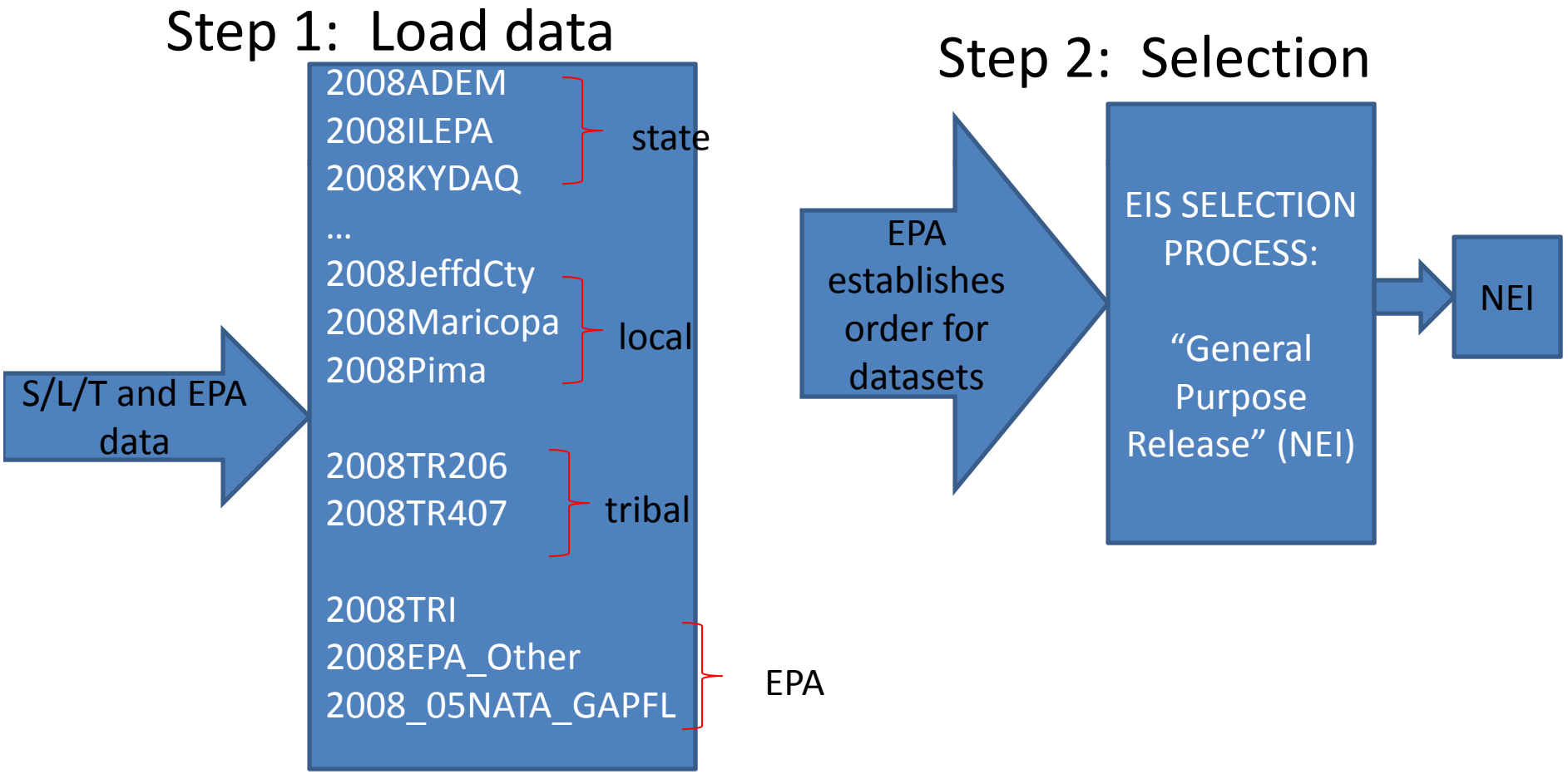
Agency Type	Reporting HAPs (#)	Min	Max
state	43	3	203
local	18	2	119
tribe	6	5	56

Mercury (Hg) reporting by S/L/T:
41 states
13 local
2 tribes

Objectives – for adding HAPs

- Complete, integrated inventory for HAPs and CAPs
  - Focus on high risk HAP/facilities and mercury (**Hg)**
  - Use automated approaches for other sources
- Use data collected for Mercury and Air Toxics Rule (MATS) rule in NEI (Hg, acid gases, metal HAPs)
- Speciate chromium – hexavalent, trivalent

NEI Created via a "Selection" of S/L/T and EPA datasets by Data Category



Point Selection Hierarchy

Red are HAP – containing EPA datasets

- EPA Overwrite Point v1.5 (2008EPA_OverPT15)
- EPA PM Augmentation V2 (2008EPA_PM2)
- EPA Chromium Split v2 (2008EPA_CHROMv2)
- EPA other data developed for using ahead of SLT for gapfilling (2008EPA_OTHER)
- 2008EPA_MATS (2008EPA_MATS)
- **2008 STATE/LOCAL/TRIBAL Data**
- EPAAirports1109 (2008EPA_AIR)
- EPA Rail (2008EPA_RAIL)
- 2008EPA_MMS (2008EPA_MMS)
- EPA EGU v1.5 (2008EPA_EGU15)
- 2008 EPA Rule Data from OAQPS/SPPD (2008EPA_Rule_Data)
- EPA NV Gold Mines (2008_NVGLD)
- EPA coke oven (2008EPA_CK)
- EPA TRI Augmentation v2 (2008TRI)
- EPA HAP Augmentation v2 (2008EPA_HAPv2)
- EPA 2005NATA values pulled forward to gapfill (2008EPA_05NATA_GAPFL)

EPA Chromium Split v2 dataset

- Contains hexavalent and trivalent chromium computed from S/L/T unspeciated chromium
- Uses speciation profiles based on process– source classification codes and regulatory codes
- 16% of S/L/T unspeciated chromium was speciated with the default profile of 34% hex; 66% tri

	2008 NEI v2 tons of chromium			
dataset or data category	Chromic Acid (VI)	Chromium Trioxide	Chromium (VI)	Chromium III
EPA Chromium Split v2			31.64	154.95
EPA Air/Rail			0.00	0.01
EPA EGU			20.00	145.16
EPA other			0.28	0.52
HAP AUG			1.48	18.31
S/L/T	4.55	0.17	6.41	1.29
TRI			11.02	52.59
POINT data category total	4.55	0.17	70.84	372.82

EPA other data developed for using ahead of SLT or for gapfilling

- 2008 and 2005 NATA emissions were compared for roughly 800 facilities
  - NATA2005 high risk facilities
  - Key Hg categories: cement, electric arc furnaces, gold mines, MWC, HWI,
- Data provided by S/L/T put into their datasets (by them) or this dataset (by EPA)
- TRI put into TRI dataset unless chosen to go ahead of S/L/T
- This dataset also included data Region 2 provided from test program for NY coke oven
- Dataset contains emissions for 21 states.

Tons Emissions from dataset

1,1,2-Trichloroethane	4,4'-MDI	Benzene	Chrom-ium (VI)	Chrom-ium III	coke oven	EO	Mang-anese	Mercury	Naph-thalene	POM /PAH	Perc
0.000	0.065	90.54	0.046	0.068	8.351	1.533	0.192	1.265	4.100	7.578	3.828

2008EPA_MATS – Mercury and Air Toxics Rule data

- Coal, Pet Coke and Oil-Fired EGUs > 25 MW
- Mercury and lead, other HAP metals and acid gases
  - Mercury, antimony, arsenic, beryllium, cadmium, chromium (hex and tri), lead, manganese, nickel, selenium
  - Hydrochloric acid, hydrogen fluoride, hydrogen cyanide
- Nearly all states (except RI, VT, ID); 2 tribes
- Unit specific and bin-avge emission factors with 2008 heat input from CAMD or other available information
- Used ahead of S/L/T with exceptions for Hg
- Largest HAP mass of all gap fill datasets

	Metals (tons)	Acid Gases (tons)	Hg (tons)	Lead (tons)
2008MATS	1,055	136,997	26	49
Percent of total POINT	38%	74%	48%	8%

EPA EGU v1.5

- Contains both CAPs and HAPs
- HAPs use EFs
- Nearly all states (except AK, HI, RI, ID); 2 tribes
- Includes some of same units in MATS and also gas fired boilers and turbines, as well as EGU <25 MW
- Used below S/L/T data

	HAP metals (tons)	Acid Gases (tons)	HAP-VOC (tons)	Hg (tons)	PAH/POM (tons)
2008 EGU v1.5	20	901	3309	0.02	12
Percent of total POINT	1%	0%	1%	0%	1%

2008 EPA Rule Data from OAQPS/SPPD

- Only Hg: 1.2 tons total from 17 states (3% of point source Hg)
- Rule Categories
  - Electric Arc Furnaces: EFs from 2010 test program, 2009 throughput
  - Hg chloralkali: estimates from rule development
  - Municipal Waste Combustors: 2008 compliance data
  - Industrial, Commercial, Institutional Boilers: tested and avge EFs, 19 units only

EPA NV Gold Mines

- Contains only Hg and only from NV goldmines- 1.7 tons
- Complete for State of NV (no other data sources for NV gold mine Hg emissions)
- Test data collected by NV under the Nevada Mercury Control Program (NMCP)
- Most Gold Mining in NV (1.7 tons Hg out of 1.73 Hg Nationally)

EPA coke oven

- Coke oven emissions only – used for facilities in 4 states
- Contributed 115 tons (29% of total coke oven emissions)
- S/L/T provided estimates to EPA for EPA dataset
- EPA provided summary of AP-42 EFs along with 2005 NATA coke oven emission

EPA TRI Augmentation v2

- Emissions for 150 HAPs from 2008 TRI was used
- 2,636 facilities in NEI used TRI
- Covering all 50 states and Puerto Rico
- 40,000 tons total (9%)
  - 33,000 tons of HAP VOC (11,000 tons methanol)
  - 6000 tons acid gases (5,000 tons HCl)
  - 400 tons HAP metals
  - 150 tons PAH/POM
  - 17 tons lead
  - 4 tons mercury
  - Remainder is other HAP

EPA TRI Augmentation v2

- TRI facilities matched to EIS facilities primarily through use of FRS IDs but also matched manually
- TRI not used for EGU nor where any dataset higher up in the hierarchy included that HAP anywhere at the facility
  - If S/L/T reported the HAP anywhere at the facility, did not use TRI – exception for high risk and Hg
- TRI assigned to processes two ways
  - Manually – for the high risk and Hg review
  - Using CAP surrogates – for the remainder of facilities that could be matched
    - PM10-fil was surrogate for HAP metals, PAHs
    - VOC was surrogate for non metal HAPs
    - SO2 was surrogate for Hydrochloric Acid and Hydrogen Fluoride
- Would like to use more TRI in 2011

EPA HAP Augmentation v2

- Multiplied S/L/T CAP by ratios of HAP to CAP based on Webfire (AP 42)
  - Uncontrolled factors
  - Same units of measure (or units that could be converted to same)
- Did not add HAP if in any other EPA datasets except for boiler Hg
- All states other than SD, 9 tribes; no PR/VI
- 92 HAPS added; 8500 tons mass; 21,286 facilities have at least 1 HAP added from this process
  - 2100 tons formaldehyde added at 4279 facilities; internal combustion engines at are pipeline compressor stations and oil and natural gas fields (onshore)

EPA 2005NATA values pulled forward to gapfill

- Affected facilities in high risk and Hg review
- Benzene, trivalent chromium, hexavalent chromium, tetrachloroethylene and mercury
- 18 facilities in 10 states
- Recommended by states to pull forward

Summary

- EPA HAP data used for all States in point data category
- Nearly 200,000 tons HAPs from EPA (vast majority was HCl from MATS data)
  - 32% of total point HAP is from MATS
  - 13 % of total point HAP is from other EPA augmentation
- Range of EPA HAP mass ranged from 9% to 100% of state HAP

Proportion of EPA HAPs by Region