Gap filling HAPs in the 2008 NEI

Madeleine Strum
U.S. Environmental Protection Agency,
Office of Air Quality Planning and Standards, Air Quality Analysis Division
Research Triangle Park, NC, 27711
strum.madeleine@epa.gov

ABSTRACT

In developing the 2008 National Emission Inventory (NEI), version 2 (v2), for the point data category, EPA supplemented state, local and tribal agency (S/L/T) data to produce a more complete inventory for air toxics, or hazardous air pollutants (HAPs). The additional information for HAPs come from numerous data sources, such as the 2008 Toxics Release Inventory (TRI), data collected for use in air toxics rule development, additional information provided by S/L/T, HAP to criteria air pollutant (CAP) ratios applied to S/L/T-reported CAP emissions and data from previous inventories. EPA also incorporated HAP emissions from the recent Mercury and Air Toxics (MATS) rule. This paper will discuss these sources of data, and how EPA incorporated them with the S/L/T data to build a more complete HAP inventory for the 2008 NEI. Charts and tables showing the quantity of EPA data from these gap fill datasets are shown.

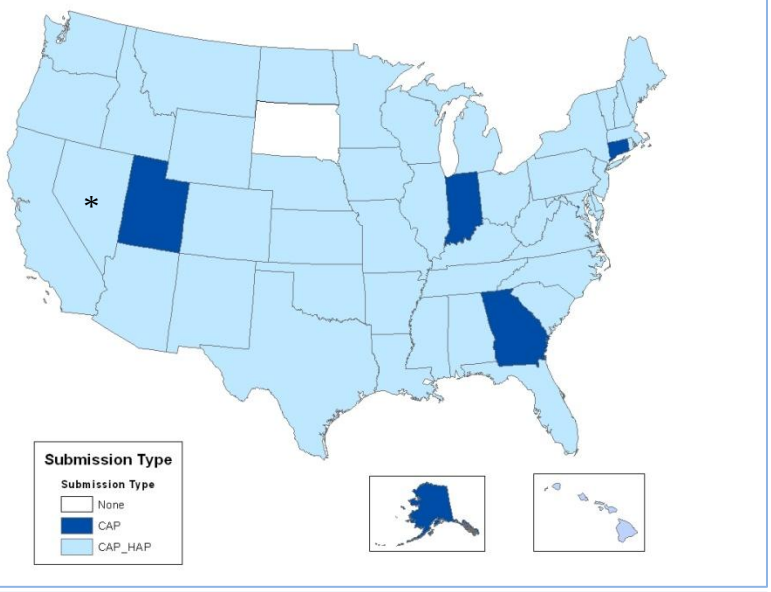
INTRODUCTION

The National Emissions Inventory (NEI) is a national compilation of air emissions sources collected from state, local, and tribal air agencies (S/L/T) as well as from EPA emissions programs. The pollutants included in the NEI are the pollutants related to implementation of the National Ambient Air Quality Standards (NAAQS), known as criteria air pollutants (CAPs), and hazardous air pollutants (HAPs) associated with EPA's Air Toxics Program. The CAPs have ambient concentration limits or are precursors for pollutants with such limits from the NAAQS program. These pollutants include lead (Pb), carbon monoxide (CO), nitrogen oxides (NO_X), volatile organic compounds (VOC), sulfur dioxide (SO_2), ammonia (NH_3), particulate matter 10 microns or less (PM_{10}) and particulate matter 2.5 microns or less ($PM_{2.5}$). The Air Emissions Reporting Rule (AERR)[1] is the rule that requires states to submit CAP emissions; reporting of HAP emissions is voluntary. The HAP pollutants include the 187 remaining HAP pollutants from the original 188 listed in Section 112(b) of the 1990 Clean Air Act Amendments (see http://www.epa.gov/ttn/atw/188polls.html for the current list). Commonly known HAPs include mercury (Hg), hydrochloric acid (HCl) and other acid gases, heavy metals such as nickel and cadmium, and hazardous organic compounds such as benzene, formaldehyde, and acetaldehyde. Although Pb is a CAP, the pollutant group "lead and compounds" is a HAP; therefore Pb is included in the HAP augmentation methods discussed in this paper. EPA develops a complete CAP/HAP integrated NEI every 3 years, e.g., 2002, 2005, 2008, 2011, etcetera.

This paper discusses the EPA datasets that added HAPs for the point source data category in the 2008 NEI v2. The NEI point data category contains emissions estimates for sources that are individually inventoried and usually located at a fixed, stationary location. Point sources include large industrial facilities and electric power plants, and also include smaller industrial and commercial facilities, such as dry cleaners and gas stations where reported as point sources by the S/L/T.

Figure 1 shows the states that submitted CAPs and HAPs for the point source data category; although numerous local agencies and some tribes also submitted CAPs and HAPs, they are not depicted in the figure. As the figure shows (and similar to previous NEIs), most states submitted HAPs voluntarily for the 2008 NEI. These submissions vary in their level of completeness. State and local agencies collect or compute HAPs using different techniques and thresholds. Five states: Georgia, Indiana, Connecticut, Utah and Alaska, and the District of Columbia reported only CAPs – no HAPs. South Dakota and the territories of Puerto Rico and the Virgin Islands reported neither CAPs nor HAPs.

Figure 1. States that submitted Point Source Emissions to the 2008 NEI by Pollutant Type



In this figure, lead (Pb), which can be considered either a CAP or HAP is treated as a CAP, so if a state submitted lead but no other HAPs it is shaded as dark blue
*Nevada's HAPs are from local agencies; the state agency did not submit HAPs.

The HAP gap filling for point sources was designed to provide a more complete and integrated NEI and was guided by the following objectives:

- Add HAPs for facilities for which S/L/T did not report– using reasonable and automated approaches such as EPA emission factors (EFs) and the EPA's Toxics Release Inventory (TRI)
- Use the Mercury and Air Toxics (MATS) Rule HAP data[2] in the NEI except where EPA was aware that the S/L/T mercury (Hg) was based on 2008 testing or continuous emissions monitoring (CEM) data
- Ensure electric generating units (EGUs) with heat input data collected by the EPA's Clean Air Markets Division (CAMD), have a complete set of integrated CAPs and HAPs
- Ensure facilities with coke ovens have coke oven emissions (a high risk HAP)
- Ensure facilities found to be high risk in the 2005 National Air Toxics Assessment (NATA)[3] are reviewed and addressed for the 2008 NEI, for at least the pollutants that caused the high risk in 2005
- Ensure facilities with Hg emissions from the 2005 NATA inventory in key Hg-emitting categories are addressed
- Speciate chromium emissions into hexavalent and non-hexavalent forms.

The NEI is built by blending the S/L/T and EPA emissions data. This is automated by the Emissions Inventory System (EIS), the software EPA uses to collect the data and put together the NEI[4]. These data are first loaded into datasets in EIS. Each S/L/T has its own dataset, and the EPA develops and loads

data into additional EPA datasets. Once all of the data for an inventory year are loaded, EPA designs a "selection" in EIS by listing all of the datasets in the order (i.e., a hierarchy) to be used to create the NEI. When more than one dataset contains an emissions value for a specific pollutant at a specific process, EIS selects the value from the dataset that is first in the hierarchy.

EPA developed numerous datasets for adding HAPs in order to: 1) distinguish among the different methods/sources of data in the NEI, and 2) achieve the desired hierarchy in the dataset selection process. This paper summarizes these datasets and provides information on the HAP data they contain.

EPA HAP-CONTAINING DATASETS, POINT DATA CATEGORY, 2008 NEI V2

Table 1 summarizes the EPA HAP-containing datasets that were used for the point source data category. They are arranged in the order in which they were used in the selection. The table shows three datasets ahead of the S/L/T data. For these three datasets the EPA data were selected for the NEI if there were S/L/T data available for the same process and pollutant as the EPA data. Technically, these EPA data are not gap filling but rather are adding HAPs to be used in place of S/L/T data for the NEI. For EPA datasets "below S/L/T," if there were S/L/T data available for the same process and pollutant as the EPA data, the S/L/T data were selected for the NEI.

An inventory user can determine which dataset was used for each NEI point source process-level emissions value from an emissions summary at the process level; process level summaries include the dataset "short name" as a field. A process level summary for point sources for the 2008 NEI v2 can be downloaded from http://www.epa.gov/ttn/chief/net/2008inventory.html. Registered EIS users[4] can run a report to provide a process level summary of the 2008 NEI v2 within EIS.

Table 1. EPA data sets containing HAPs in the point source data category of the 2008 NEI

Dataset name (and Short Name*) and hierarchy	Description and Rationale for the Order of the Selected Datasets
EPA Chromium Split v2 (2008EPA_ CHROMv2) **--ABOVE S/L/T--**	Contains hexavalent and trivalent chromium emissions derived from the S/L/T total (unspeciated) chromium emissions. This dataset is ahead of the S/L/T data because it replaces S/L/T total chromium with speciated chromium.
EPA other data developed for using ahead of SLTor gapfilling (2008EPA_OTHER) **--ABOVE S/L/T--**	HAP emissions that S/L/T agencies recommended EPA use as part of the high risk and NATA2005 review. Additionally, this dataset contains Region 2 data for benzene and coke oven emissions for Tonawanda Coke Corp based on recent testing. This datasets is used ahead of the S/L/T agency data because it changes S/L/T emission values based on their review and comments.
2008 MATS-based EGU emissions (2008EPA_MATS) **--ABOVE S/L/T--**	Lead (Pb), mercury (Hg), HAP metal and acid gas HAP emissions from the MATS rule, including unit-specific test data and emissions data derived from EFs from a 2010 testing program[2] and 2008 heat input. The dataset excludes MATS Hg emissions for units where EPA knew states had test data or that the unit had Hg continuous emission monitoring systems in 2008 (this exclusion allows the S/L/T agency Hg emissions to be chosen ahead of MATS for such units). These data are selected ahead of state data because they are expected to be generally more accurate because they are based on unit specific tests or based on the latest available EFs derived from testing of similar units, and consistent with the MATS rule.
EPAAirports1109 (2008EPA_AIR) **-BELOW S/L/T -**	Emissions of CAP and HAP for aircraft operations including commercial, general aviation, air taxis and military aircraft, auxiliary power units and ground support equipment computed by EPA for approximately 20,000 airports. Methods include the use of the Federal Aviation Administration's Emissions and Dispersion Modeling System.

Dataset name (and Short Name*) and hierarchy	Description and Rationale for the Order of the Selected Datasets
EPA Rail, point (2008EPA_RAIL) **-BELOW S/L/T -**	Emissions of CAP and HAP for diesel rail yard locomotives at about 750 rail yards. CAP emissions computed using yard-specific emission factors using yard-specific fleet information and on national fuel values allocated to rail yards using an approximation of line haul activity within the yard. HAP emissions computed using HAP-to-CAP emission ratios.
EPA EGU v1.5 (2008EPA_EGU15) **-BELOW S/L/T -**	Uses Clean Air Markets Division (CAMD) NO_X, SO_2 and other pollutants (including HAPs) computed using CAMD heat inputs and EFs generally consistent with AP-42[5] and/or the approach used in the Integrated Planning Model (IPM).
2008 EPA Rule Data from OAQPS/SPPD (2008EPA_ Rule_Data) **-BELOW S/L/T -**	Mercury emissions from categories for which rule data were used to gap fill missing S/L/T agency data. Includes: municipal waste combustors, electric arc furnaces, mercury cell chlor-alkali plants and industrial, commercial and institutional boilers. For this latter category, we used Hg data from 19 units from the Boiler rule information collection request database (August 2010 version) that were able to be matched to EIS units.
EPA NV Gold Mines (2008_NVGLD) **-BELOW S/L/T -**	Hg emissions developed from published results of the Nevada Mercury Control Program - Annual Emissions Reporting (http://ndep.nv.gov/bapc/hg/aer.html) for 2008. Because of issues with the 2008 testing, data for Homestake Mining Co. – Ruby Hill and Barrick Goldstrike Mines, Inc. were based on validated 2009 test data provided by Nevada.
EPA coke oven (2008EPA_CK) **-BELOW S/L/T -**	Coke oven emissions computed from AP-42 or updated from 2005 NATA values using 2008 production data. Emissions/approaches provided by a few states that did not report coke oven emissions in the S/L/T agency data.
EPA TRI Augmentation v2 (2008TRI) **-BELOW S/L/T -**	TRI data for the year 2008 other than one facility from the 2005 NATA review for which 2009 TRI was used. These data were used only for pollutants at a facility that are not included in the S/L/T agency data except in some cases from the NATA/Hg review. TRI data assigned to EIS processes in 2 ways: 1) manually for the NATA/Hg review and 2) based on the distribution of surrogate CAP emissions (e.g., PM10-FIL for metals) which was done as part of an automated approach.
EPA HAP Augmentation v2 (2008EPA_HAPv2) **-BELOW S/L/T -**	HAP data computed from S/L/T agency criteria pollutant data using HAP/CAP emission factor ratios based on the EPA Factor Information Retrieval System (WebFIRE) database[6]. These data are selected below the TRI data because the TRI data are expected to be better.
EPA 2005NATA values pulled forward to gapfill (2008EPA_ 05NATA_GAPFL) **-BELOW S/L/T -**	Emissions from the 2005 NATA inventory used as directed by S/L/T for facilities that were part of the NATA high risk and Hg review. Also includes 2005 NATA Hg emissions from some hazardous waste incinerators (HWI), where states did not provide Hg data but there were HWI processes with non-zero emissions of criteria pollutants reported by the S/L/T. These data are selected last because they are the least preferred method for supplementing HAP emissions, though no emissions in this dataset overlapped with any other datasets.
* The dataset short name is included in the process-level facility emission summary report	

The next sections briefly describe on how these datasets (other than the mobile datasets) were developed. They also provide the quantity of HAPs from these datasets used in the 2008 NEI v2. The development of each of these datasets is described in more detail in the 2008 NEI v2 technical support document (TSD)[7] at http://www.epa.gov/ttn/chief/net/2008inventory.html. Documentation of the mobile-related datasets is provided in Section 4 of the TSD.

EPA Chromium Split v2

This dataset contains chromium VI and chromium III emissions based on S/L/T-submitted data for chromium, chromium VI and chromium III as the data source; no sources of chromium emissions other than from S/L/T data were included in this dataset. The purpose of this dataset was generate hexavalent and trivalent chromium from S/L/Ts that reported unspeciated chromium in order to provide risk assessors and analysts the emissions of hexavalent chromium, since this form, or valence state of

chromium, poses cancer risk. In addition to chromium VI, high risk forms of chromium are chromic acid (VI) and chromium trioxide.

We used two approaches to compute hexavalent and trivalent chromium from the S/L/T data. Where chromium and either hexavalent or trivalent chromium were reported at the same process, then a difference method was used to compute the other valence state. If only unspeciated chromium was reported, then we speciated it into hexavalent and trivalent forms. Since the fraction of hexavalent chromium depends upon the type of process emitting the chromium, we used speciation factors that depend upon the process. We used speciation factors from an MS ACCESS database "Cr Speciation 01122009"[8] ; these factors are provided in excel format within the supporting documents to the TSD. Where speciation factors were unavailable for a specific process or the process was defined as miscellaneous, a default value of 34% hexavalent chromium was used. This represents the best judgment of EPA staff based on limited data on species of chromium emitted from five significant source categories. The total chromium mass in these emissions ranged from 0.4% to 70% hexavalent. Because the high end of the range was associated exclusively with electroplating sources the EPA chose 34%, the upper end of the range for utility boilers. Note that speciation for oil-fired utility boilers used the average of the test data which was 18% -- the upper bound of the 7 tests was 34%, and the data ranged from 5% to 34%.[9] Sixteen percent of the S/L/T point source unspeciated chromium utilized the default value of 34% hexavalent chromium.

Table 2 shows all of the point datasets that include chromium emissions, and the amount of chromium of each chromium species. The first three chromium types are those with the high cancer risk. As can be seen, the EPA Chromium Split v2 dataset contains the largest amount of chromium out of all of the point datasets. This means that the S/L/T reported the most chromium as unspeciated, and the gap filling effort on EPA's part was to speciate it into hexavalent and trivalent forms.

Table 2. Summary of chromium emissions in the 2008 NEI v2
Point data category broken out by dataset grouping contribution.

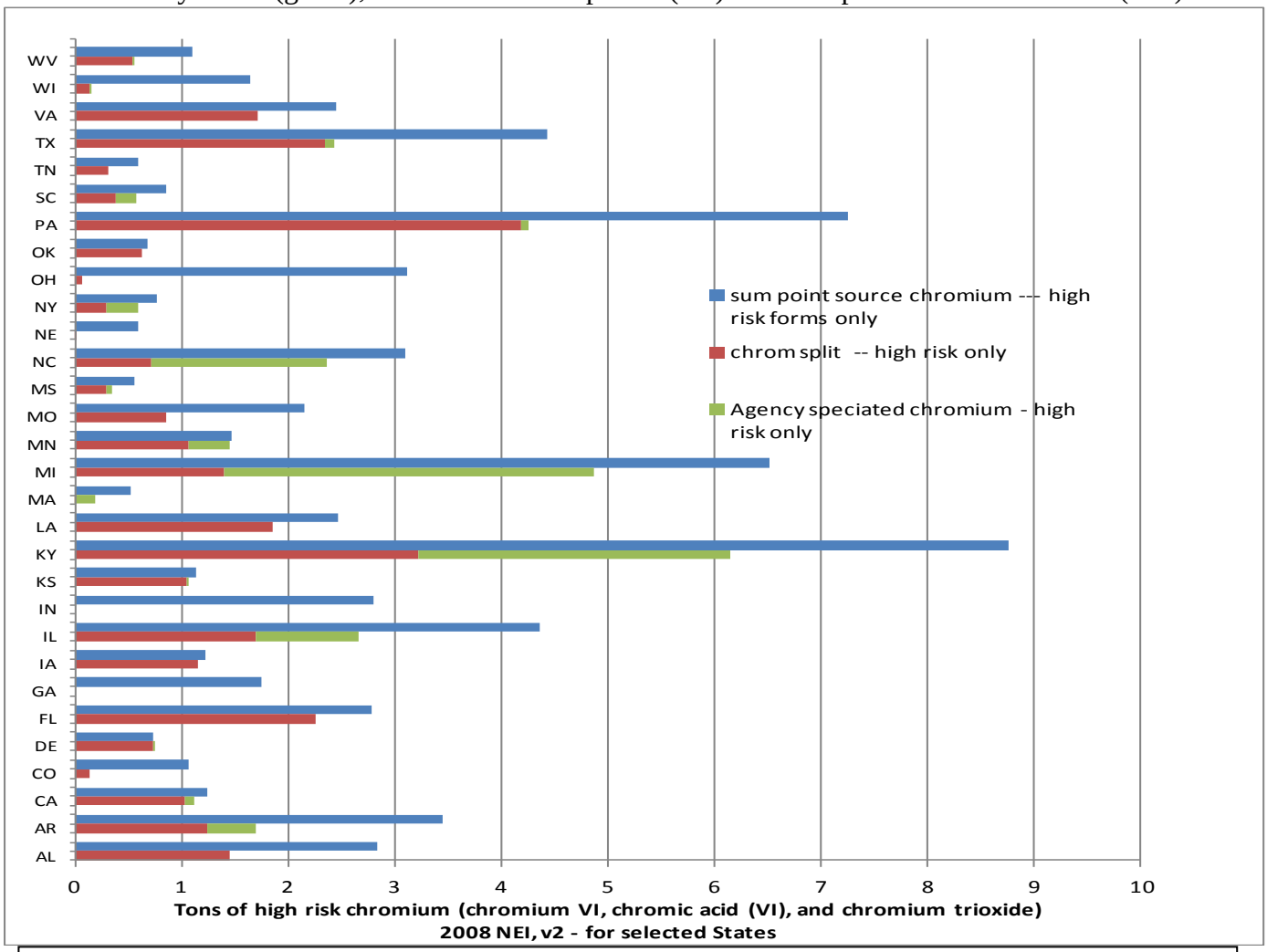
	2008 NEI v2 tons of chromium			
dataset or data category	Chromic Acid (VI)	Chromium Trioxide	Chromium (VI)	Chromium III
EPA Chromium Split v2			31.64	154.95
EPA Air/Rail			0.00	0.01
EPA EGU			20.00	145.16
EPA other			0.28	0.52
HAP AUG			1.48	18.31
S/L/T	4.55	0.17	6.41	1.29
TRI			11.02	52.59
POINT data category total	4.55	0.17	70.84	372.82
NONPOINT data category total			30.04	59.55
NONROAD data category total			0.25	0.48
ONROAD data category total			11.25	3.58
2008 NEI v2 INVENTORY total	4.55	0.17	112.38	436.42

EPA EGU is the combination of the 2008EPA_MATS and EPA EGU v1.5 datasets.
EPA other is the combination of 2008 EPA Rule Data from OAQPS/SPPD, EPA other data developed for using ahead of S/L/Tor gap filling, and EPA 2005NATA values pulled forward to gap fill.
EPA Air/Rail is the combination of EPA Rail and EPAAirports1109

Figure 2 shows the amount of high risk chromium (sum of chromium VI, chromic acid (VI) and chromium trioxide) for states with point source totals exceeding 0.5 tons. The blue bar (upper bar) is the

total high risk chromium for the point data category in the state, and the red or red/green bar is the amount of high risk chromium based on S/L/T submitted data. The green is the portion of high risk chromium provided by the S/L/T and the red was the amount from the EPA Chromium Split v2 dataset. The blue bar is always greater than the red/green bar since hexavalent chromium comes not only from S/L/T data but many of the other datasets listed in Table 1 that use data sources other than S/L/T data. The figure also shows that in most states, the high risk chromium is from the 2008EPA_CHROMv2 dataset or the other gap fill datasets.

Figure 2. Comparison of High Risk Chromium among the following data sources: speciated chromium submitted by S/L/T (green), EPA Chromium Split v2 (red) and total point source chromium (blue)



In the above bar chart, DE- blue bar (0.727241) is larger than sum of red and green (0.727239) though it does appear to look smaller.

Other EPA data

This dataset was created primarily to incorporate the data provided by S/L/T in response to the NATA2005 high risk and Hg review packages into EIS. EPA sent out these packages (spreadsheets) to S/L/T for the purposes of data review and completeness per the second and third objectives listed in the introduction to this paper. While some S/L/T made changes or submittals in their own datasets through EIS, others provided the information in the spreadsheets. As a result, these data were submitted by EPA into the 2008EPA_OTHER dataset, and it was used ahead of the S/L/T data. While some of the values were included only to gap fill missing S/L/T data such that the order was not important, other values were intended to be used instead of S/L/T-reported data. This dataset also included EPA Region 2 emissions data for two facilities: (1) Tonawanda Coke, in New York, for which EPA Region 2 provided

test-based emissions for benzene and coke oven emissions, and (2) Baxter Healthcare Corp Edwards Div., in Puerto Rico for which Region 2 provided ethylene oxide emissions (not provided by Puerto Rico) based on the most recent permit and consistent with 2005 emissions used in the 2005 NATA.

Not all of the data collected from the 2005 NATA high risk and Hg review packages were submitted into EIS through the 2008EPA_OTHER dataset. If the S/L/T submitted new or revised data to EIS, then these were not part of the 2008EPA_OTHER but rather were incorporated into the S/L/T dataset. If the S/L/T recommended gap filling using the TRI data (or HAP augmentation approach) then the data were submitted via these datasets (2008TRI and 2008EPA_HAPv2). TRI data were only put into the 2008EPA_OTHER dataset if they needed to be used ahead of S/L/T data since the 2008EPA_OTHER dataset is used above the S/L/T data in the hierarchy. In cases in which TRI was used in the 2008EPA_OTHER dataset, the dataset name is 2008EPA_OTHER, but the emission comments field (in EIS and in the process level summaries) indicates that the data are from TRI.

Table 3 summarizes the HAPs in the 2008EPA_OTHER dataset. This dataset has relatively small mass since most of the 2005 NATA high risk and mercury review facilities were addressed using other approaches: S/L/T submitting emissions or recommending the use of TRI or other datasets, learning that the facility no longer had the high risk or Hg-emitting operations in 2008, or insufficient information on the facility's operation/emissions in 2008 to gap fill (these facilities are listed in the TSD http://www.epa.gov/ttn/chief/net/2008neiv2/2008_neiv2_tsd_draft.pdf in Section 3.1.7). In addition, the 2005 NATA and high risk mercury review facilities are a small part of the total inventory.

Table 3. Summary of HAP emissions in the Other EPA data Dataset by State and Pollutant Group

	1,1,2-Trichloro-ethane (tons)	4,4'-Methylene-dianiline (tons)	Benzene (tons)	Chromium (VI) (tons)	Chromium III (tons)	coke oven emissions (tons)	Ethylene Oxide (tons)	Manganese (tons)	Mercury (tons)	Naphthalene (tons)	POM /PAH (tons)	Tetrachloroethylene (tons)
AL									0.115		5.950	
DE									0.081			
IN									0.232	0.945		
KY	0.000											0.000
MI									0.013			
MN									0.002	2.355	1.628	
MO				0.029	0.056							
MS								0.191				
NC				0.010					0.152			
NE									0.020			
NJ									0.031			
NY			90.54*			8.351*						
OH				0.002						0.800		
OR									0.029			
PA		0.065							0.328		0.000	
PR							1.533					
RI												3.828
TN				0.005	0.009			0.000	0.034			
TX				0.001	0.002				0.073			
UT									0.157			
WI				0.000								
Total	0.000	0.065	90.54	0.046	0.068	8.351	1.533	0.192	1.265	4.100	7.578	3.828
*values not from the High Risk or Hg review but based on Region 2 information on Tonawanda Coke.												

2008 MATS-based EGU emissions

Emissions for 2008 through 2010[10,11,12] were developed for all units expected to be subject to the Mercury and Air Toxics rule (MATS), which was published in February 2012[13]. The basis of the 2008EPA_MATS dataset were the 2008 emissions.

The emission units included in the 2008EPA_MATS dataset were coal, petroleum coke and oil-fired EGUs greater than 25 mega watts (MW). This included 1194 emission units at 491 facilities. The set of pollutants estimated in this dataset included HCl and hydrofluoric (HF) acid gases, hydrogen cyanide (HCN), and twelve metal HAPs: antimony (Sb), arsenic (As), beryllium (Be), cadmium (Cd), trivalent chromium (Cr III), hexavalent chromium (Cr VI), cobalt (Co), lead (Pb), manganese (Mn), Hg, nickel (Ni), and selenium (Se). Note that the MATS emission factors were for total chromium and EPA speciated the MATS-derived total chromium as follows: oil units used assigned 18% hexavalent; 82% trivalent chromium; coal, coal refuse and petroleum coke units were assigned to 12% hexavalent and 88% trivalent chromium.

The 2008 EPA MATS data were computed using site specific or average EFs developed from the test program conducted for MATS under part iii of the Information Collection Request and 2008 heat input data, from CAMD where available. More details on the heat input and EFs are provided in Section 3.10 of the TSD. Because these factors were believed to be much more up-to-date and more reliable than what EPA had previously made available for S/L/T use, the 2008EPA_MATS emissions dataset was used ahead of S/L/T-reported values for these fifteen pollutants, with one area of exception. For Hg, there are some units that were already required by State or local regulations to monitor their emissions using Hg CEMs by 2008. Where EPA could determine that the S/L/T-reported mercury emissions were based on such CEMs or 2008-specific test data, EPA removed the emission factor based values from the 2008EPA_MATS dataset to allow the S/L/T-reported CEM values to be selected for the 2008 NEI.

This MATS data in the 2008 NEI v2 contains about 138,000 tons of HAP (about 105,000 tons is HCl) and 49 tons of lead. Table 4 provides an emissions summary by state or tribe and pollutant. We inadvertently did not use the all of the MATS chromium due to an error in the order of the datasets. The MATS should have gone before the chromium split v2 dataset so that it would be used before the speciated S/L/T chromium. As a result of this error, S/L/T chromium data (speciated by EPA) were used ahead of MATS chromium.

Table 4. HAP emissions (tons) in the NEI from the 2008 EPA MATS dataset

	Sb	As	Be	Cd	Cr VI*	Cr III *	Co	HCl	HCN	HF	Pb	Mn	Hg	Ni	Se
AK	0.001	0.001	0.000	0.000	0.009	0.065	0.002	0.23	0.07	4	0.003	0.015	0.005	0.042	0.06
AL	0.282	1.850	0.077	0.107	1.123	8.233	0.315	7225	147	1183	1.223	3.476	0.661	10.694	8.27
AR	0.197	1.702	0.057	0.052	0.799	5.860	0.215	436	207	138	0.900	1.375	0.483	3.731	5.02
AZ	0.084	0.545	0.021	0.027	0.248	1.822	0.090	510	113	130	0.342	0.855	0.537	1.902	2.04
CA	0.011	0.183	0.002	0.003	0.071	0.517	0.020	124	30	2	0.040	0.130	0.001	0.341	0.45
CO	0.071	0.131	0.020	0.040	0.928	6.804	0.330	749	71	221	0.280	8.074	0.339	5.079	3.20
CT	0.050	0.017	0.002	0.004	0.053	0.379	0.040	264	11	4	0.054	0.152	0.003	0.734	0.32
DC	0.014	0.001	6.7E-05	1.5E-04	4.2E-04	0.002	0.007	0.15	0.01	0.05	0.005	0.004	4.7E-05	0.143	0.001
DE	0.054	0.312	0.010	0.010			0.049	1114	11	112	0.171	0.256	0.048	0.869	0.92
FL	3.562	1.518	0.112	0.110	0.432	2.991	2.731	5909	548	540	3.675	4.776	0.662	54.417	10.05
GA	0.294	1.989	0.083	0.114	1.479	10.845	0.474	6260	85	779	1.436	4.456	1.009	11.919	10.82
HI	0.023	0.116	0.004	0.004	0.018	0.105	0.855	25	18	4	0.039	0.257	0.001	17.748	0.05
IA	0.309	1.678	0.056	0.053	0.009	0.065	0.252	810	199	168	1.005	3.402	0.925	4.118	4.94

	Sb	As	Be	Cd	Cr VI*	Cr III *	Co	HCl	HCN	HF	Pb	Mn	Hg	Ni	Se
IL	0.462	3.498	0.132	0.150	1.629	11.949	0.580	1038	67	823	2.175	4.363	0.795	9.046	12.11
IN	0.512	4.132	0.155	0.162	1.359	9.965	0.596	5765	193	1793	2.898	14.198	1.171	12.911	14.56
KS	0.154	0.597	0.027	0.043	0.0E+00	0.0E+00	0.139	367	79	408	0.567	1.696	0.642	4.260	2.49
KY	0.257	1.670	0.074	0.113	0.733	5.373	0.345	6210	191	634	1.523	4.096	0.786	10.752	9.61
LA	0.484	1.145	0.045	0.049	0.538	3.915	0.358	1513	117	221	0.774	1.271	0.900	6.558	4.03
MA	0.454	0.338	0.014	0.018	0.277	1.993	0.288	263	48	45	0.363	0.583	0.068	5.553	1.89
MD	0.202	0.199	0.017	0.027	0.130	0.938	0.135	1584	69	165	0.245	1.030	0.126	3.915	1.56
ME	0.055	0.053	0.002	0.002	0.001	0.005	0.027	113	5	0.4	0.040	0.057	0.007	0.535	0.15
MI	0.421	3.011	0.112	0.114	1.423	10.436	0.459	2537	423	572	1.766	3.308	1.007	8.534	10.60
MN	0.088	0.433	0.025	0.040			0.160	897	53	1629	0.432	1.725	0.035	4.178	3.15
MO	0.500	3.565	0.123	0.127	0.626	4.588	0.554	1449	456	421	10.224	3.579	1.135	11.360	11.01
MS	1.364	0.887	0.035	0.034			0.345	3794	37	405	0.636	1.369	0.552	6.419	2.52
MT	0.126	0.347	0.014	0.057	0.099	0.728	0.054	55	15	23	0.498	1.725	0.124	0.751	1.85
NC	0.187	1.795	0.090	0.097	0.627	4.598	0.392	4982	61	583	1.019	3.459	0.775	7.969	13.42
ND	0.074	0.214	0.021	0.037	0.144	1.057	0.132	77	10	151	0.387	1.641	1.312	4.453	2.77
NE	0.132	0.889	0.037	0.052	0.406	2.977	0.121	2059	182	284	0.477	0.746	0.665	1.923	2.61
NH	0.048	0.272	0.017	0.016	0.000	0.000	0.034	1141	9	119	0.136	0.181	0.117	0.253	1.54
NJ	0.078	0.167	0.009	0.008	0.064	0.471	0.078	896	27	101	0.105	0.238	0.054	0.991	0.63
NM	0.009	0.012	0.009	0.014	0.019	0.142	0.034	27	5	39	0.057	0.267	0.005	0.412	0.10
NV	0.009	0.019	0.002	0.007	0.104	0.760	0.057	636	21	60	0.046	0.196	0.009	0.491	0.64
NY	6.911	0.403	0.039	0.037	0.123	0.904	1.546	904	36	122	0.546	6.912	0.164	27.592	1.69
OH	0.524	3.156	0.125	0.199	1.702	12.479	0.562	10114	292	8231	2.094	6.116	1.620	17.985	15.37
OK	0.268	2.308	0.077	0.072	0.001	0.008	0.317	572	280	173	1.222	1.868	0.606	5.065	6.81
OR	0.029	0.254	0.008	0.008	0.000	0.000	0.032	65	31	21	0.134	0.205	0.067	0.557	0.75
PA	0.870	7.156	0.102	0.164	0.447	3.262	0.541	8409	260	1274	2.941	6.123	1.016	13.486	14.51
PR	2.081	0.346	0.021	0.017	0.070	0.332	1.135	124	33	11	0.457	3.148	0.043	29.900	0.17
SC	0.124	1.281	0.031	0.048	0.268	1.963	0.166	2737	52	361	0.539	2.231	0.290	3.567	7.88
SD	0.061	0.049	0.033	0.030	0.014	0.104	0.122	56	26	18	0.060	27.658	0.096	0.031	0.12
TN	0.271	2.079	0.076	0.110	0.000	0.000	0.367	7205	107	809	1.214	2.942	1.129	12.799	6.42
TX	0.460	1.720	0.116	0.177	1.201	8.808	0.806	3044	427	880	1.909	7.176	3.079	18.043	17.19
UT	0.079	0.357	0.022	0.041	0.134	0.984	0.094	561	41	73	0.411	1.705	0.202	4.620	1.75
VA	0.363	0.874	0.037	0.040	0.635	3.772	0.564	4054	75	413	0.684	1.696	0.407	20.064	2.86
WA	0.006	0.008	0.003	0.003	0.002	0.012	0.024	103	0.97	104	0.009	0.084		0.037	0.01
WI	0.179	1.223	0.051	0.059	0.954	6.994	0.244	1178	179	250	0.765	2.492	0.709	6.649	5.26
WV	0.284	1.981	0.081	0.116	0.541	3.968	0.330	6239	119	1313	1.373	4.400	0.936	12.538	6.73
WY	0.177	1.325	0.050	0.065	0.270	1.977	0.224	476	77	553	0.862	2.419	0.782	6.545	4.24
751**	0.008	0.019	0.002	0.004	0.011	0.080	0.010	11	4	3	0.043	0.193	0.015	0.523	0.18
780**	0.073	0.361	0.020	0.038	0.098	0.722	0.088	134	88	178	0.389	1.745	0.214	4.733	1.60

*the chromium emissions from MATS were not used due to a hierarchy error—the chromium split v2 dataset should have gone AFTER the MATS dataset; because it did not, MATS chromium was not used where S/L/T chromium was speciated via the chromium split v2 dataset

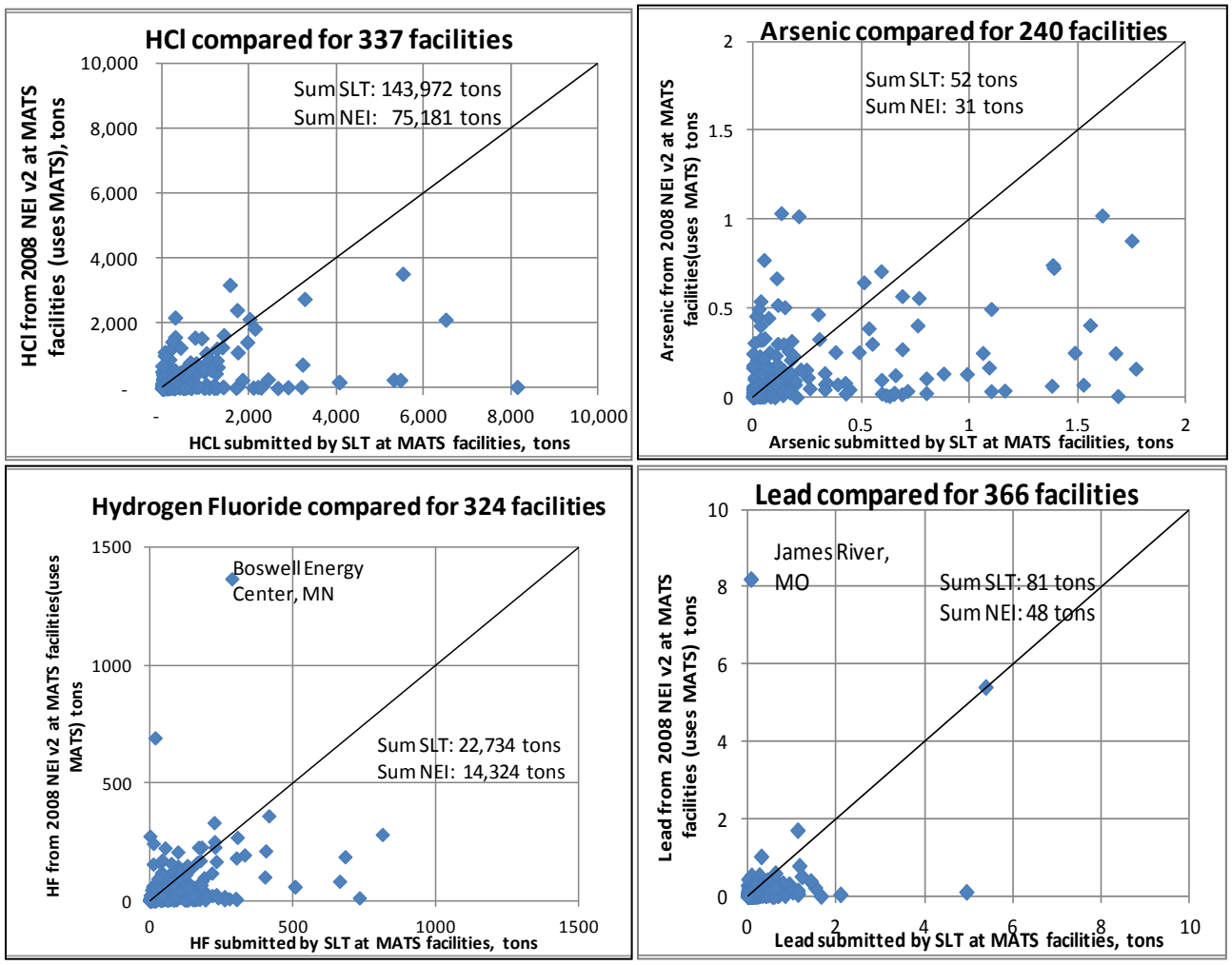
**751 is the code for the Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico & Utah

**780 is the code for Navajo Nation, Arizona, New Mexico & Utah

Figure 3 shows the 2008 NEI v2 compared to Agency submitted data for the facilities that have both MATS and Agency submitted emissions for selected pollutants. For most of the facilities, the MATS data are lower and the sum across all compared facilities is lower, but there are some facilities with

much higher MATS values. For some of these, the MATS data were based on units that were tested under parti iii (Boswell and James River). The two facilities with arsenic values over 1 ton were based on an average emission factor computed based on test data for similar unit configurations.

Figure 3. S/L/T emissions at MATS facilities compared to NEI v2 emissions for selected MATS HAPs



EPA EGU v1.5

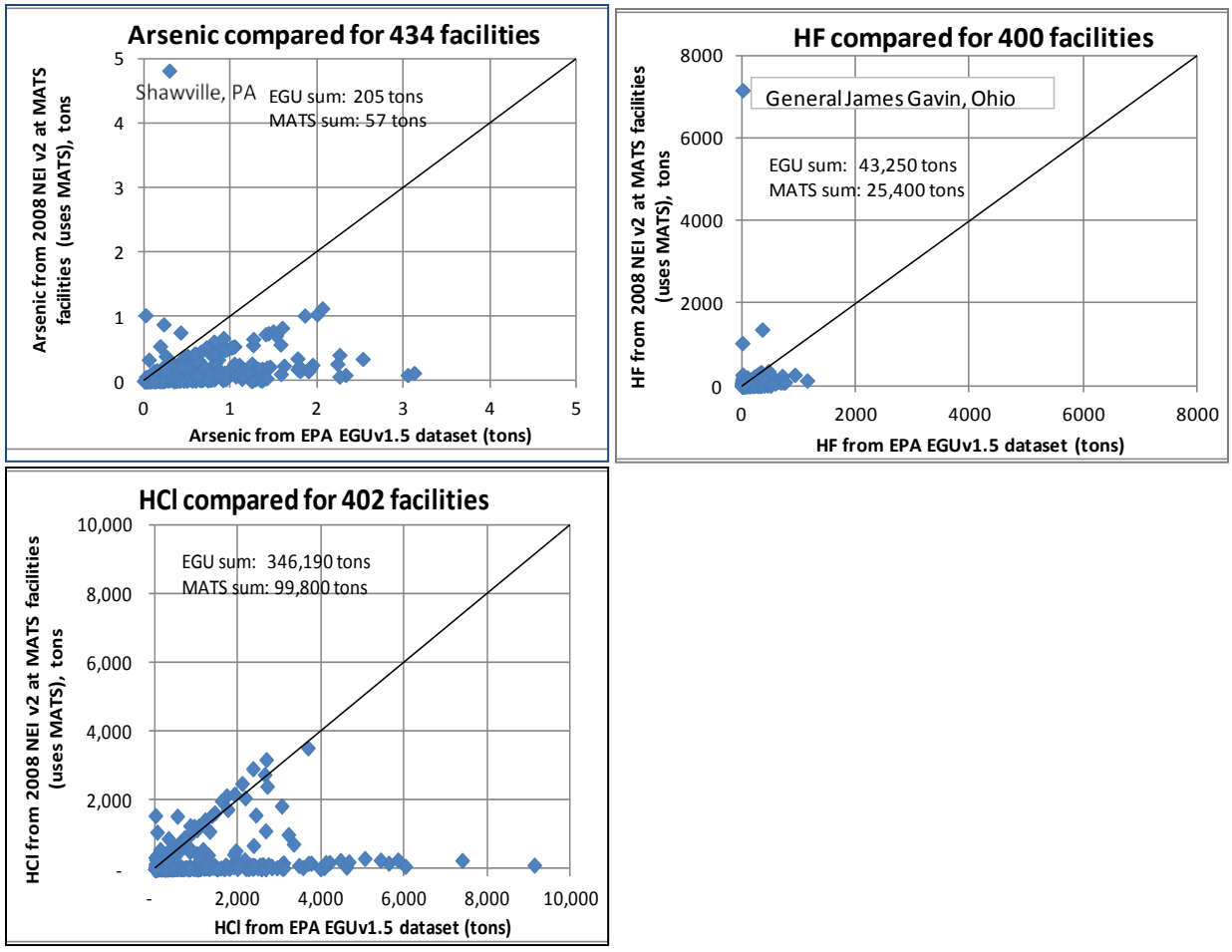
This dataset adds CAPs as well as HAPs to EGUs for pollutants that are missing in the S/L/T reported data. The 2008EPA_EGU15 dataset uses the hourly SO_2 and NO_X CEM data and hourly heat input values reported by facilities to CAMD. The annual sum of the reported heat input values for 2008 were used to estimate emissions for a set of CAP and HAP pollutants (dependent upon unit type and primary fuel), and the annual SO_2 and NO_X sums were used directly, for a set of 1984 emission units at 751 different facilities. These units included coal-fired boilers (74 pollutants, including the SO_2 and NO_X), oil-fired boilers (41 pollutants), gas-fired boilers (39 pollutants), gas-fired simple turbines and combined cycle units (18 pollutants), and petroleum coke-fired boilers (73 pollutants).

For regulatory development by EPA, the NEI EGU emissions are compared against future-year emissions estimated by the integrated planning model (IPM). This model predicts SO_2, NO_X, Hg, and HCl as part of its primary functions and uses emission factors for these pollutants that reflect the future-year controls associated with the individual units. Other pollutants such as VOC, $PM_{2.5}$, PM_{10}, and metal HAPs are estimated using IPM post-processing. The emission factors used for the EPA EGU v1.5 dataset were consistent with the factors used by the IPM post-processing. The approach and emission

factors can be found in 2008EGU_emiss_DetailedPlanFinal 012610.pdf in the 2008 NEI TSD references (ftp://ftp.epa.gov/EmisInventory/2008v2/doc/2008nei_references.zip). If the S/L/T data contained any of the five PM species reported to EIS (filterable $PM_{2.5}$/ $PM_{10,}$ primary $PM_{2.5}$/ PM_{10} and condensible PM) but did not include all of them, the gap filling approach used PM augmentation of the S/L/T data rather than mix PM species from both the S/L/T and EPA EGU v1.5 datasets. The PM augmentation approach is described by Huntley, et. al.[14]

Given that the MATS and EGU datasets share some of the same HAPs (i.e., acid gases and metals), and this was the first inventory year using MATS data, we were interested in understanding the impact of using the updated data on inventory totals. Figure 4 shows a comparison of MATS and EGU datasets for selected pollutants at MATS facilities. Similarly to the comparison of MATS with S/L/T data, on average and for the sum of the compared facilities, the MATS emissions are lower than those from the EGUv1.5 dataset. The S/L/T data probably used the same EFs as the EGUv1.5 dataset so this result is not surprising. Also, there are a few facilities in the MATS data that have significantly higher values than other MATS facilities and the EGUv1.5 value for that facility. The high value in MATS dataset for arsenic for Shawville, PA was based on unit-specific tests. This HAP was not included in the S/L/T dataset, and therefore it was not one of the facilities shown in the figures comparing S/L/T to MATS data in the above section. Similarly, the MATS dataset has a high value for hydrogen fluoride for General James Gavin in Ohio as compared for EGUv1.5. It is also based on unit-specific test values and also not included in the S/L/T dataset (hence not shown in the figures in the above section).

Figure 4. Emissions from the EPA EGUv1.5 dataset MATS facilities compared to NEI v2 emissions for selected MATS HAPs



2008 EPA Rule Data from OAQPS/SPPD

This dataset contains only mercury emissions, and the values in this dataset were used only if there was no Hg for the specific process in either the S/L/T or 2008EPA_OTHER dataset. After our analysis of the Hg emissions in the 2008 NEI v1, we recognized that important source categories of Hg were missing or unexpectedly low. EPA's Sector Policies and Programs Division (SPPD) in OAQPS collected Hg emissions data for a number of industries for which rules have been developed. The SPPD data used in the 2008EPA_Rule_Data dataset are summarized in Table 5.

Each of the values in this dataset needed to be carefully matched to the correct units and processes in EIS to ensure that there would be no double counting across the two datasets in the event that the S/L/T did report Hg for the category covered by SPPD. For a few municipal waste combustion sources, S/L/T were questioned when the SPPD data were significantly different from their data. In those cases, S/L/T indicated that their data were based on stack testing. This helped to support our selection of the 2008EPA_Rule_Data below the S/L/T data in the hierarchy.

We also used a very limited set of Hg emissions from the Boiler MACT rule. These were selected from the database used in the Hg modeling for the MATS rule as described in the Technical Support Document (TSD) For the Proposed Toxics Rule Docket No. EPA-HQ-OAR-2009-0234.[15]

Table 5. Categories and Hg emissions in the dataset: 2008EPA_Rule_Data

Category covered by the 2008 EPA Rule Data	**description**	**Total Hg in dataset (tons)**	**Hg used from that dataset in NEI**	**2008 NEI total for category (reflects all datasets used for 2008 NEI)**	**S/L/T where Hg from this dataset was used**
Municipal waste combustors	unit level emissions for both small and large units, representing "2008 compliance data" per the SPPD staff that provided the information	1.23	0.18	1.3	CA, CT, TX, OK, VA, MA, IN, GA, UT
Electric Arc Furnaces	EAF emissions for 32 facilities (subset of the industry) based on a 2010 test program and 2009 production information	2.54	0.53*	4.7	TN, TX, NE, GA, AR, AL
Hg Chloralkali plants	Emissions from Hg chloralkali processes at 4 facilities, computed by SPPD staff	0.32	0.079	1.3	OH, GA
Industrial boilers	Emissions from 19 boilers (very small subset) from the version of the Boiler MACT baseline emissions used in the MATS rule modeling (dataset dated August 2010). Did not use full Industrial Boiler dataset due to inability to match the ICR data with EIS boiler units for the thousands of units in the Boiler MACT database	0.39	0.39	4.5**	IN, IA, MO, GA, WY

*this reflects only the EAF emissions associated with this dataset ; it is an underestimate of the NEI's use of the EAF rule information since much of the test data for EAFs were selected by S/L/T to use in the EPA Other dataset or their dataset. In many situations, the EF from the rule data was used along with 2008 throughput; the Hg emissions computed this way were also put into the EPA Other dataset.

** sum of NEI is 4.0 tons, but we estimated we are missing 0.5 tons and therefore we use 4.5 tons as sector total

EPA NV Gold Mines

This dataset contains only Hg from gold mines in the state of Nevada. In the 2008 NEI, emissions from gold mines occur only in Nevada, Alaska, Colorado, Montana, and South Dakota, with the vast majority (1.70 out of a total of 1.73 tons) occurring in Nevada. All Nevada gold mine emissions come from the EPA NV Gold Mines dataset which uses data Nevada collects but does not submit to EPA for the NEI. No states report gold mine Hg emissions; the gold mine Hg from the other states is from the TRI. Nevada collects Hg emissions from gold mines and posts results as part of its Nevada Mercury Control Program (NMCP). See the NMCP website at http://ndep.nv.gov/bapc/hg/aer.html. The data in the EPA NV Gold Mines dataset are from the 2008 PDF file at that site other than two facilities for which data was for 2009 validated tests; these data were provided to us via email[16].

EPA coke oven

This dataset contains coke oven emissions for 10 facilities. It is the result of a coke oven emissions review EPA conducted by comparing 2005 coke oven emissions from the NATA inventory with the 2008 coke oven emissions in version 1.5 of the 2008 NEI. In that review, EPA identified numerous facilities that were missing coke oven emissions or facilities for which the S/L/T emissions were incomplete. These were addressed by additional submissions by S/L/T of coke oven emissions, EPA's creation of a coke oven emission dataset, and the 2008EPA_OTHER which housed EPA Region 2's coke oven emissions estimate for the Tonawanda Coke Plant.

The 2008 NEI v2 used the codes 141 (benzene soluble organics or BSO) and 142 (methylene chloride soluble organics or MCSO) for coke oven emissions. These codes have been replaced by pollutant code 140 (coke oven emissions) for use in the 2011 NEI.

Coke oven emissions were reported by S/L/T for facilities with coke oven processes in Alabama (Walter Coke and Drummond Company), Illinois (US Steel Granite City), Michigan (U.S. Steel Great Lakes Works), Pennsylvania (USS-Clairton Works, Erie Coke Corp, Arcelormittal Monessen LLC/Monessen Coke Plt, Shenango), Virginia (Jewel Coke), West Virginia (Mountain State Carbon).

The EPA coke oven dataset contained emissions for facilities in Indiana (Ispat Inland Steel Indiana Harbor Coke, US Steel Gary Works), Ohio (AK Steel Corporation, ArcelorMittal Warren Inc., Haverhill North Coke Company, Kentucky (Ashland Works-Coke Plt.) and additional emissions (to address missing processes) for two Pennsylvania facilities (Erie Coke Corp, Arcelormittal Monessen LLC/Monessen Coke Plt). S/L/T computed these emissions and provided them to EPA rather than submitting them into EIS. This dataset also included coke oven emissions for the Tonawanda Coke Plant in New York, which EPA Region 2 estimated. These same emissions are also in the EPA Other dataset. Although we did not need to include the Tonawanda emissions in both datasets, we included it in the EPA coke oven dataset to have all of the EPA-submitted coke oven data in a single dataset.

Table 6. Coke Oven Emissions in 2008EPA_CK and other 2008 NEI v2 datasets.

Dataset or Data Source	**Coke Oven emissions (tons) (sum of pollcodes 141 and 142)**
EPA Coke Oven Emissions	123
S/L/T-reported Coke Oven data	279
EPA Other	8*
TOTAL coke oven emissions in NEI ** = 402 tons	
*this value is not summed into the total since these emissions are also included in the EPA Coke Oven emissions – these are the Tonawanda Emissions estimated by Region 2	
** excludes pollcodes 141 and 142 reported at some EGUs and a landfill in WV, since these facilities do not have coke ovens	

EPA TRI Augmentation v2

The TRI Augmentation v2 dataset includes emissions from the toxics release inventory (TRI)[17] for facilities that were matched to EIS facilities and where emissions were not already included in S/L/T submissions. For all but 1 facility the TRI data are for the year 2008. For the Detroit Tool Metal Products-Lebanon facility in Laclede county Missouri, 2009 data were used since the facility did not report to TRI in 2008 (it reported in 2005, 2006 and 2009). This dataset contains no facilities on tribal lands.

The TRI provides facility level emissions summed by stack and fugitive air emission releases by pollutant, whereas the NEI includes process-level details. EIS requires emissions to be submitted at a process level. To build the TRI dataset, the TRI stack and fugitive emissions had to be assigned to EIS facility processes. This was done using different methods for two different sets of facilities. In both cases, stack and fugitive emissions from TRI were summed and treated as a facility total. The first set of facilities were from the 2005 NATA high risk and Hg review. S/L/T were provided the opportunity to review the TRI values EPA planned to use for gap filling, and S/L/T were also asked to recommend the EIS processes to apportion the total (fugitive plus stack) TRI emissions. About 220 facilities (about half high risk and half from the Hg review) relied on this manual process assignment method. In the manual method, the high risk HAPs or Hg were assigned to specific processes recommended by S/L/T. Where specific processes were not recommended by S/L/T, EPA chose the process(es) assumed to be responsible for that HAP. For some of the Hg categories such as electric arc furnaces and Portland cement, it was relatively straight forward to find the specific processes for apportioning the emissions. In some situations, the HAPs were apportioned based on the CAPs reported by S/L/T for the facility. For example, manganese was apportioned to processes in the same proportion as the S/L/T-reported PM10-FIL emissions. Where there were no criteria pollutants at the facility, emissions were assigned to processes previously used (i.e., in 2005) for TRI data. In many cases, the SCCs for these processes were 39999999. We assigned a more descriptive SCC (than 39999999) using the NAICS description if a broad industry-specific SCC code was available.

Assignment of TRI emissions to EIS processes for the second set of facilities relied on an automated procedure. The procedure apportions the TRI based on S/L/T-reported CAP emissions which is described by manganese example provided above. In this method, EIS facilities were matched to TRI facilities via the Federal Registry System (FRS) identifier. Matches were checked based on the similarity between the geographic coordinates in EIS and FRS, and other parameters. Unfortunately the automated checking occasionally erroneously eliminated a good match due to geographic coordinate errors in either of the two databases (TRI or EIS). As a result, the 2008 NEI v2 did not include the highest emitting chlorine plant in the country (US Magnesium, Crowley Plant in Utah). This is documented as one of the 2008 NEI issues listed on the 2008 webpage

(ftp://ftp.epa.gov/EmisInventory/2008v2/doc/2008neiv2_issues.xlsx). Another issue with this method is that if there were no S/L/T-reported CAP emissions for the pollutant used to apportion the HAPs, the TRI data were not used. We estimate out of the 10,000 total EIS to TRI matches (out of a total of about 16,000 TRI facilities with HAP emissions), 4000 facilities did not have any CAP emissions and were therefore not gap filled.

Another part of the method was to ensure TRI pollutants weren't included in the 2008TRI dataset if they were part of pollutant groups reported by S/L/T. For example, we did not use xylene (mixed isomers) from a TRI facility in the NEI if a specific xylene isomer such as o-xylene existed in the S/L/T dataset for that facility.

The TRI Augmentation dataset added nearly 40,000 tons of HAP and lead emissions from the 2008 EPA TRI for 2,636 facilities in the EIS. The data used covers 150 different HAPs and lead as shown in Table 8.

Table 7: Emissions in the 2008 NEI v2 that are from the Toxics Release Inventory

Pollutant	tons from TRI Aug	Pollutant	tons from TRI Aug	Pollutant	tons from TRI Aug
Methanol	10,887	m-Xylene	11	Ethyl Carbamate	0.13
Carbonyl Sulfide	7,142	m-Cresol	8.6	Hexachlorobenzene	0.13
Hydrochloric Acid	5,332	Acrolein	7.8	2-Acetylaminofluorene	0.10
Styrene	2,877	Selenium	7.7	o-Toluidine	9.0E-02
Toluene	2,464	Phenanthrene	7.2	1,1,2,2-Tetrachloroethane	8.8E-02
Hexane	2,213	Cobalt	7.2	Pentachloronitrobenzene	8.0E-02
Xylenes (Mixed Isomers)	1,431	Diethanolamine	7.1	1,3-Propanesultone	7.0E-02
Formaldehyde	930	p-Cresol	6.0	Dimethyl Sulfate	6.7E-02
Acetaldehyde	896	Antimony	5.9	4-Dimethylaminoazobenzene	6.7E-02
Hydrogen Fluoride	623	Phthalic Anhydride	5.6	Hydrazine	6.1E-02
Phenol	598	Arsenic	5.1	Ethylene Dibromide	5.1E-02
Trichloroethylene	535	Aniline	5.0	Acrylamide	4.3E-02
Methyl Isobutyl Ketone	514	Acetophenone	4.8	2-Nitropropane	3.7E-02
Ethyl Benzene	309	Propionaldehyde	4.5	1,3-Dichloropropene	3.0E-02
Methylene Chloride	285	Mercury	4.3	Benzyl Chloride	2.8E-02
Benzene	271	Cadmium	4.2	Methoxychlor	2.4E-02
Manganese	268	Epichlorohydrin	3.7	1,4-Dichlorobenzene	2.3E-02
Cumene	200	p-Phenylenediamine	3.1	Asbestos	1.7E-02
Methyl Chloride	183	Dibutyl Phthalate	3.1	Hexachloroethane	1.6E-02
Carbon Disulfide	164	Bis(2-Ethylhexyl)Phthalate	2.6	2,4-Dinitrotoluene	1.2E-02
Ethylene Glycol	127	Phosphine	2.4	1,1-Dimethyl Hydrazine	1.2E-02
Cresol/Cresylic Acid (Mixed Isomers)	125	Ethylene Oxide	2.3	Dichloroethyl Ether	1.1E-02
Triethylamine	115	o-Cresol	2.2	1,2,3,4,5,6-Hexachlorocyclohexane	9.7E-03
Naphthalene	106	Benzo[g,h,i,]Perylene	2.2	Nitrobenzene	9.5E-03
Chlorine	96	Acrylic Acid	1.9	Pentachlorophenol	7.7E-03
Methyl Methacrylate	93	Allyl Chloride	1.9	Propoxur	7.7E-03
Tetrachloroethylene	77	Phosgene	1.6	Ethylidene Dichloride	7.0E-03
Vinyl Acetate	70	p-Dioxane	1.5	Toxaphene	7.0E-03
Nickel	53	Ethyl Chloride	1.2	2,4,6-Trichlorophenol	5.8E-03
Chromium III	53	o-Xylene	1.1	Quinoline	5.7E-03
1,3-Butadiene	47	Maleic Anhydride	1.1	Catechol	5.2E-03
Chloroform	45	Carbon Tetrachloride	1.0	Carbaryl	5.0E-03
Propylene Dichloride	43	1,1,2-Trichloroethane	0.99	Heptachlor	4.0E-03
Cyanide	37	Phosphorus	0.96	Toluene-2,4-Diamine	3.7E-03
Propylene Oxide	32	Ethyl Acrylate	0.84	Methyl Iodide	3.4E-03
PAH/POM - Unspecified	31	Dibenzofuran	0.70	Benzidine	3.3E-03
Chlorobenzene	29	2,4-Dichlorophenoxy Acetic Acid	0.65	Trifluralin	3.2E-03
Biphenyl	27	4,4'-Methylenedianiline	0.59	Hexachlorocyclopentadiene	2.5E-03
N,N-Dimethylformamide	22	Chlordane	0.54	2,4-Dinitrophenol	1.8E-03
Ethylene Dichloride	22	4,4'-Methylenebis(2-Chloraniline)	0.53	4-Nitrophenol	5.1E-04
Acrylonitrile	21	Vinyl Chloride	0.42	Dimethylcarbamoyl Chloride	5.1E-04

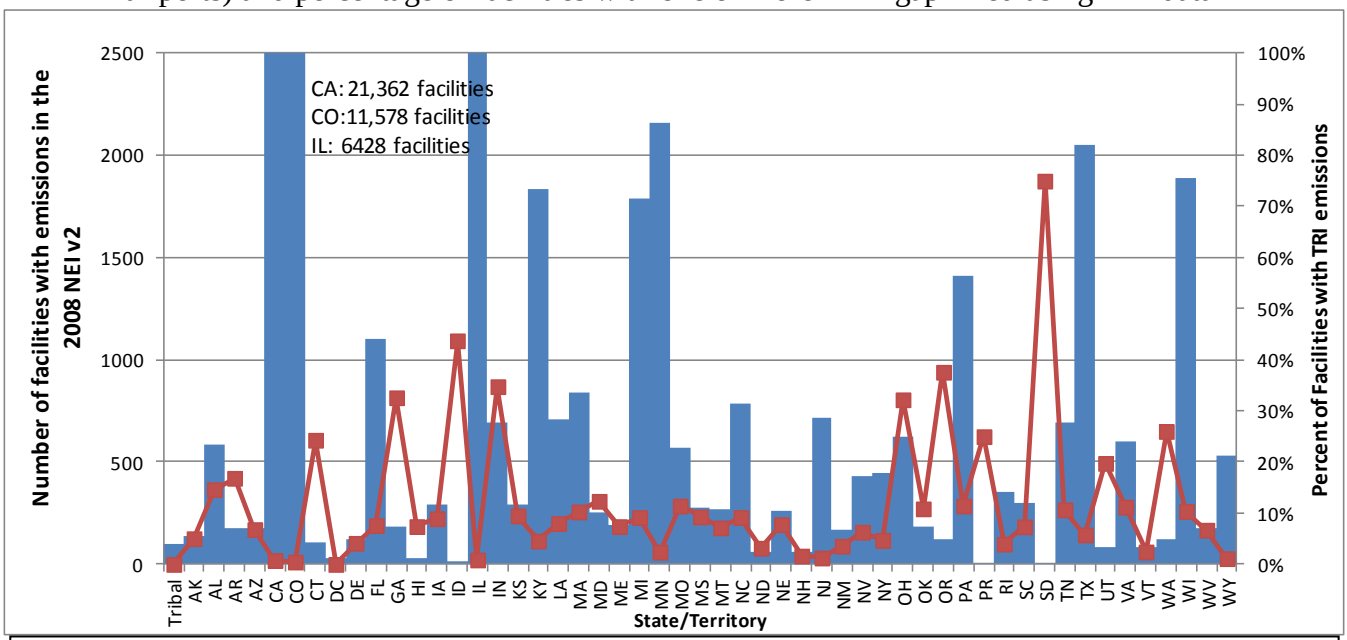
Pollutant	tons from TRI Aug	Pollutant	tons from TRI Aug	Pollutant	tons from TRI Aug
Dimethyl Phthalate	19	Captan	0.38	4,6-Dinitro-o-Cresol	5.0E-04
Lead	17	p-Xylene	0.38	4-Aminobiphenyl	5.0E-04
Methyl Bromide	17	Chloroacetic Acid	0.37	Chloroprene	5.0E-04
Methyl Chloroform	15	Vinylidene Chloride	0.34	PAH, total	3.6E-04
Titanium Tetrachloride	14	Beryllium	0.30	2,4,5-Trichlorophenol	1.3E-04
Methyl Tert-Butyl Ether	13	Hydroquinone	0.30	1,2-Dibromo-3-Chloropropane	7.5E-05
Acetonitrile	12	2,4-Toluene Diisocyanate	0.25	Hexachlorobutadiene	4.0E-05
Chromium (VI)	11	Polychlorinated Biphenyls	0.24	Benzotrichloride	1.5E-05
1,2,4-Trichlorobenzene	11	N,N-Dimethylaniline	0.22	3,3'-Dimethylbenzidine	5.0E-06
				Dichlorvos	3.5E-08

The dataset was designed so that it would not contain all of the TRI data, but only those TRI data needed for the purposes of gap filling missing data. Therefore, this dataset does not allow a comparison of TRI versus S/L/T data because if the pollutant was reported by the S/L/T it was not included in the TRI v2 dataset.

Not all TRI facilities were used because they were not all matched to EIS facilities; the facilities in the two databases use different identification codes, different facility names and sometimes different facility configurations such that two TRI facilities represents a single EIS facility and vice versa. Also, they were not all used due to the procedure we used to add TRI data to the NEI, which, for the automated approach discussed below, required CAPs to be reported by S/L/T for the EIS facilities.

Figure 5 shows the number of facilities in the 2008 NEI v2 by state and the percentage of the facilities that include emissions from TRI. The state with the highest TRI percentage is South Dakota, which did not report emissions in 2008. The source of South Dakota's 2008 NEI point data are the following EPA datasets: EPAAirports1109, EPA EGU v1.5, 2008EPA_MATS, and EPA TRI Augmentation v2 data resulting from the high risk and Hg review.

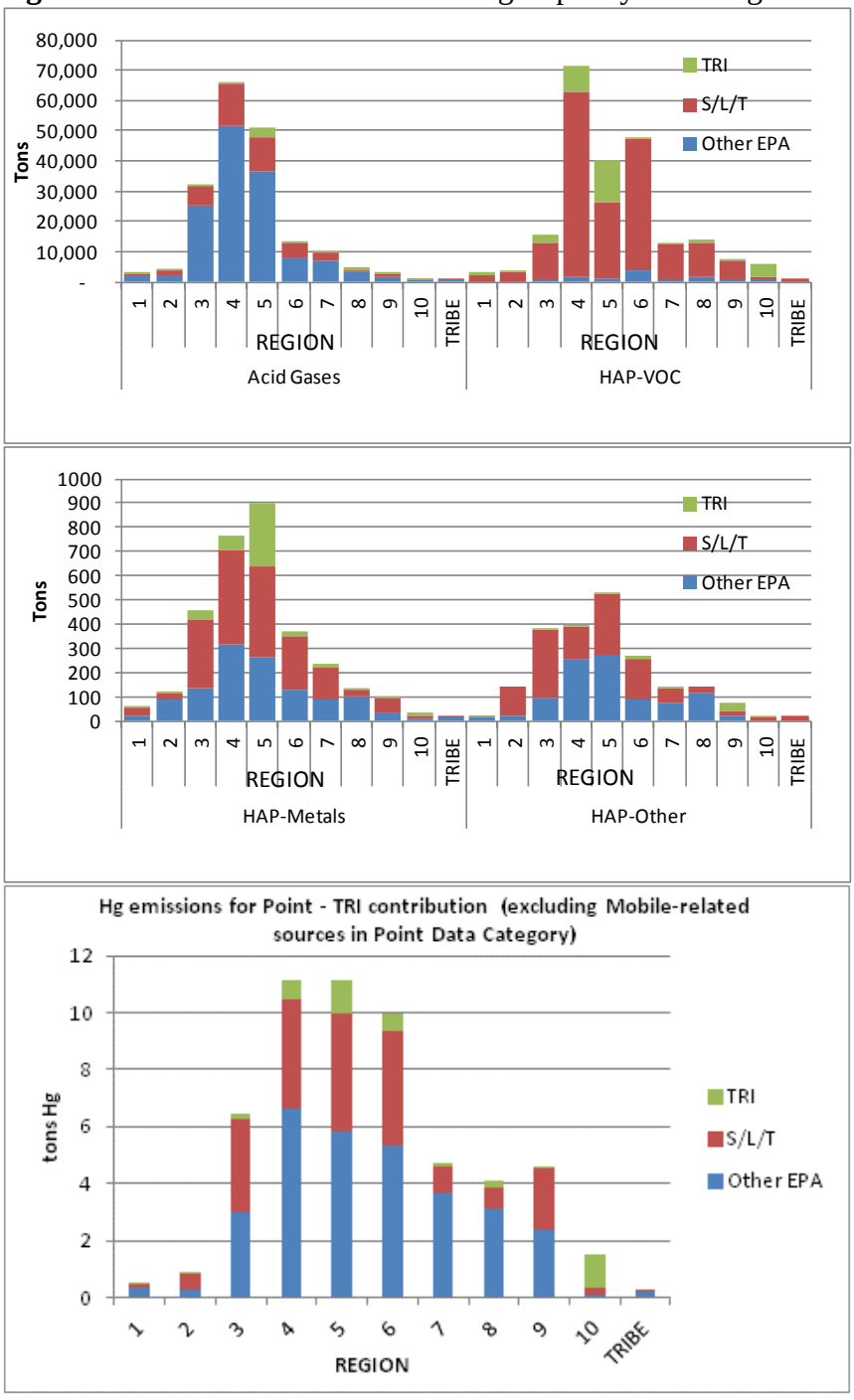
Figure 5. Number of facilities with emissions in the 2008 NEI v2 by state (excluding rail yards and airports) and percentage of facilities with one or more HAP gap filled using TRI data



CA, CO and IL have more facilities than the scale of the above chart; their numbers are shown in the chart. Some states have more facilities than others not only because they have more industry but also because they report more small facilities as point sources than other states. For example, California includes dry cleaners, and CO includes gas stations.

Figure 6 shows the amount of point data category emissions (excluding those associated with mobile sectors) used from TRI compared to S/L/T and other EPA gap filling datasets by EPA Region. In these figures, HAPs are grouped into acid gases, HAP-VOC, HAP-metals (excluding Hg), HAP-other (cyanide, phosphine, PCBs, and other) and HAP-Hg. As can be seen, TRI mass plays the largest role in the NEI for Region 5.

Figure 6. Use of TRI for certain HAP groups- by EPA Region



The amount of TRI emissions used in the NEI by state for each pollutant is shown in Table 8; 0.0 means less than 0.1 tons of pollutant was used. One interesting observation from the table that Ohio shows the use of TRI for gap filling a large number of HAPs, even though it is a state that reports HAPS to the NEI.

Table 8. TRI Emissions in the 2008 NEI v2, by State and Pollutant (tons)

	AK	AL	AR	AZ	CA	CO	CT	DE	FL	GA	HI	IA	ID	IL	IN	KS	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV	NY	OH	OK	OR	PA	PR	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
1,1,2,2-Tetrachloroethane			0.0																																0.0									0.1						
1,1,2-Trichloroethane			0.0																																1.0									0.0						
1,1-Dimethyl Hydrazine																																			0.0															
1,2,3,4,5,6-Hexachlorocyclohexane			0.0																										0.0						0.0									0.0						
1,2,4-Trichlorobenzene									10.8																										0.1								0.0	0.0						
1,2-Dibromo-3-Chloropropane																																			0.0															
1,3-Butadiene					0.1	0.0					0.3			0.3	2.7	0.1		4.0				23.0	1.6			0.4									12.8	0.1		0.0					0.0	1.0	0.5					0.1
1,3-Dichloropropene			0.0		0.0																														0.0									0.0						
1,3-Propanesultone																																			0.1															
1,4-Dichlorobenzene			0.0																																0.0									0.0						
2,4,5-Trichlorophenol																																			0.0															
2,4,6-Trichlorophenol																																			0.0															
2,4-Dichlorophenoxy Acetic Acid			0.4																					0.0										0.2									0.0						
2,4-Dinitrophenol															0.0										0.0																											
2,4-Dinitrotoluene																	0.0																		0.0											0.0					
2,4-Toluene Diisocyanate			0.0							0.1												0.0													0.1			0.0													
2-Acetylaminofluorene																																			0.1															
2-Nitropropane			0.0																																0.0									0.0						
3,3'-Dimethylbenzidine																																			0.0															
4,4'-Methylenebis(2-Chloraniline)																			0.5																																	
4,4'-Methylenedianiline					0.0													0.6																																	
4,6-Dinitro-o-Cresol															0.0																																				
4-Aminobiphenyl																		0.0																																		
4-Dimethylaminoazobenzene																																			0.1															
4-Nitrophenol																																			0.0															
Acetaldehyde		0.0	0.2		0.0					284			57.0		34.2		32.4			27.5		1.5		10.0		36.2									75.9		164						0.7		40.0		132			
Acetonitrile		0.1	1.5		0.1	0.3	1.0							0.4	4.3		0.0					1.1									1.1			0.0	0.1							0.1		1.1			0.5		
Acetophenone															2.7									0.3											1.8										0.0					
Acrolein		0.0			0.0											0.9																			0.1									0.1		6.6				
Acrylamide					0.0		0.0															0.0													0.0									0.0		0.0				
Acrylic Acid		0.0	0.0		0.0		0.3												0.0	0.0		0.0	0.1											0.0	0.0		0.0		0.0			0.0		1.4			0.1		
Acrylonitrile			0.2		0.0														0.0					0.0						0.0					20.1			0.0					0.0		0.8					
Allyl Chloride			0.0														0.4					1.4													0.0									0.0							
Aniline			0.0															3.3												0.0					1.7									0.0						
Antimony					0.0	0.0			0.0	0.0		0.0		0.1	0.3		0.2		0.1			0.1	0.0		0.5		0.3			0.2				0.0	0.0	1.4			0.6			0.1		0.1	0.1	0.1	0.0		1.5		
Arsenic	0.2				0.0	0.0			0.0			0.0	0.3	0.0	1.3					0.1				0.0		0.1	0.0						0.6		0.0			0.0				0.4		2.0					
Asbestos			0.0		0.0																																													
Benzene	5.6	0.2	2.3	3.4	0.8		0.5		1.9	11.6	5.2	18.7			56.8	0.3	0.1	17.0	13.2	0.5	0.2	2.7	7.7	0.5		13.0				0.0				0.0	68.1		0.4	2.4				0.1	0.5	17.4	1.4		1.1			17.6
Benzidine																																			0.0									0.0						
Benzo[g,h,i,]Perylene		0.0	0.0		0.0	0.0	0.3		0.0	0.0	0.0				0.2	0.0	0.0	0.0	0.3	0.0		0.0	0.0	0.0	0.0	0.3				0.0			0.0		0.0	0.5	0.0	0.0	0.0		0.0			0.0	0.0	0.0	0.1		0.0		0.4	0.0
Benzotrichloride																																			0.0															
Benzyl Chloride			0.0									0.0																							0.0									0.0						
Beryllium															0.2									0.1			0.1								0.0			0.0												
Biphenyl									1.4	21.0				0.0	0.3		0.0	0.1				0.3	0.0		0.0	0.2									0.9					1.8			0.4	0.1	0.2					
Bis(2-Ethylhexyl)Phthalate		0.7			0.2		0.0								0.0				0.0			0.1					0.0		0.0						0.0			0.2					0.0		1.5			0.0		
Cadmium			0.0	0.0	0.0				0.0				3.8		0.1												0.0		0.0				0.0		0.0	0.0		0.1				0.0	0.1						
Captan			0.4																										0.0																				
Carbaryl																																												0.0						
Carbon Disulfide	0.4		0.1		2.1					0.0				13.0	1.7		0.4	0.1				0.0	0.1			0.0									144	0.0							0.0	0.1	0.1	0.0		1.3			0.1

Continued: TRI Emissions in the 2008 NEI v2, by State and Pollutant (tons)

	AK	AL	AR	AZ	CA	CO	CT	DE	FL	GA	HI	IA	ID	IL	IN	KS	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV	NY	OH	OK	OR	PA	PR	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
Carbon Tetrachloride		0.0	0.8																										0.0						0.1										0.0		0.0					
Carbonyl Sulfide	0.1	21.9			2.2					12.2			2.8	4.6	617					864			0.8			0.1									4083	0.0		0.0					1120	0.8	0.1	0.0		404	0.4		3.2
Catechol			0.0							0.0																																				0.0					
Chlordane			0.5																										0.0						0.0		0.0							0.0					
Chlorine		0.7	2.3	0.3	0.0		0.2	0.5	14.4	14.6			0.5	0.6	15.8	0.1	0.3	0.1		0.1	0.1	3.3	2.9	1.4					0.6				0.0	0.8	11.5	0.2	3.0	0.0		0.1	1.4		0.0	5.3	7.2	0.5		0.9	5.6	0.1	
Chloroacetic Acid		0.1	0.0																					0.0																			0.0			0.2					
Chlorobenzene			0.4		0.1										0.0			0.0		1.0									0.0					0.0	26.4								0.3						0.9		
Chloroform		0.0	3.1							15.8							0.8					0.4												0.0	7.9								0.2		0.0		17.1			
Chloroprene																																												0.0							
Chromium (VI)		0.2	0.9	0.1	0.0	0.0	0.0		0.0	0.1		0.1	0.0	0.1	1.3	0.1	1.8	0.0	0.0	0.0		0.2	0.0	0.5	0.2	0.0	0.1		0.1		0.0		0.0	0.0	0.8	0.0	0.0	2.5			0.0	0.0	0.2	0.8	0.1	0.0		0.0	0.5		0.0
Chromium III		1.8	1.9	0.2	0.1	0.0	0.1		0.2	0.1		0.2	0.1	0.1	10.5	0.2	9.7	0.0	0.3	0.1		2.4	0.0	1.2	0.6	0.0	0.2		0.3		0.0		0.1	0.1	10.2	0.1	0.1	4.9			0.1	0.0	0.6	2.1	0.2	0.1		0.0	3.3		0.2
Cobalt		0.5	0.0	0.1	0.1	0.1	0.1					0.1		0.0	1.5	0.1	0.0	0.3	0.0	0.0		1.4	0.0		0.1	0.2	0.8		0.0				0.0	0.1	0.3	0.0		0.3			0.1		0.6	0.1		0.0		0.0	0.0		
Cresol/Cresylic Acid (Mixed Isomers)		3.5	15.9						19.0	28.4			3.0	0.0	2.8	4.9	0.0			11.7		14.1	0.0	0.0	0.0				0.0						2.2	0.6	11.9	0.1					0.0	0.0		6.0		0.5			0.1
Cumene	0.1	0.0	0.7		0.3	0.1			0.0	0.0				0.1	127				0.0	0.0	0.0	4.7	0.5	0.0		0.4	0.0					0.0		0.8	64.0			0.2					0.0	0.4	0.0	0.0					0.3
Cyanide		2.1	0.0		0.4		0.0							0.5	1.3		0.1							0.0									30.3		0.7	0.3		0.3						0.6		0.2		0.1	0.1		
Dibenzofuran														0.1	0.4								0.0												0.2									0.0							
Dibutyl Phthalate			0.0																										0.0						1.8	0.0	1.1						0.1		0.0					
Dichloroethyl Ether																		0.0																	0.0									0.0							
Dichlorvos			0.0																																																
Diethanolamine			0.0		0.1					0.3				0.5	0.1		0.0	0.0				3.7				0.9									0.0	0.0		0.1					0.0	0.1				1.3		0.0	
Dimethyl Phthalate			0.0		7.4					1.1					7.4					0.0										0.4				0.0		0.3	2.3					0.0							
Dimethyl Sulfate																																		0.0	0.0													0.1		
Dimethylcarbamoyl Chloride																																			0.0														
Epichlorohydrin		0.0	0.3																1.9			0.1												0.0			0.0						1.4							
Ethyl Acrylate			0.0																0.0			0.0	0.3											0.2			0.2			0.0			0.0		0.1					
Ethyl Benzene	1.0		0.2		4.4	0.6	0.4		4.2	19.6	1.3	0.0			83.6	0.2	1.2	1.3	13.7	5.9	0.2	61.9	24.0	2.7		8.2				0.2	0.0	1.0	0.3	0.2	46.1		0.2	4.7			0.4		6.1	0.5	1.6	2.6		0.7	4.2		5.0
Ethyl Carbamate			0.0		0.0										0.0														0.0						0.1														
Ethyl Chloride																		0.0				1.1												0.0	0.0															
Ethylene Dibromide																							0.0												0.0															
Ethylene Dichloride			0.3													0.1																			0.1			20.4			0.6								
Ethylene Glycol		4.1	1.1		2.8	0.5	0.0		2.0	0.0		0.0		0.5	19.1		3.0	0.4	0.4	0.2	0.8	5.3	3.6	0.8		0.6	4.9		0.2				0.0	0.5	22.9		0.1	42.1			0.0		5.5	3.2		0.3			1.2		
Ethylene Oxide												0.0																							0.2			0.4			1.3		0.2	0.1		0.0			0.0		
Ethylidene Dichloride																		0.0																	0.0									0.0							
Formaldehyde			6.4		20.3	0.0	5.7		0.0	282			9.1		46.4	0.4	16.3	1.5	3.0	3.9		1.9		9.5		221			30.1					0.1	45.0		163	0.0					0.8		14.3		39.6				
Heptachlor																																			0.0		0.0							0.0							
Hexachlorobenzene			0.0																																0.0								0.1	0.0						
Hexachlorobutadiene																																			0.0															
Hexachlorocyclopentadiene																																			0.0									0.0						
Hexachloroethane			0.0		0.0										0.0							0.0													0.0									0.0							
Hexane	5.9	0.3	5.8	64.1	57.3	14.1	0.5	0.2	44.2	16.8	26.5	145			865	0.3	0.6	11.4	16.8	2.6	0.8	53.6	22.4	4.1		35.6	0.0		5.8		0.2		0.3	0.0	566		1.2	0.5		0.1			19.1	0.9	42.0	144		4.6	1.3		32.9
Hydrazine		0.0																	0.0					0.0											0.0									0.0							
Hydrochloric Acid		116			5.1		1.1		16.8	589			39.0		899		0.0	3.8	99.9	200	29.7	30.7	15.9			29.1			9.3					50.0	1740	0.0	131		66		0.0		0.0		88.5			779	22.5		360	0.3		
Hydrogen Fluoride					0.5	33.8	0.1		0.0	0.0			31.9	1.1	165		0.2	2.1	2.7	31.0	1.1	0.3	0.3	0.4		12.3								1.2	197		1.1	0.4			0.0		98.3	26.2	3.8			0.0	0.1		11.6
Hydroquinone		0.0	0.0												0.0																			0.2									0.0					0.0		
Lead	0.2	0.6	0.2	0.4	0.1	0.1	0.0		0.2	0.3			0.0	0.1	0.0	0.1	0.2	0.7	0.2	0.2		0.1	0.1	1.0	0.1	0.3	2.7	0.0	0.0			0.0	0.6		1.2	0.3	0.4	0.7	0.0	0.0	0.0	0.0	0.1	0.8		0.9	0.0	0.6	3.1	0.0	0.1
Maleic Anhydride		0.1	0.0		0.0	0.0									0.2				0.2	0.0	0.3	0.0	0.0						0.0						0.0	0.1							0.0	0.0		0.1					
Manganese	0.0	9.7	4.2	0.5	1.0	0.2		0.1	2.0	2.2		1.1	0.0	0.1	37.4	0.5	9.5	1.2	0.1	0.4		1.3	0.9	1.4	0.8	0.2	3.4		5.3				0.0	4.9	0.1	149	0.0	2.9	13.4			0.9	0.4	3.9	2.4	0.5	2.6		0.9	0.5	0.0	0.0
m-Cresol														0.0	7.8																			0.0	0.7						0.1								

Continued: TRI Emissions in the 2008 NEI v2, by State and Pollutant (tons)

	AK	AL	AR	AZ	CA	CO	CT	DE	FL	GA	HI	IA	ID	IL	IN	KS	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV	NY	OH	OK	OR	PA	PR	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
Mercury	0.0	0.1	0.0	0.0	0.0	0.0	0.0		0.2	0.2	0.0	0.0	0.3	0.1	0.4	0.0	0.1	0.5	0.0	0.0		0.1		0.1	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.7	0.1	0.8	0.1	0.0	0.0		0.0	0.1	0.0	0.1	0.1		0.1	0.0	0.0	0.0
Methanol	0.1	0.1	21.8	4.2	85.1	2.7	22.8	0.0	3.5	3091	0.3	0.0	282	141	172	0.2	525	30.8	40.6	196	56.7	259	84.7	75.6		584			34.3		1.0	0.4	0.7	11.7	775		1789	9.9			708		0.9	0.3	0.0	966		882	10.3	7.5	2.6
Methoxychlor			0.0											0.0																				0.0		0.0							0.0							
Methyl Bromide			5.8		6.0																			4.4										0.0						0.3									
Methyl Chloride			0.0							13.2							14.3			17.8		0.2			6.2									98.8						30.9			0.0		2.0			0.2		
Methyl Chloroform															0.1																			0.0	0.9								0.0	13.7	0.0					
Methyl Iodide																																			0.0						0.0									
Methyl Isobutyl Ketone		1.6	0.7		3.3	0.2	0.4		1.1	253		0.0			31.8		0.3	0.2	9.0	1.0		70.1	10.5	0.1								0.0			2.5	29.7		52.0	4.4					22.0		1.2	7.1		8.3	3.2		
Methyl Methacrylate			0.0		5.3	8.2	7.5		0.3	9.3					17.6				1.1	1.3		16.7	0.7	0.0											0.0	12.1			0.2					9.1	0.0		0.5		0.0	2.7		
Methyl Tert-Butyl Ether	0.1	0.9	2.6							0.3					0.1		0.1		3.6			3.1										0.4			0.0	0.3			0.1		0.1			0.0					1.6		
Methylene Chloride					0.6		48.1		4.1						132		0.4		7.9	21.4		0.1	0.3			9.4									13.6	37.5			1.3					0.1		8.6		0.4		
m-Xylene										10.2																									0.0								0.5		0.1					
N,N-Dimethylaniline		0.2																																																	
N,N-Dimethylformamide		0.0	0.1		1.8	0.3									0.1		0.1		6.9				0.0	0.0								0.0			0.0	0.1					0.0			10.2		2.4			0.3		
Naphthalene	0.4	2.0	0.1	0.4	0.7	0.3	0.0		0.2	0.0	1.1	5.0		0.0	49.5	0.0	1.6	4.6	0.7	3.3	0.1	0.0	2.3	0.4		4.6			0.0				0.3	0.0	18.5		0.7	2.2		0.1	0.1		0.0	1.3	0.5	2.4		0.8	0.7		0.8
Nickel		2.2	1.9	0.3	0.3	0.5	0.3	0.0	0.5	0.1		0.6	0.4	0.2	14.3	0.4	3.1	0.7	0.3	0.2		3.9	1.5	1.0	0.6	0.3	0.2		0.1				0.2	0.1	5.4	0.1	0.3	9.9		0.1	0.1	0.0	1.1	1.2	0.1	0.1		0.1	0.1		0.1
Nitrobenzene			0.0																										0.0					0.0	0.0			0.0						0.0						
o-Cresol									2.2					0.0																						0.0									0.0				0.0		
o-Toluidine																																			0.0									0.1						
o-Xylene																			0.3								0.0																		0.8						
PAH, total															0.0																																		0.0			
PAH/POM - Unspecified	0.0	0.8	1.0	0.1	0.0	0.1	0.0		1.1	0.3	0.0	0.0	0.1	0.0	4.1	0.3	2.8	0.4	3.2	0.2	0.0	0.1	0.6	0.1	0.4	3.6		0.0	0.0			0.0		0.1	2.4	0.3	0.3	0.4		0.0			0.2	0.7	0.0	5.0		0.3	0.0	1.8	0.0
p-Cresol														0.0	5.9																				0.0	0.0						0.1			0.0					
p-Dioxane									0.2													0.0														0.1			1.1											0.1		
Pentachloronitrobenzene					0.1																																														
Pentachlorophenol																													0.0						0.0		0.0							0.0						
Phenanthrene		0.3	0.0		0.0										3.6		0.0						0.0			0.6									0.0	0.6	1.0		0.4						0.3	0.1	0.0				0.0	0.1
Phenol		0.6	13.5		33.8				13.0	53.4		6.8	0.6	0.2	148		14.0		5.5	9.4	0.0	9.2	0.3	0.0		3.0			0.0						0.1	144	0.6	65.4	1.7			4.9			0.1	0.6	7.6		57.1	4.5		0.3
Phosgene		0.0																																												1.6					
Phosphine													2.4																																							
Phosphorus													0.6	0.0	0.0			0.0																	0.1								0.2						0.0		
Phthalic Anhydride		0.0	0.0		0.1			0.0							2.0				0.1	2.5	0.3	0.2					0.0		0.0						0.0			0.1					0.2	0.0							
Polychlorinated Biphenyls					0.0										0.0										0.0												0.0						0.0	0.2							
p-Phenylenediamine															2.8			0.3																	0.0																
Propionaldehyde			3.8												0.3																														0.4						
Propoxur			0.0																																0.0									0.0						
Propylene Dichloride																																		0.1	0.0									0.0		42.7				
Propylene Oxide					6.6							0.0			22.4																				0.0						3.3			0.1		0.0				
p-Xylene																																												0.0	0.4						
Quinoline																																			0.0															
Selenium			0.0		0.0								3.6		3.8								0.0											0.1										0.1						
Styrene		0.0	0.0		267	0.1	0.0		20.4	293		14.5		0.0	1358		0.0	0.6	3.2	111		211	25.6	0.4		0.0			0.0					0.1	219		47.7	4.1		0.0	78.2		150	0.6		8.0		28.8	1.8		6.8
Tetrachloroethylene					0.3		28.0		8.6		0.0			0.3	14.3	0.3	0.6	2.4	4.5			0.1	4.3			0.7							0.0		0.0	9.6	0.4		2.0					0.0	0.7	0.1	0.0		0.1	0.0		
Titanium Tetrachloride										3.5							0.0	0.7		0.0		0.0											2.0		0.0								0.5	7.7						
Toluene	5.9	3.0	9.2	22.6	21.8	9.1	4.1		29.8	408	6.7	0.5		1.7	725	0.5	0.0	10.2	150	13.5	1.7	125	23.7	0.8		32.6						1.2		195	8.8	235		40.2	11.9		0.2	16.1		115	1.0	43.0	92.6		51.0	18.7		28.6
Toluene-2,4-Diamine																																												0.0						
Toxaphene			0.0											0.0																					0.0		0.0							0.0						
Trichloroethylene		12.9	0.5			5.6	37.8			1.4					210			6.5	14.8	37.3			5.0	0.7					0.0				0.3	0.0	57.2		54.9	31.0					0.3	0.1		46.6			0.4	11.0	
Triethylamine			1.1				2.4		0.1	0.0					59.0	0.0	0.2	0.0	1.4				0.0												0.8		25.5	0.1						0.0		22.9			0.5		
Trifluralin																								0.0																				0.0							
Vinyl Acetate			0.6		2.1										31.6				5.8	2.3		4.8							0.0						2.5			0.0						0.0		9.7			9.9		
Vinyl Chloride			0.1																																0.1									0.3						
Vinylidene Chloride																																			0.3															
Xylenes (Mixed Isomers)	4.3	0.5	9.1		60.7	14.2	1.8		42.8	82.0	9.4	0.0			416	0.5	0.0	8.6	70.3	16.3	0.8	125	84.4	14.4		34.1						0.1		1.1	14.6	183	0.1	55.1	6.7		2.0	15.2		31.8	0.3	16.0	61.3		10.7	16.7	0.0	21.4

EPA HAP Augmentation v2

EPA developed this dataset by computing HAP emissions based on applying ratios of HAP to CAP to S/L/T reported CAP emissions at the process level by SCC code. Ratios were developed from EFs in Webfire[4] (http://cfpub.epa.gov/webfire/). In particular, we used the "All webfire Factors" comma separated values downloaded from the "Download WebFIRE Data" section of the website. Webfire is being modified to include factors generated from test report data submitted to EPA from the Electronic Reporting Tool (ERT), but it does not yet include the ERT data.

The CAP "surrogates" used for the denominator of the HAP-to-CAP ratio were: PM10-FIL, VOC and SO2; each HAP was assigned to one of these 3 CAPs (the 2008 NEI TSD shows the assignments). About 2400 ratios were developed for nearly 400 unique SCCs covering 116 different HAPs. In order for any of the webfire data to be used, there had to be both a HAP and a matching surrogate CAP EF in the same units (or units that could be readily converted to the same) and both HAP and CAP EFs had to be uncontrolled. Also, whenever the calculation resulted in HAP to VOC ratios for the same SCC that summed to more than 1, we renormalized the ratios (to sum to 1) so as not to create more HAP VOC than VOC.

There are many limitations in this approach: HAPs and CAPs EFs may not have been consistent. For example, pollutants may not have been tested at the same time nor for the same sources nor operating conditions. The approach also depends upon S/L/T using accurate SCCs. If there is an incorrect value for the CAP used in the calculations, it could result in an incorrect value for the augmented HAP. Because of these limitations, we positioned this dataset low on the hierarchy. In addition, to prevent potential outliers, we computed the maximum emissions from each combination of source classification code (SCC) and pollutant S/L/T data. If any HAP augmented value exceeded the maximum, or if the SCC-pollutant combination produced by the HAP augmentation routine was not present in the S/L/T data (across all states), we removed it from the dataset.

To ensure this dataset would not result in double counted emissions, we removed facility-pollutant combinations produced from the ratio approach if the facility-pollutant was reported in any of the other datasets higher in the hierarchy with one exception. This exception is that we did not remove any Hg from any boiler or process heater SCC with a fuel of biomass, oil or coal. Although HAP aug added only 0.28 tons Hg, it was a logical step toward ensuring all biomass, oil and coal-fired boilers with criteria air pollutants also would include Hg (note that we estimated that HAP augmentation missed up to 0.5 tons of Hg due to missing PM10-FIL, the CAP surrogate, from these boilers).

About 8,500 tons of HAP in the 2008 NEI v2 are from the HAP Augmentation dataset. Formaldehyde is the largest contributor to the total, as shown Table 9. More than 70% of this augmented formaldehyde augmentation comes from the combustion of natural gas in internal combustion engines (SCCs 20200252, 20200253 and 20200254). The facility types with the most augmented formaldehyde are pipeline compressor stations and oil and natural gas fields (onshore).

Table 9. Emissions from the HAP Augmentation Dataset in the 2008 NEI v2

Pollutant	tons 2008 HAP aug	Pollutant	tons 2008 HAP aug	Pollutant	tons 2008 HAP aug	Pollutant	tons 2008 HAP aug
Formaldehyde	2108.5	Propionaldehyde	9.6	Methyl Bromide	1.7	Fluoranthene	9.25E-02
Acrolein	1195.3	Nickel	8.0	2-Methylnaphthalene	1.6	Benzo[a]Pyrene	7.50E-02
Acetaldehyde	1135.9	Carbon Tetrachloride	7.3	Chromium (VI)	1.5	Chrysene	7.40E-02
Hexane	836.2	Propylene Dichloride	7.0	PAH, total	1.5	Acetophenone	4.13E-02
Hydrochloric Acid	755.1	Chloroform	6.6	Ethyl Chloride	1.4	2,4-Dinitrophenol	2.61E-02
Methanol	670.5	Phosphorus	6.5	Acetonitrile	1.3	Cumene	2.29E-02
Benzene	441.4	Ethylene Dichloride	6.5	Acrylonitrile	0.94	4-Nitrophenol	1.48E-02
Toluene	275.6	1,1,2,2-Tetrachloroethane	6.3	PAH/POM - Unspecified	0.88	Benzo[b]Fluoranthene	1.07E-02
1,3-Butadiene	165.7	Selenium	6.2	Phenanthrene	0.78	Benzo[g,h,i,]Perylene	9.02E-03
Hydrogen Fluoride	155.0	Chlorobenzene	6.1	Acenaphthylene	0.38	4,4'-Methylenediphenyl Diisocyanate	8.14E-03
Styrene	122.7	Arsenic	5.9	Fluorene	0.38	Pentachlorophenol	5.32E-03
Xylenes (Mixed Isomers)	99.3	Vinyl Chloride	5.6	Beryllium	0.35	Benzo[e]Pyrene	3.23E-03
2,2,4-Trimethylpentane	84.9	Methyl Chloroform	5.0	Mercury	0.32	Indeno[1,2,3-c,d]Pyrene	3.02E-03
Methylene Chloride	53.8	Methyl Chloride	4.8	Cobalt	0.29	Isophorone	1.92E-03
Trichloroethylene	46.0	Ethylene Dibromide	4.8	Dibutyl Phthalate	0.25	Vinylidene Chloride	1.77E-03
Ethyl Benzene	42.3	1,1,2-Trichloroethane	4.2	Antimony	0.25	Polychlorinated Biphenyls	1.65E-03
Tetrachloroethylene	37.1	Bis(2-Ethylhexyl)Phthalate	3.8	Methyl Iodide	0.22	Benzo[k]Fluoranthene	1.28E-03
Chlorine	33.3	1,3-Dichloropropene	3.2	Benz[a]Anthracene	0.18	Dibenzo[a,h]Anthracene	2.63E-04
Phenol	32.8	Lead	3.2	Pyrene	0.18	Hydroquinone	2.41E-04
Naphthalene	28.3	Methyl Isobutyl Ketone	3.2	1,4-Dichlorobenzene	0.18	Perylene	2.18E-04
Biphenyl	20.1	Ethylidene Dichloride	3.0	Anthracene	0.12	2-Chloronaphthalene	6.72E-05
Manganese	19.9	o-Xylene	2.4	Acenaphthene	0.12	Dibenzofuran	2.31E-05
Chromium III	18.3	Cadmium	2.2	Carbon Disulfide	0.12	Phosgene	2.61E-06

Table 10 and Table 11 show the amount of HAP added from this dataset by State and tribes, respectively. A value of 0.0 means less then 0.1 tons in Table 10, and a value of 0.00 means leas than 0.01 in Table 11.

Table 10. Emissions (tons) from the HAP Augmentation Dataset in the 2008 NEI v2 by State and Pollutant or Pollutant Group

Pollutant	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV	NY	OH	OK	OR	PA	RI	SC	TN	TX	UT	VA	VT	WA	WI	WV	WY
1,1,2,2-Tetrachloroethane	0.0	0.0	0.0	0.1	0.0	0.3			0.0	0.1	0.3		0.1	0.0	0.0	0.2	0.5	0.1	0.3	0.0	0.0				0.1	0.1	0.0	0.1	0.0	0.0		0.0	0.3			0.1	0.7		0.1		0.0	0.0	1.9	0.0	0.2			0.0	0.1	0.2
1,1,2-Trichloroethane	0.0	0.0	0.0	0.0	0.0	0.2				0.0	0.3		0.1	0.0	0.0	0.2	0.4	0.1	0.2	0.0	0.0				0.1	0.1		0.1		0.0		0.0	0.2			0.0	0.5		0.1		0.0	0.0	1.1	0.0	0.2				0.1	0.0
1,3-Butadiene	1.1	1.2	0.7	0.7	0.2	19			0.0	1.1	4.0		0.0	0.1		2.7	9.1	1.5	6.2	0.0	0.2	0.0		0.0	1.6	1.0	3.1	1.2	0.1	1.4		0.2	12			0.8	20	0.0	1.2		0.0	0.2	56	0.2	3.5			0.0	1.9	11
1,3-Dichloropropene	0.0	0.0	0.0	0.0	0.0	0.1				0.0	0.1		0.1	0.0	0.0	0.1	0.3	0.0	0.2	0.0	0.0				0.1	0.1		0.1		0.0		0.0	0.2			0.0	0.4		0.0			0.0	0.9	0.0	0.2				0.1	0.0
1,4-Dichlorobenzene		0.0	0.0		0.0	0.0	0.0			0.0	0.0		0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		0.0				0.0	0.0		0.0				0.0	0.0	0.0		0.0			
2,2,4-Trimethylpentane	0.3	0.3	0.2	0.1	0.2	7.3			0.0	1.1	4.1			0.1	0.1	2.5	6.8	0.9	3.6	0.0	0.2	0.0		0.0	1.1	0.3	0.2	1.2		0.6		0.2	7.6	0.0		0.8	11	0.0	1.2		0.0	0.2	23	0.0	3.1				1.8	3.6
2,4-Dinitrophenol		0.0	0.0		0.0	0.0				0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
4,4'-Methylenediphenyl Diisocyanate											0.0																																0.0								
4-Nitrophenol		0.0	0.0		0.0	0.0				0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Acetaldehyde	15	12	0.7	0.1	7.4	42	0.7		0.2	8.5	46	0.0	0.0	0.6	0.0	27	34	11	63	0.3	1.8			0.1	11	2.4	31	0.0	1.4	2.3	0.1	1.5	89	0.0		8.0	151	7.5	2.8	0.0		1.7	325	2.0	32	0.3	1.3	0.0	17	171
Acetonitrile										0.0	0.2									0.1	0.0			0.0								0.0			0.1	0.8			0.0										
Acetophenone		0.0	0.0		0.0	0.0				0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Acrolein	7.4	29	0.7	0.1	15	47	0.1		0.1	8.1	86	0.0	0.0	0.7	0.0	26	29	14	60	0.2	2.3			0.5	12	2.0	42	0.0	0.7	2.9	0.3	0.1	119	0.0		9.5	128	22	4.9	0.0	0.9	6.1	306	0.9	39	1.5	16	4.7	18	125
Acrylonitrile										0.0	0.2									0.1	0.0			0.0								0.0				0.5														
Antimony		0.0	0.0		0.0	0.0	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Arsenic	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.1	0.0	0.1	0.0	0.5	0.0	0.2	0.1	0.0	0.0		0.0	0.0	0.5	0.0	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.8	0.2	0.0	0.3	0.0		0.2	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Benzene	4.6	13	5.2	1.0	14	13	0.3	0.0	0.0	13	68	2.3	0.1	0.2	0.0	8.2	9.4	10	16	0.3	1.2			0.5	4.5	1.2	28	0.0	1.0	5.8	0.3	0.1	8.5	0.2		5.5	15	23	4.9	0.0	1.0	5.6	64	1.2	16	1.6	18	0.0	3.7	45
Beryllium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Biphenyl	0.0	0.1	0.0	0.0	0.0	3.3			0.0	0.2	0.0		0.0	0.0	0.0	0.1	1.3	0.0	0.5	0.0	0.0	0.0		0.0	0.0	0.0	0.2	0.0		0.0		0.0	2.8			0.0	1.7	0.0	0.2		0.0	0.0	6.9	0.0	0.0				0.1	2.4
Bis(2-Ethylhexyl)Phthalate		0.5	0.1		0.0	0.1	0.0			0.0	0.0		0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.3	0.0	0.0	0.3	0.1	0.0	0.0		0.0	0.0	0.8	0.0	0.0	0.0		0.0	0.0	0.7	0.1	0.2	0.0	0.0	0.0	0.0	
Cadmium	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.3	0.1	0.1		0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Carbon Disulfide		0.0	0.0		0.0	0.0	0.0			0.0			0.0		0.0	0.0	0.0	0.0			0.0	0.0			0.0	0.0		0.0	0.0	0.0		0.0		0.0		0.0	0.0		0.0			0.0	0.0	0.0	0.0		0.0			
Carbon Tetrachloride	0.0	0.5	0.2	0.0	0.2	0.2				0.2	0.6		0.1	0.0	0.0	0.1	0.4	0.1	0.3	0.0	0.0	0.1		0.0	0.1	0.3	0.2	0.1		0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.4	0.2	0.1		0.0	0.1	1.3	0.0	0.3	0.0	0.2	0.1	0.1	0.0
Chlorine		3.5	2.3		1.6	0.0	0.0			0.7	4.1		0.0		0.1	0.1	0.1	0.7	1.6	0.0	0.0	0.4		0.1	0.6	1.6	1.2	0.2		0.1	0.1	0.0		0.0		0.4	1.1	5.3	0.3			0.2	1.5	0.0	1.7	0.1	3.1	0.1		
Chlorobenzene	0.0	0.3	0.3	0.0	0.2	0.1				0.2	0.6		0.1	0.0	0.0	0.1	0.3	0.1	0.2	0.0	0.0	0.1		0.0	0.1	0.3	0.1	0.1		0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.4	0.2	0.1		0.0	0.1	1.0	0.0	0.3	0.0	0.2	0.1	0.1	0.0
Chloroform	0.0	0.3	0.2	0.0	0.1	0.2				0.1	0.9		0.1	0.0	0.0	0.1	0.4	0.1	0.2	0.0	0.0	0.0		0.0	0.1	0.5	0.1	0.1		0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.5	0.2	0.1		0.0	0.1	1.0	0.0	0.2	0.0	0.2	0.0	0.1	0.0
Chromium (VI)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Chromium III	0.0	0.3	0.4	0.0	0.1	0.1	0.0	0.0		0.6	1.4	0.0	0.0	0.1	0.0	1.0	0.0	0.1	0.3	0.1	0.1		0.0	0.0	0.7	0.0	0.0	0.2	0.2	0.3	0.0	0.0	0.0	0.0	0.0	9.9	0.0	0.0	0.3	0.0	0.0	0.5	0.2	0.0	0.6	0.0	0.1	0.3	0.0	0.1
Cobalt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cumene		0.0			0.0	0.0				0.0						0.0									0.0			0.0				0.0		0.0		0.0			0.0			0.0	0.0							
Dibenzofuran													0.0			0.0																											0.0								
Dibutyl Phthalate		0.0	0.0		0.0	0.0	0.0						0.0				0.0	0.0		0.0	0.0	0.0			0.0	0.0		0.0	0.0	0.0				0.0			0.0			0.0				0.0	0.0	0.0		0.0		0.0	
Ethyl Benzene	4.6	0.8	0.5	0.3	2.8	2.9	0.5		0.0	0.9	1.2		0.0	0.0	0.0	0.7	1.5	1.1	1.5	0.2	0.1	0.2		0.0	0.2	0.8	0.7	0.2	0.7	0.1	0.1	0.7	2.5	0.0	0.0	0.5	1.6	0.2	0.6	0.0	0.0	0.2	5.8	0.9	0.7		0.4	0.1	0.3	4.1
Ethyl Chloride	0.0	0.1	0.0	0.0	0.0	0.1	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.1	0.0	0.1	0.1	0.0		0.0	0.0	0.0		0.2	0.0	0.0	0.0		0.0	0.0	0.3	0.0	0.1		0.0	0.0	0.0	0.0
Ethylene Dibromide	0.0	0.0	0.0	0.1	0.0	0.2				0.0	0.1		0.1	0.0	0.0	0.2	0.5	0.1	0.2	0.0	0.0	0.0	0.0		0.1	0.1		0.1		0.1		0.0	0.2			0.1	0.5		0.1		0.0	0.0	1.4	0.0	0.2			0.0	0.1	0.1
Ethylene Dichloride	0.0	0.4	0.3	0.0	0.1	0.3				0.2	0.6		0.1	0.0	0.0	0.1	0.3	0.1	0.2	0.0	0.0	0.2		0.0	0.1	0.4	0.1	0.1		0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.4	0.3	0.1		0.0	0.1	1.0	0.0	0.3	0.0	0.2	0.0	0.1	0.0
Ethylidene Dichloride	0.0	0.0	0.0	0.0	0.0	0.1				0.0	0.1		0.1	0.0	0.0	0.1	0.3	0.0	0.1	0.0	0.0				0.1	0.1		0.0		0.0		0.0	0.2			0.0	0.4		0.1		0.0	0.0	0.8	0.0	0.1				0.1	0.0
Formaldehyde	154	13	0.2	0.6	64	47	13	0.3	1.4	8.0	318	0.1	0.4	4.6	0.7	196	18	29	407	6.2	13			0.8	81	0.7	220	0.0	13	1.9	0.3	5.0	2.0	1.9		65	0.2	42	8.2	0.0		6.9	201	13	22	1.1	14	0.4	0.2	97
Hexane	3.4	11	6.1	3.2	63	49	6.0	6.7	3.5	18	25		1.4	2.4	0.0	54	6.6	21	201	21	15	2.5		6.8	25	6.9	3.0	1.9	0.0	3.2	0.9	21	13	13	0.0	39	10	14	7.1	0.4	0.2	24	65	5.8	15		19	2.0	3.5	16

Continued: Emissions (tons) from the HAP Augmentation Dataset in the 2008 NEI v2 by State and Pollutant or Pollutant Group

Pollutant	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV	NY	OH	OK	OR	PA	RI	SC	TN	TX	UT	VA	VT	WA	WI	WV	WY
Hydrochloric Acid		28	28		37	0.0	97			17	52		0.1		0.9	1.8		16	21	0.0	21	34		2.2	19	11	20	0.1		0.3	3.1	0.0		0.0	1.5	179		69	2.1			5.2	14	2.6	17	2.7	40	5.8		
Hydrogen Fluoride					7.6	0.0	12									2.7					0.0				12			0.0	0.0							116						0.0		0.1			4.1			
Hydroquinone		0.0																																															
Isophorone													0.0			0.0																										0.0							
Lead	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.1			0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0		0.1	0.1	0.0	0.1	0.0	0.0	0.2	0.3	0.0	0.1		0.1	0.4	0.0	0.2
Manganese	0.0	0.4	0.0	0.0	1.1	0.1	0.0	0.0	0.0	0.7	1.7	0.0	0.0	0.3	0.0	0.3	0.0	0.8	1.3	0.0	0.1		0.0	0.0	1.1	0.6	0.2	1.9	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.4	0.6	2.7	0.4	0.0		1.3	0.7	0.1	0.9	0.3	1.0	0.0	0.0	0.0
Mercury	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methanol	4.4	4.8	0.0	0.4	1.0	117			0.1	5.9	13		0.8	0.2	0.2	9.1	23	6.2	24	0.1	0.5	0.5		0.1	4.1	1.2	15		0.6	0.9		1.7	64			2.4	67	29	3.9		0.0	0.8	179	0.7	11			0.2	5.3	66
Methyl Bromide		0.2	0.1		0.1	0.0				0.1	0.2		0.0		0.0	0.0		0.0	0.0	0.0		0.1		0.0	0.0	0.2	0.1	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.1	0.0			0.0	0.1		0.1	0.0	0.1	0.0	0.0	
Methyl Chloride		0.6	0.2		0.2	0.1	0.0			0.1	0.4		0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2		0.0	0.0	0.7	0.1	0.1	0.1	0.1	0.0	0.0		0.0	0.0	0.3	0.0	0.2	0.0		0.0	0.1	0.6	0.0	0.1	0.0	0.3	0.0	0.0	
Methyl Chloroform		0.6	0.4		0.3	0.0	0.0			0.3	0.7		0.0		0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.2		0.0	0.0	0.8	0.1	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.3	0.0			0.0	0.4	0.0	0.1	0.0	0.3	0.0	0.0	
Methyl Iodide		0.0	0.0		0.0	0.0	0.0						0.0		0.0		0.0	0.0			0.0	0.0			0.0	0.0		0.0	0.0	0.0						0.0	0.0						0.0	0.0	0.0		0.0			
Methyl Isobutyl Ketone		0.0								0.1	0.3		0.0	0.3										0.0				1.1							0.0		0.0	0.9					0.3							
Methylene Chloride	0.1	4.1	2.1	0.1	3.0	0.9			0.0	1.3	7.1		0.2	1.4	0.0	0.5	2.8	0.8	1.1	0.0	0.2	1.7		0.0	0.4	7.6	1.3	0.2	0.0	0.2	0.0	0.0	0.8	0.0	0.0	0.3	1.7	2.6	0.4			0.7	4.8	0.0	1.1	0.1	2.6	0.2	0.3	0.5
Naphthalene	0.3	1.4	0.5	0.1	0.5	1.9	0.0	0.0	0.0	0.3	2.8	0.0	0.0	0.5	0.0	0.4	1.2	0.4	0.8	0.1	0.1	0.4		0.0	0.2	0.6	0.7	0.2	0.0	0.1	0.0	0.1	1.6	0.0		0.5	1.9	0.9	0.3	0.0	0.6	0.2	5.4	0.0	0.9	0.0	0.7	0.0	0.2	1.1
Nickel	0.0	0.2	0.4	0.0	0.2	0.1	0.1	0.0	0.0	0.6	1.4	0.0	0.0	0.2	0.0	0.2	0.0	0.1	0.6	0.1	0.5		0.0	0.0	0.7	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.2	0.0	0.0	0.3	0.3	0.0	0.4	0.0	0.1	0.0	0.1	0.2
Pentachlorophenol		0.0	0.0		0.0	0.0				0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Phenol	1.4	2.9	0.2	0.1	0.3	0.7	0.0		0.0	1.4	8.2		0.1	0.4	0.0	0.1	0.5	0.3	2.7	0.1	0.0	0.1		0.0	0.2	0.4	0.2	0.1	0.0	0.1	0.0	0.1	1.1	0.0		3.2	0.8	1.6	0.2		0.0	0.2	3.0	0.1	0.3	0.0	0.2	0.1	0.1	0.6
Phosgene																																											0.0							
Phosphorus		0.1	0.1	0.0	0.1	0.0	0.3		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.6	0.1	0.1	0.0	0.0		0.0	0.0	1.2		0.0	0.0	1.5	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Polychlorinated Biphenyls										0.0	0.0		0.0							0.0	0.0			0.0	0.0									0.0	0.0				0.0	0.0									
POM/PAH	0.0	0.2	0.3	0.0	0.2	0.3	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.4	0.0	0.0	0.2	0.8	0.0	0.7	0.0	0.0	0.4	0.1	0.0
Propionaldehyde		1.1	0.6		0.6	0.0				0.6	1.4		0.0		0.0	0.0		0.2	0.6	0.0		0.3		0.0	0.0	1.4	0.3	0.0			0.0	0.0		0.0	0.0	0.0	0.1	0.5	0.1		0.0	0.1	0.6		0.4	0.0	0.6	0.1	0.0	
Propylene Dichloride	0.0	0.5	0.3	0.0	0.1	0.1				0.2	0.7		0.1	0.0	0.0	0.1	0.3	0.1	0.2	0.0	0.0	0.2		0.0	0.1	0.5	0.1	0.1		0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.4	0.2	0.1		0.0	0.1	1.1	0.0	0.3	0.0	0.2	0.2	0.1	0.0
Selenium	0.0	0.1	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0		1.3	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.4	0.0	0.1	0.0	0.3		0.0		0.2	0.7	0.2	0.0	0.0	0.0	0.0	0.8	0.0	0.2	0.0	0.3	0.1	0.0	0.0
Styrene	0.0	10	8.2	0.0	7.7	0.2	0.0			1.3	23		0.1	0.0	0.1	0.8	0.4	2.6	2.5	0.0	0.0	2.7		0.2	0.8	4.3	8.4	0.3	0.0	0.0	0.1	0.0	0.3	0.0	0.1	1.0	3.0	10	1.9		0.4	2.8	7.1	0.0	7.8	0.7	9.7	2.1	0.1	0.0
Tetrachloroethylene	0.0	0.5	0.2	0.0	0.2	0.0	0.0		0.0	0.1	0.9		0.0		0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.2		0.0	0.0	1.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30	0.1	0.3	0.0		0.0	0.1	0.2	0.0	0.1	0.0	0.4	0.0	2.0	0.0
Toluene	18	4.4	3.6	1.5	13	23	2.1	0.0	0.0	7.2	19	0.0	0.2	0.2	0.0	5.0	10	4.4	10	0.9	0.8	2.9		0.1	2.1	6.1	11	0.1	2.6	0.9	0.1	3.2	9.4	0.1	0.0	3.2	11	6.6	3.1	0.0	0.2	1.7	39	3.8	5.7		5.1	0.3	2.2	26
Trichloroethylene		0.4	0.1		0.1	0.2				0.2	0.5		0.0		1.9	19		1.0	0.1	0.5	0.5	0.2		2.2	0.0	0.4	0.1	0.0		0.0	0.0	0.0		0.0	0.0	14	0.0	0.3	0.5		0.0	0.1	0.1		0.2	0.0	1.2	1.9	0.0	
Vinyl Chloride	0.0	0.3	0.1	0.0	0.1	0.3			0.0	0.1	0.5		0.0	0.0	0.0	0.1	0.2	0.1	0.2	0.0	0.0	0.1		0.0	0.2	0.2	0.1	0.0		0.0	0.0	0.0	0.3	0.0	0.0	0.2	0.4	0.1	0.1		0.0	0.0	1.1	0.0	0.2	0.0	0.1	0.0	0.1	0.2
Vinylidene Chloride					0.0				0.0										0.0	0.0						0.0		0.0				0.0						0.0					0.0					0.0	0.0	
Xylenes	8.8	1.5	0.7	0.3	5.2	11	1.0		0.0	1.7	2.1	0.0	0.0	0.2	0.0	1.7	4.8	1.1	4.3	0.4	0.1	0.3		0.0	0.6	0.7	3.0	0.5	1.2	0.1	0.0	1.6	4.8	0.1	0.0	1.1	4.8	0.3	1.2	0.0	0.0	0.3	18	1.0	1.6		0.6	0.1	0.6	13

Table 11. Emissions (tons) from the HAP Augmentation Dataset in the 2008 NEI v2 by Tribe and Pollutant or Pollutant Group

Pollutant	Confederated Tribes of the Colville Reservation, Washington	Fond du Lac Band of the Minnesota Chippewa Tribe	Leech Lake Band of Ojibwe	Makah Indian Tribe of the Makah Indian Reservation	Navajo Nation, Arizona, New Mexico & Utah	Nez Perce Tribe of Idaho	Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation, Montana	Pueblo of Pojoaque	Southern Ute Indian Tribe
1,1,2,2-Tetrachloroethane					0.11				0.02
1,1,2-Trichloroethane					0.08				0.01
1,3-Butadiene					1.33				0.27
1,3-Dichloropropene					0.07				0.01
2,2,4-Trimethylpentane					1.36				0.27
2,4-Dinitrophenol	0.00					0.00			
4-Nitrophenol	0.00					0.00			
Acetaldehyde	0.68	0.05	0.35		0.80				4.15
Acetophenone	0.00					0.00			
Acrolein	2.66	0.01	0.06		0.53				3.22
Antimony	0.00					0.00			
Arsenic	0.00	0.00				0.00			0.00
Benzene	2.79	0.01	0.10		2.73				0.16
Beryllium	0.00					0.00			
Biphenyl					0.02				0.05
Bis(2-Ethylhexyl)Phthalate	0.00					0.00			
Cadmium	0.00	0.00				0.00			0.00
Carbon Tetrachloride	0.03				0.10	0.01			0.02
Chlorine	0.36					0.11			
Chlorobenzene	0.02				0.07	0.01			0.01
Chloroform	0.02				0.07	0.00			0.01
Chromium (VI)	0.00	0.00				0.00			0.00
Chromium III	0.00	0.00				0.00			0.00
Cobalt	0.00	0.00				0.00			0.00
Ethyl Benzene	0.02	0.04	0.28		0.31	0.00			0.20
Ethyl Chloride					0.00				0.00
Ethylene Dibromide				0.00	0.12		0.00	0.00	0.02
Ethylene Dichloride	0.02			0.00	0.07	0.00	0.00	0.00	0.01
Ethylidene Dichloride					0.06				0.01
Formaldehyde	3.01	0.81	6.20		4.47				
Hexane		0.06			0.80				0.49
Hydrochloric Acid	8.60								
Lead		0.00				0.01			0.00
Manganese	0.26	0.00							0.00
Mercury	0.00					0.00			
Methanol	0.64				3.60				1.22
Methyl Bromide	0.01					0.00			
Methyl Chloride	0.02					0.00			
Methyl Chloroform	0.02					0.00			
Methyl Isobutyl Ketone	0.01								
Methylene Chloride	0.19				0.23	0.05			0.04
Naphthalene	0.06	0.00	0.01		0.16	0.02			0.05
Nickel	0.01	0.00				0.00			0.00
Pentachlorophenol	0.00					0.00			
Phenol	0.15	0.01			0.12	0.01			0.08
Phosphorus	0.00					0.00			
POM/PAH	0.00	0.00			0.07	0.00			0.00
Propionaldehyde	0.05								
Propylene Dichloride	0.02				0.07	0.01			0.01
Selenium	0.00					0.00			
Styrene	1.26				0.09				0.01
Tetrachloroethylene	0.03				0.00	0.01			0.00
Toluene	0.62	0.15			2.10	0.14			0.99
Trichloroethylene	0.02					0.00			
Vinyl Chloride	0.01				0.04	0.00			0.01
Xylenes	0.02	0.07			0.71	0.00			0.43

EPA 2005NATA values pulled forward to gapfill

This dataset was the lowest in the point source dataset hierarchy, though the order of this dataset has no impact on the selection outcome since no other dataset overlaps with this one. The 2008EPA_ 05NATA_GAPFL dataset resulted from the high risk and Hg review. S/L/T recommended EPA use the 2005 NATA emissions to gap fill high risk HAP or Hg for these facilities because there were no other available data or because the S/L/T chose the 2005 NATA above 2008 TRI (latter occurred only for some facilities in Ohio). There were 18 facilities in this dataset covering a small set of HAPs; these are shown in Table 12.

Table 12. Emissions (tons) from the 2008EPA_05NATA_GAPFL dataset

State	FACILITY_SITE_NAME	COUNTY_NAME	Benzene	Chromium (VI)	Chromium III	Mercury	Tetrachloroethylene
CA	Aera Energy Llc	Orange	0.8051				
	TAMCO	San Bernardino				0.1222	
GA	Searle	Richmond				0.0008	
KY	Rohm & Haas Kentucky Inc	Jefferson				0.0013	
MI	Landscape Forms Inc	Kalamazoo		0.0425	0.0825		
MO	EBV Explosives Environmental Co-Joplin	Jasper				0.0023	
NY	Crucible Materials Corp	Onondaga				0.0081	
OH	Barium & Chemicals Inc	Jefferson		0.0602	0.1168		
	Bwx Techs Inc Nuclear Equipment Div	Summit		0.0904	0.1756		
	Evertz Technology Services	Butler		0.0144	0.0279		
	Faurecia Exhaust Sys Inc Troy Facility	Miami		0.0190	0.0370		
	FMC Foodtech (Stein-DSI)	Erie		0.0063	0.0122		
	PPG Industries - ERU (0165010146)	Pickaway				0.0112	
	Xtek Inc	Hamilton			0.0039		
PA	Leff-Marvins Cleaners	Allegheny					3.74
UT	Deseret Chemical Depot: Deseret Chemical Depot (South Area)	Tooele				0.0045	
WV	BAYER CROPSCIENCE	Kanawha				0.0177	
	BAYER MATERIALSCIENCE	Marshall				0.0034	

SUMMARY/CONCLUSIONS

EPA used a number of datasets to add HAP emissions to the point sources for the 2008 NEI v2. Separate datasets were developed based on the source of the emissions data and the selection hierarchy for the NEI. While most datasets were used to gap fill missing HAPs, some EPA datasets were selected ahead of S/L/T data for use in the NEI. The EPA EGU datasets, primarily the 2008 MATS-based EGU emissions, comprise the vast majority of the total HAP mass added across all of the EPA datasets. This mass is mainly emissions from the acid gas HCl. The Toxics Release Inventory also adds considerable mass. For any individual process/pollutant in the NEI, the particular dataset for the specific emissions value can be determined from a process level summary of the point source data category. Additional information about the derivation of the value is available in the emissions calculation method code and comment fields. Even for the same process at a facility, different HAPs could come from different datasets.

EPA gap filling for the 2008 NEI v2 was different from previous years. We used data from previous years (2005) sparingly. Non-MATS rule data were also used in lesser quantities, in part due to the year of the data, and also due to the difficulty in integrating the rule data into the EIS facility configuration. The largest use of the non-MATS rule data was to gap fill missing Hg emissions. Automated techniques were developed to avoid double counting such as not augmenting with TRI or HAP augmentation if the HAP was reported by the S/L/T for any process at the facility. Efforts were also taken to integrate the HAPs across the existing EIS processes.

We learned that with regards to TRI, more needs to be done to ensure key facilities are gap filled through more matching of EIS and TRI facilities, and a more complete application of the TRI emissions to the matched facilities (i.e., regardless of whether thesee facilities have CAP emissions reported to them). EPA is considering changing the TRI approach for 2011 NEI in order to add more TRI emissions where no S/L/T emissions exist.

We also confirmed that even for S/L/T that report HAPs, gap filling is needed for building a more complete inventory. Table 13 shows the percent of emissions by EPA dataset groups as compared to the S/L/T data. High EPA dataset percentages are shown not only for the states in Figure 1 that did not report HAP, but also for some of the states that do report HAPs.

In total, the EPA gap filling techniques resulted in the use of 197,000 tons of HAPs from EPA data (mostly HCl from the MATS data). This comprises 45% of the total point source HAPs in the 2008 NEI v2. The EPA MATS dataset constitutes 32% of the total point source HAPs and the other (non MATS) EPA augmented data constitutes 13%. At a state level, the augmented HAP emissions make up from 9% to 100% of the point source HAPs, with all states getting some kind of augmentation.

Table 13. Percent of emissions from dataset groupings for different HAP and HAP groupings in the 2008 NEI

	Acid Gases				HAP-hg						HAP-Metals							HAP-VOC						POM/PAH					
	S/L/T	EPA EGU	HAP AUG	TRI	S/L/T	EPA Air/Rail	EPA EGU	EPA other	HAP AUG	TRI	S/L/T	chrom split	EPA Air/Rail	EPA EGU	EPA other	HAP AUG	TRI	S/L/T	EPA Air/Rail	EPA EGU	EPA other	HAP AUG	TRI	S/L/T	EPA Air/Rail	EPA EGU	EPA other	HAP AUG	TRI
AK		100					17		15	68				31		23	46		48			47	5		99			1	0
AL	17	82	0	1	61	0	27	7	1	5	44	4	0	36		1	15	97	0	1		1	0	0	10	1	72	2	14
AR	68	31	1	0	29	0	52	16	0	2	39	3	0	37		3	17	96	1	0		1	2	60	16	0		6	18
AZ	6	94		0	8	0	91		0	0	44	1	0	47		0	8	43	27	14		1	14	1	94	2		1	3
CA	76	18	5	1	94	0	0	6	0	0	81	6	0	5		4	4	81	8	0	0	3	8	32	67	0		1	0
CO	21	77	0	2	54	0	42		1	3	24	2	0	70		2	2	89	3	1		6	1	20	69	2		7	2
CT		72	28	0			8	80	2	10				72		8	21		11	15		10	65		60	1		0	38
DC		100				2	6		92				0	87		13			3			97			53			47	
DE	27	73		0	40		22	38	0		72	19		8		0	0	95	1	3		1	0	98	1	0		0	
FL	22	78	0	0	40	0	48		1	11	16	4	0	75		2	3	90	5	2		1	2		83	2		2	14
GA		92	1	7		0	73	14	1	11			0	84		11	5		4	3		11	83		87	3		2	8
HI	62	38			87		3		4	7	0			99		1		26	54			1	19	8	92			0	0
IA	50	50	0		19	0	67	12	0	0	53	15	0	28		0	4	95	1	0		0	4	85	13	2		0	0
ID	6			94		0			0	99			0			9	91	4	11			3	82		89			0	11
IL	51	49	0	0	50	0	46		0	4	57	6	0	37		0	0	97	2	0		0	1	71	29	0		0	0
IN		88	0	12		0	62	18	1	19			0	44		3	53		2	3		6	89		16	2		1	81
KS	21	79	0	0	36	0	62		0	2	42	18	0	34		0	5	93	1	1		4	0	3	53	5		16	24
KY	14	86	0	0	20	0	70	0	1	10	55	6	0	21		1	16	87	1	2		2	9	22	22	2		6	48
LA	32	67	1	0	27	0	46		0	27	69	6	0	20		3	2	91	1	2		6	1	98	1	0		0	0
MA	3	75	0	22	6	0	37	52	5	0	2	0	0	90		3	6	6	17	10		5	62		29	0		1	70
MD	4	84	1	11	74	0	25		0	0	31	2	0	57		5	6	1	5	3		2	90	0	80	2		1	17
ME	58	27	8	7	93		7				95	1		4		0		94	2	0		1	3	89	9	0		1	0
MI	60	40		0	49	0	47	1	0	3	54	13	0	26	0	0	7	68	4	1		0	26	72	26	0		1	1
MN	40	59	0	0	97	0	3	0	0		76	6	0	14		0	4	92	2	0		0	5	28	32	0	30	0	11
MO	33	66	1	0	19	0	75	1	0	4	27	8	0	53	0	5	6	84	4	3		5	4	74	22	2		1	1
MS	8	91	0		21	0	78		1	0	58	5	0	29	0	2	6	99	1	0		1	0	59	21	1		4	16
MT		60	13	27		1	73		1	26	29		0	60		3	8	0	3	3		26	68		11	1		3	86
NC	27	73	0		24	0	62	12	1	1	12	5	0	68	0	6	9	98	2	0		0	0	91	8	0		0	
ND	49	51	0		13	0	85		2	0	26	8	0	64		2		95	1	3		1		88	10	2		0	0
NE	2	97	0	1	0	0	82	13	0	5	16	0	0	49		4	30	86	4	3		2	5		89	5		5	0
NH	1	98	0		16		84		0		59	3		36		1		83	12	4		1	0	2	79	17		2	
NJ	23	77	0		58		22	12	0	7	46	9		38		6	0	81	11	4		4	0	23	76	1		1	
NM	8	92			0	2	48		0	49	60	11	0	28		1	0	71	3	3		23	0	0	85	3		10	2
NV	2	98	0	0	0	0	0	99	0	0	0	0	0	27		2	71	11	25	13		4	48	0	98	1		1	
NY	53	44	0	2	68	0	30	1	0		25	3	0	71		0	1	82	10	2	4	0	2	97	3	0		0	0
OH	2	88	1	9	5	0	63	2	2	28	2	1	0	24	0	5	68	5	2	2		2	88	28	31	2		1	39
OK	27	73	0	0	16	0	76	1	0	7	49	9	0	38		4	1	88	1	1		10	0		31	3		7	59
OR	18	29	19	34	2	0	8	3	1	86	19	4	0	17		29	30	6	3			6	86	84	12	0		1	3
PA	15	85	0	0	55	0	32	10	0	2	35	24	0	24		1	16	91	3	3	0	1	2	85	10	1		1	3
PR		72		28			73			27				100					98		2				100				
RI	99			1	99				1	0	96	3				1		91	6		2	0	1		92			1	7
SC	34	65		2	72	0	28		0		62	4	0	31		0	2	92	0	0		0	7	99	1	0		0	

SD		100					80			20				98			2		78	22					98	2				
TN	38	62	0	1	20	0	65	8	1	6	72	2	0	19	0	2	5	83	2	0		1	14	69	27	1		2	1
tr	1	97	2		0		100		0		3	0		95		3		89	0	5		6		3	11	38		49	
TX	24	75	0	1	48		49	2	0	1	43	8		42	0	2	5	92	0	2		5	0	73	20	1		3	4
UT		46	0	54		0	39	35	0	25			0	75		1	24		22	18		11	49		81	4		2	13
VA	36	64	0	0	59	0	30	1	2	9	25	20	0	46		4	4	71	2	1		3	24		28	0		8	64
VI																			100						100				
VT	5	89	6		21				79		0	0		92		7		61	7	28		4			60	24		16	
WA	24	26	6	45	61	1			0	38	59	6	0	2		19	14	27	6	0		4	64	52	41	0		1	5
WI	55	44	0	0	51	0	49		0	0	53	2	0	35	0	1	9	96	1	1		0	2	88	8	1		4	0
WV	14	86		0	21	0	77	2	0	0	60	6	0	34		0	0	92	1	4		3	1	28	7	3		3	60
WY	5	94		1	7	0	82	6	1	3	0	5	0	90		3	2	80	1	2		14	3	3	52	14		4	27

EPA EGU is comprised of the “EPA EGU v1.5” and “2008 MATS-based EGU emissions”. EPA Other is comprised of the “EPA 2005NATA values pulled forward to gapfill”, “2008 EPA Rule Data from OAQPS/SPPD”, ‘‘EPA other data developed for using ahead of S/L/T or gapfilling” and “EPA NV Gold Mines” EPA air/ rail is comprised of “EPAAirports1109”, and “EPA Rail”

The following HAPs groups are excluded from the above table: 1) HAP-PM, consisting of coke oven emissions, naphthalene, asbestos, fine mineral fibers and calcium cyanamide; 2) HAP other, consisting of cyanide, phosphine, phosphorous and 3) HAP-GlycolEthers,

REFERENCES

1. Air Emissions Reporting Rule, **Federal Register** /Vol. 73, No. 243 /Wednesday, December 17, 2008, pp **76539- 76558, see http://www.epa.gov/ttnchie1/aerr/** for direct link to rule, summary and fact sheet.

2. See MATS ICR Data section of the Utility NESHAP website at http://www.epa.gov/ttn/atw/utility/utilitypg.html for a database of EGU ICR Part iii data. Also the EGU ICR Part iii data are used in references 9, 10 and 11 below.

3. 2005 National Air Toxics Assessment Technical Methods document and 2005 National Air Toxics Assessment Website (http://www.epa.gov/ttn/atw/nata2005/05pdf/nata_tmd.pdf and http://www.epa.gov/ttn/atw/nata2005) U.S. EPA Office of Air Quality Planning and Standards.

4. Emissions Inventory System, (http://www.epa.gov/ttn/chief/eis/index.html); system is available to registered users in the EPA and S/L/T communities involved in emission inventory development.

5. EPA, *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources,* AP-42, Fifth Edition, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, January, 1995, (http://www.epa.gov/ttn/chief/ap42/index.html)

6. "All Webfire Factors" csv file downloaded from http://cfpub.epa.gov/webfire/, November 2011.

7. 2008 National Emissions Inventory, version 2 Technical Support Document, June 2012, accessed June 2012, Developed by the Emission Inventory and Analysis Group at EPA. http://www.epa.gov/ttn/chief/net/2008neiv2/2008_neiv2_tsd_draft.pdf. Supplemental data: ftp://ftp.epa.gov/EmisInventory/2008v2/doc , Appendices: http://www.epa.gov/ttn/chief/net/2008neiv2/2008_neiv2_appendices_draft.pdf, References: ftp://ftp.epa.gov/EmisInventory/2008v2/doc/2008nei_references.zip

8. Email from Anne Pope, US EPA, Sectors Policy and Programs Division, To Madeleine Strum, US EPA, Air Quality Assesment division, 10/19/2010.

9. Strum, Madeleine. EMS-HAP Version 3.0 (Emissions Modeling System for Hazardous Air Pollutants Version 3.0) User's Guide, Appendix C, page C-61. EPA-454/B-03-006, U.S. EPA, Office of Air Quality Planning and Standards, August 2004. http://www.epa.gov/scram001/userg/other/emshapv3ug.pdf

10. Houyoux, Marc and M. Strum, "Memorandum: Emissions Overview: Hazardous Air Pollutants in Support of the Final Mercury and Air Toxics Standard" EPA-454/R-11-014, November 2011.

11. Emissions Spreadsheet. posted at http://www.epa.gov/ttn/atw/utility/utilitypg.html, Technical Supporting documents, Dec 16, 2011.

12. Houyoux, Marc, Parker, Barrett and Myers, Ron. "Emission Factor Supporting Documentation for the Final Mercury and Air Toxics Standards", U.S. EPA Office of Air Quality Planning and Standards, EPA-454/R-11-012, November 2011.

13. Federal Register, Vol 77 # 32, Feburary 16, 2012. National Emission Standards for Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam GeneratingUnits; Final Rule. Pp. **9304- 9513.**

14. EPA's PM Augmentation Procedure", R. Huntley, US EPA; J. Dorn and S. Colodner, TranSystems │E.H. Pechan, to be presented at the 2012 International Emission Inventory Conference in Tampa, Florida, August 2012.

15. Technical Support Document (TSD) For the Proposed Toxics Rule Docket No. EPA-HQ-OAR-2009-0234, US EPA, Office of Air and Radiation. March 2011.

16. Email from Adele Malone, Planning Branch, Bureau of Air Quality Planning
Nevada Division of Environmental Protection to Madeleine Strum, EPA on November 7, 2011 as part of the comments on the Hg review package

17. Toxics Release Inventory, www.epa.gov/tri, Previous Years' TRI Basic Plus Data Files, downloaded March 2011.

KEYWORDS
NEI, national emissions inventory, HAPS, hazardous air pollutants, gap filling, point sources, 2008 NEI v2,