STANDARDIZING REPORTING CODES FOR THE COMBINED AIR EMISSIONS REPORTING SYSTEM (CAERS) TEAM REPORT

Contents

1 Project Description

1.1 Background and Purpose

In conducting research on the differences among State Local Tribal (SLT) emissions inventory (EI) programs, the National Emissions Inventory (NEI), and the Toxics Release Inventory (TRI), the SLT-EI/NEI/TRI Research and Development (R & D) team noted differences in data field codes between SLT emissions inventory systems and EPA's Emissions Inventory NEI system (EIS), which houses data for the NEI. These differences were indicated in their final report, but were not pursued at the time, given the scope of their project. This report documents subsequent work by another R&D team as part of ongoing work by the Combined Air Emissions Reporting (CAER) Product Design Team (PDT), to identify those code differences and provide recommendations on how they should be dealt with to support the use of CAERS by SLTs.

There are two broad categories of differences in codes between SLT emissions inventory systems and EIS. The first has to do with differences in nomenclature or naming conventions for similar data fields, such as a different name or number to represent the same unit type. The second has to do with codes that are unique for the SLT and are thus either missing from the EIS code lists or do not have a one-to-one match with the EIS codes.

Work for this project consisted of identifying both types of differences and issuing recommendations for how CAERS should handle reporting codes development. Adoption of the recommendations for CAERS will help minimize the burden of collecting emissions data for facilities and SLTs.

This report summarizes the results of our research. Results of specific analyses are organized as project deliverables, which are provided as appendices to this report.

The Appendixes can be found at the end of this document, and are summarized below:

- **Data Elements for the Project** (Appendix A): specifies the description of data elements selected for the project.
- **Survey of Codes in SLT EI Systems and Results** (Appendix B): includes the original survey sent to SLTs, summary responses from SLTs, analysis of survey responses, and findings.
- **Analysis of Codes Used in the 2017 Draft NEI** (Appendix C): provides a comparison of codes used by SLTs and EPA for each specified data element in CAERS.
- **Options for CAERS and Recommendations** (Appendix D): includes the business rules and the proposed CAERS tables for the 5 data elements in the study. The tables include information from SLTs that have code differences in their EI systems compared to EIS.

While CAERS takes program requirements both from federal and SLT programs as given, some coding issues impact SLTs not currently using or interested in using CAERS. Also, coding improvements that help make for more consistent data submissions within CAERS, can help make submitted data more consistent across SLTs submitting directly through EIS. Therefore, some recommendations for EIS codes are included where applicable.

1.2 Team Participants and Acknowledgements

The following team members participated in the development and review of results for this project:

- Chun Yi Wu (Minnesota Pollution Control Agency), Project Lead
- Julia A. Gamas (U.S. EPA), Project Co-Lead
- Jing Wang (Georgia Department of Natural Resources)
- Benjamin Way (Wyoming Department of Environmental Quality)

We would like to acknowledge the support from Kelly Poole, from the Environmental Council of the States (ECOS).

2 List of Data Elements for Research

Data elements for research were determined as those essential to CAERS and with potential code differences between SLTs and EIS. These data elements were identified early so that they can be factored in the design of CAERS. The following five groups of data element codes were identified (Appendix A):

- Unit Type Code
- Control Measure Code
- Calculation Material Code (also referred to as “Throughput”)
- Calculation Parameter Unit of Measure (also referred to as “Throughput Unit of Measure”)
- Emission Calculation Method Code

Although varieties of pollutants have been collected in different programs, pollutant codes have been studied in previous R & D projects. The SLT EIs/NEI/TRI Team developed cross walks of pollutants between NEI and TRI. The Data Model Team identified pollutants covered in SLT EIs in addition to those in NEI. A direct link between CAERS and the Substance Registry Services (SRS), EPA's authoritative resource for information about chemicals, biological organisms, and other substances tracked or regulated by EPA, has already been incorporated into its design. Therefore, a research of pollutants codes will not be covered in this project.

3 Survey of Codes in SLT EI Systems

A survey among SLTs was conducted to find whether they have additional codes than those of EIS, and/or SLT-specific naming conventions that are different from EIS’s. This project uses EIS codes as starting points because EIS codes are more detailed than TRI codes.

The following information was sought through the survey:

- Codes that SLT systems include that are not included in EIS.
- SLT codes that are conceptually the same as EIS codes but are used differently from how they are used in EIS (for example, the code numbering system is different for the SLT than for EIS.)
- SLT codes that are not a one-to-one match with EIS codes and, thus, require that they be mapped to an EIS code so they can be reported to EIS.

Among 82 SLTs that reported emissions to the NEI, 38 SLTs responded the survey. Results show 21 SLTs have one or more data elements with differences from the EIS codes. Other SLTs use the same codes as the NEI. Detail analysis, findings, and recommendations are shown in Appendix B.

4 Analysis of Codes Used in the 2017 Draft NEI

Not all SLTs were able to respond to the survey. Therefore, 2017 NEI data reported by all SLTs were analyzed, to get a more complete picture of the nation. After collecting data from SLTs for the NEI, EPA also uses EIS codes to do emissions augmentation and to obtain emissions information from other available resources, such as the TRI. Therefore, analysis of the 2017 NEI was also extended to the use of codes by EPA. Results of this analysis can be found in Appendix C.

5 Findings and Recommendations

This section summarizes the findings and recommendations from the project. Details, including examples, are provided in the Appendixes, and specifically in Appendix D.

5.1 Findings

The following findings are based on observations from data provided by the SLTs that responded to the survey, as well as the analysis of data from the 2017 NEI. Note that additional use cases could exist from those SLTs that did not respond to the survey.

1. Among emission data for 92 SLTs listed as reporters to the 2017 NEI, 23 SLTs reported more than 50% of the emission records, 59 SLTs reported less than 50% of the emission records, and 10 locals and tribes did not report emissions to the NEI.
2. In general, codes used in SLT systems may have different conventions than EIS codes, including format, length, and the use of numerical values to represent data fields.
3. Overall, SLT systems may have more or fewer codes than EIS for data elements analyzed in this study. SLTs can have additional codes to EIS codes and, also, they may not use certain EIS codes.
4. Not all codes for Unit Type, Calculation Parameter Unit of Measure, and Calculation Material are shown in the 2017 draft NEI. However, large numbers of records are associated with the code "unclassified," or show up blank or null. This implies that SLTs do not collect the information, SLTs do not report the data element, or the EIS codes for those data elements might not be user-friendly. This implication is confirmed from the survey results.
5. SLTs may have more specific codes for the Control Measure and Unit Type data elements than EPA used in EIS. SLTs that do not report the Control Measure data element to EIS usually use fewer codes in their systems than EIS.
6. All 23 EIS codes for the emission calculation method data element are used by SLTs in the draft 2017 NEI. However, seven EIS codes are not used by EPA such as Trade Group Emission Factor, S/L/T Emission Factor, Vendor Emission Factor, and Emission Factor based on some other information sources.
7. Calculation Method is the most controversial data element among the five data elements studied in this project. Although this data element must be present when SLTs report emissions to the NEI with EIS codes, the use (and thus, interpretation) of the same EIS code can be different from SLT to SLT.

5.2 Recommendations

5.2.1 Actions for CAERS

The following are actions that we recommend for the CAER system to assist in proper code use:

1. CAERS should enforce the requirement for reporting Unit Type, Calculation Parameter Unit of Measure, and Calculation Material data elements, where possible.
2. CAERS should include a reference table that links a process Source Classification Code (SCC) to default Unit Type data element codes, so that CAERS can automatically fill codes for the Unit Type date element when the information is missing or not required by SLTs. CAERS can take the SCC for the first process for an emission unit type code if the emission unit has multiple processes with different SCCs.

For EIS the following would assist in making CAERS more complete:

5.2.2 Actions for EIS

The following are actions that we recommend for EIS to assist in proper code use:

- Add more detailed EIS codes for the Control Measure data element and modify descriptions to make them less confusing and thus, less subject to being interpreted in different ways by different SLTs.
- Add "biomass solid," "biomass liquid" and "biomass dried" to the codes for Calculation Material. Additional clarification on individual items that are included in "biomass" would be helpful.

5.2.3 Recommendations for SLT codes use in CAERS

CAERS will have to supply the different SLTs with reporting codes as follows (see Appendix D):

- The SLT has the same codes as EIS so facilities from that SLT can enter those codes. This is the current default setting in CAERS.
- The SLT has the same codes as EIS but the nomenclature and coding system for the SLT are different. The CAERS would have to contain a crosswalk so that the users can work with the SLT codes and then have the data sent with the corresponding EIS codes to EPA.
- The SLT has additional codes that do not map to EIS codes. In this case, the CAERS will have to include the additional SLT codes and crosswalk to EIS codes in its SLT customization.
- The SLT has codes that map to EIS codes but are not identical to an EIS code. The CAERS would have to crosswalk those codes to the nearest EIS match, with input from the SLT.
- Additional use cases that will need to be accommodated into CAERS: E.g., an SLT does not want to offer a specific EIS calculation method to its facilities.

The team also discussed how the different SLT codes should be provided to CAERS. Two options emerged through team discussions:

1. SLT provides its codes to CAERS.
2. Establish a standardized set of codes in CAERS.

The team recommend Option 1 for the current development of CAERS with the business rules listed below. Option 2 could be a longer-term option. In fact, it would likely evolve over time as a result of more SLT and EPA systems integrating with CAERS, using the Agile approach.

Business rules for an SLT providing its codes to the CAERS are listed as follows:

1. SLTs are only allowed to edit their respective codes.
2. SLTs take full responsibility for their respective codes in terms of maintenance (creating new codes, updating, and retiring codes over time).
3. SLTs must map their codes to the corresponding EIS code, or closest match, if SLTs want to report the information to NEI but have codes that are different from the EIS codes for a data element.

5.2.4 Recommendations for CAERS Code Tables

The recommended code tables for each data element are in Appendix D. Those tables contain information for SLTs that have codes different from EIS and responded to the survey. There are common fields in all five tables. Descriptions of those common columns and how they should be used in CAERS are explained below.

- The column “Program System Code” represents the information management system which has responsibility for the SLT codes listed in the table, in a linked or interrelated information management system. It is the same as the Program System Code used in EIS. For example, the Program system code for Wyoming Department of Environmental Quality is WYDEQ.
- The "Addition to EIS Codes" column shows how to use the SLT codes in CAERS:
  - "U" means the SLT does not use that specific EIS code. In this case, the SLT users will see all EIS codes but not those EIS codes marked as “U”, in CAERS.
  - "Y" means that SLT codes exist for the SLT but do not exist in EIS. The code would need to be added to the list of codes in CAERS that the user from that SLT can choose from. If a code exists for many SLTs but it is not listed in EIS, EPA should consider adding that code to the list of codes in EIS. For example, EIS code 109 for Control Measure data element represents Catalytic Oxidizer/ Incinerator, but three states added a code only for Catalytic Oxidizer and a code only for Incinerator. That suggests EPA to consider a separation of EIS code 109 to two codes. In this case, the SLT users will see all EIS codes (except codes marked as “U”), as well as their corresponding SLT additional codes with “Y” in CAERS.
  - "N" means that the SLT uses its own codes in CAERS. In this case, the SLT users will only see their SLT codes in CAERS, regardless of all EIS codes.
- The records that are marked “Y” and “N” in the "Addition to EIS Codes" column should have the “Map to EIS Codes” column filled up if an SLT wants to send data to NEI. Otherwise, the data will only be used in the SLT EI, not in the NEI and TRI.
- The "Last Updated" column contains an auto-generated timestamp that represents the date and time the record was last updated.
- The "User" column is also auto-generated based on user log-in information.

APPENDIXES - FULL DELIVERABLES

Appendix A *Data Element for the Project*

The following is a list of the data elements for the project:

- Unit Type
- Control Measure
- Calculation (Throughput) Parameter Unit of Measure
- Calculation (Throughput) Material
- Emissions Calculation Method

See the file: “List of DataFieldCodes.xlsx”

Appendix B *Survey of Codes in SLT EI Systems and Results*

B.1 Original Survey of Codes in SLT EI Systems

E-Enterprise for the Environment Combined Air Emissions Reporting (CAER) Codes for Data Fields Survey for State/Local/Tribal (SLT) Emission Inventories (EIs)

This survey seeks information on the codes used in your emission inventory system to determine whether in your system:

- There are codes that your state system includes that are not included in the NEI. For example, MI (Michigan) has an additional Emission Calculation Method Code, "Facility EF" that is specifically for emission factors that come from that facility because emission factors could come from a variety of sources.
- There are codes that are the same as NEI codes but are used differently from the use of NEI. For example, for the NEI calculation method code 2, "Engineering judgement," NEI does not have a description. Some view it as a better factor to use than a "trade group emission factor" with respect to data quality, whereas others view it as the lowest level of data quality.
- There are codes that are not in a one-to-one match with NEI codes and, thus, require you to transform (map) them in order to report to NEI. For example, Minnesota (MN) uses control measure codes 906 for Fiberglass Filter with Cardboard Frame and 907 for Fiberglass Filter without Cardboard Frame. Those codes are mapped to the same NEI code 58, Mat or Panel Filter.

The survey will focus on five data fields: Unit Type Code, Control Measure Code, Calculation Parameter Unit of Measure, Calculation Material Code, and Emission Calculation Method Code. The "List of Data Field Codes.xlsx" file provides the definition of the data fields and the links to previous work done for the data fields. For your reference, the "NEI codes" file contains five sheets, each for NEI codes in each data field.

Your participation is critical for the CAERS development and will be greatly appreciated. If you have questions, please contact Chun Yi Wu at chun.yi.wu@state.mn.us or (651)757-2833.

1. Does your state system contain codes from any of the following data fields that are not included in NEI?

		YES	NO
a.	Unit Type Code	☐	☐
b.	Control Measure Code	☐	☐
c.	Calculation Parameter Unit of Measure	☐	☐
d.	Calculation Material Code	☐	☐
e.	Emission Calculation Method Code	☐	☐

2. Does your state system use code values in any of the following data fields that are the same as the NEI code values but have a different definition from that in the NEI?

For example, your system has a data field called 'Unit Type Code,' in which your specific data value 1402 refers to a Unit Melter Furnace, whereas the NEI Unit Type Code value 1402 refers to a Storage Bin, and the NEI code value for a Unit Melter Furnace is 205. (Situations like these will require some cross-walking to be built into CAERS.)

		YES	NO
a.	Unit Type Code	☐	☐
b.	Control Measure Code	☐	☐
c.	Calculation Parameter Unit of Measure	☐	☐
d.	Calculation Material Code	☐	☐
e.	Emission Calculation Method Code	☐	☐

3. Does your state system contain codes that are not in a one-to-one match with NEI codes, and thus, require you to transform (map) in order to report to the NEI.

		YES	NO
a.	Unit Type Code	☐	☐
b.	Control Measure Code	☐	☐
c.	Calculation Parameter Unit of Measure	☐	☐
d.	Calculation Material Code	☐	☐
e.	Emission Calculation Method Code	☐	☐

4. If you answered YES to any of the above questions, please provide a URL where we can find your lists of codes and/or attach files that contain the corresponding code tables in your system, including codes, description, map to NEI codes (if applicable), comments, and other data fields if necessary.

5. Please provide the following applicable information for the SLT you represent. If you represent a state, only the FIPS State Code is needed.

- FIPS State Code:
- FIPS County Code:
- Tribal Code:

B.2 Summary of Survey Results

The survey was originally sent to SLT EI contact people in November 2019 via e-mail. In December 2019, another e-mail was sent to remind them to complete the survey. After that, follow up calls and emails were sent to those SLTs that had not responded. Thirty-eight SLTs responded to the survey.

The detailed response distribution from the 82 SLTs that reported emissions to the 2017 NEI is shown in Figure B. 1., where we can see that from those 82 reporting SLTs, 22 were Local, 52 were State, and 8 were Tribal authorities. Out of 22 local authorities, 6 responded to the survey. Out of 52 State authorities, 31 responded to the survey. Out of 8 tribal authorities, 1 responded to the survey. The data is also summarized in Table B. 1.

Figure B. 1. Distribution of Survey Respondents

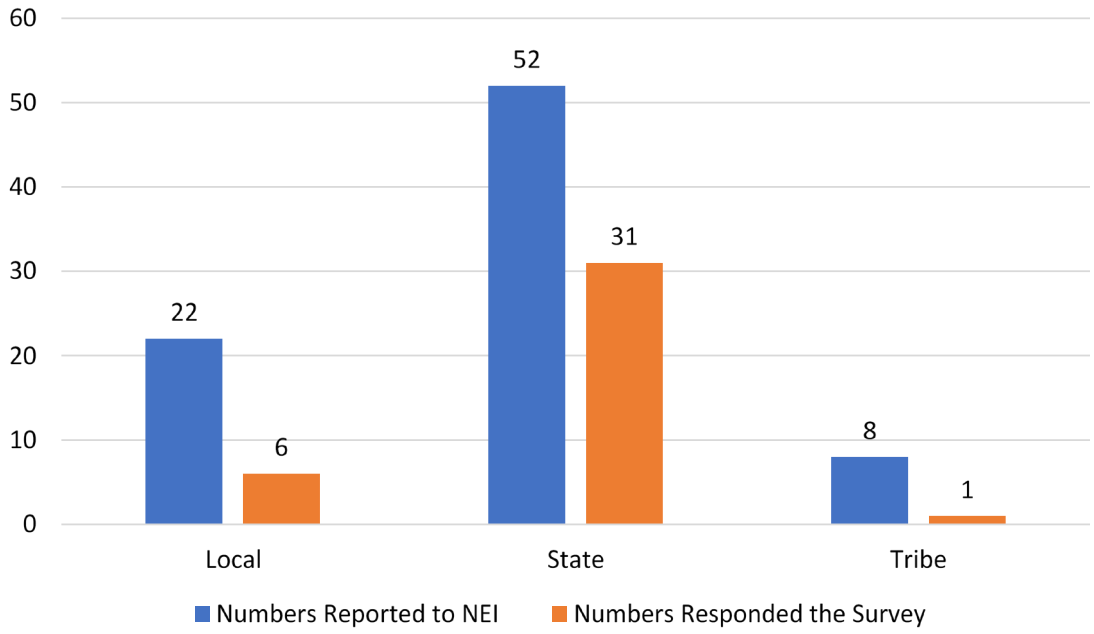

Table B. 1. Distribution of Survey Respondents

Jurisdiction Type	Numbers Reported to NEI	Numbers Responded the Survey
Local	22	6
State	52	31
Tribe	8	1
Total	**82**	**38**

Among 38 SLTs responded the survey, 21 SLTs (about 55%) indicated code differences between their systems and EIS, for one or more data elements. The other SLTs are using the same codes as those in EIS. Figure B. 2. and Table B. 2. show the number of SLTs that have differences with EIS codes for each data element.

Figure B. 2. Number of SLTs that Have Differences from EIS for Each Data Element

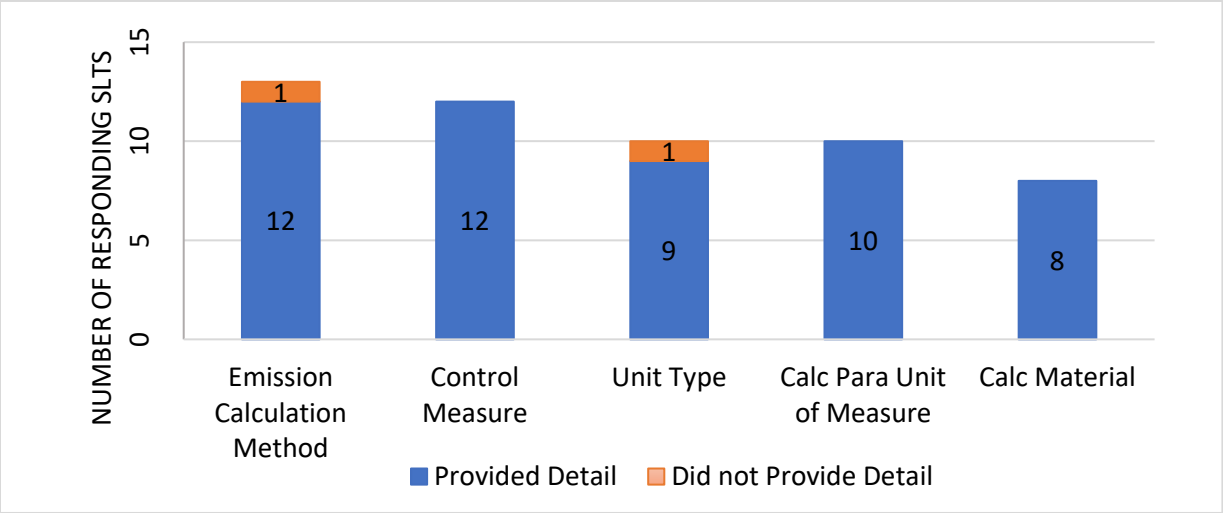

Table B. 2. Number of SLTs that Have Differences from EIS for Each Data Element

Data Elements	Provided Detail	Did not Provide Detail	Total
Emission Calculation Method	12	1	13
Control Measure	12		12
Unit Type	9	1	10
Calc Para Unit of Measure	10		10
Calc Material	8		8

Table B. 3 shows detailed information for SLTs who have codes different from EIS for each data element. In the list, SLTs are represented by their unique codes that indicate information management systems which have responsibility for the codes. Those codes are the same as the Program System Codes used in EIS. A detailed list of the program system codes can be found in Appendix E. The SLTs in the brackets did not provide detail information on differences between the SLT codes and the EIS codes.

Table B. 3. List of SLTs that Have Codes Different from EIS for Each Data Element

Unit Type	Control Measure	Calculation Parameter Unit of Measure	Calculation Material	Emission Calculation Method
CODPHE	CODPHE	CODPHE	CTBAM	Chattan
CTBAM	CTBAM	CTBAM	FLDEP	CODPHE
DNREC	DNREC	DNREC	MIDEQ	CTBAM
FLDEP	FLDEP	FLDEP	MNPCA	LADEQ
LADEQ	IADNR	Louisville	NYDEC	Louisville
MNPCA	LADEQ	MNPCA	OHEPA	MIDEQ
MTDEQ	MNPCA	MTDEQ	SWCAA	MNPCA

Unit Type	Control Measure	Calculation Parameter Unit of Measure	Calculation Material	Emission Calculation Method
SWCAA	NYDEC	OHEPA	WYDEQ	NCDAQ
WIDNR	SWCAA	WIDNR		NYDEC
(TXCEQ)	WI DNR	WYDEQ		OHEPA
	WYDEQ			OKDEQ
	TXCEQ			WYDEQ
				(TXCEQ)

B.3 Survey Findings

This section details the team's findings based on observations from those SLTs that responded to the survey. More items could exist from SLTs that did not respond the survey.

B.3.1 All Data Elements

1. The codes in SLT systems could be in a different convention from the codes in EIS. For example:
   - EIS codes for four data elements (Unit Type, Control Measure, Calculation Material, and Emissions Calculation Method) are represented by numerical values but descriptive texts for Calculation Parameter Unit of Measure. However, the codes used by SLTs for all five data elements could be numerical values, descriptive texts, or a mixture of both. For example, Colorado uses text values to represent unit type codes.
     The length of the codes used by SLTs are different and could be as short as 2 or as long as 16.
   - The numerical values used by SLTs are in a different format, for example, Oklahoma (OK) system uses XX_X (e.g., 10_3) for code of emission calculation method while New York (NY) only uses XX (e.g., 08).
2. SLT systems could have more or fewer codes than EIS for the data elements in this study. For example, Michigan has 388 codes, Ohio (OH) has 644 codes, and MN has 667 codes for the calculation material while EIS has 637 codes. SLTs could have additional codes to EIS codes, and, meanwhile, not use certain EIS codes. For example, the Florida (FL) system has 18 additional codes to the EIS codes, uses 45 EIS codes, but does not use 24 EIS codes for the calculation parameter unit of measure.

B.3.2 Unit Type Data Element

1. For some emission units it is difficult to determine the correct classification in the current EIS codes for the Unit Type data element. For example, a boiler that burns natural gas and hazardous waste (subject to the HWC MACT), could be a boiler (with EIS code 100), but could also be an incinerator (with EIS code 270). SLTs (such as Southwest Clean Air Agency or SCAA) have separated the fuels at the process level, but the code for Unit Type is applied at the emission unit level.
2. Reported unit type codes do not always represent the real emission unit types. Some SLTs do not have a unit type code reported from their facilities. For example:
   - The Montana (MT) system does not obtain unit type codes from any other resources. It tracks the SCC and ties the unit type code to the unit with a cross-reference table of SCCs.

- Connecticut (CT) does not have the data element in its system because the unit type code is not critical to its EIS reporting efforts. CT has not effectively populated the field (less than 6% of the data has a valid assignment). The SLT codes for CT facilities to report are only limited source type codes. CT manually adds other codes when it reports to NEI.
- MN obtains unit type codes from the permitting database. However, the information is not complete. A cross reference table for SCC to unit type code has been generated to fill the missing values. If an emission unit has multiple processes, the SCC for the first process is used.
- In the FL system, the mapping of state codes to EIS code is not only based on state codes but also on the description of the emission units. One state unit type code could be mapped to multiple EIS codes depending on the description of the unit. For example, FL code of 10.01, Electric Utilities, could be mapped to 4 EIS codes (see Table B. 4.).

Table B. 4. Example of Florida Codes Mapping to EIS Codes for the Unit Type Data Element

EIS Code	Description	Notes for Mapping to EIS	FL Code and Description
100	Boiler	w/ "boiler" in EU desc	**10.01 Electric Utilities** 10.02 Industrial 10.03 Commercial/Institutional, Residential 10.04 Resource Recovery Boiler 10.07 Cogeneration Boiler 10.08 Boiler, < 10mmBtu/Hour 10.09 Bagasse Boiler
120	Turbine	w/ "turbine", but not "combined cycle", in EU desc	**10.01 Electric Utilities** 11.02 Gas Turbines
140	Combined Cycle (Boiler/Gas Turbine)	w/ "combined cycle" in EU desc	**10.01 Electric Utilities**
160	Reciprocating IC Engine	w/ "engine" in EU desc	**10.01 Electric Utilities** 10.02 Industrial 10.03 Commercial/Institutional, Residential 11.01 Reciprocating Engines

If a state like FL were to adopt the CAER system, CAERS could be designed to assist the facility by providing the four EIS codes that correspond to the one state code so the user could pick the right one.

It would show the code name, then the EIS descriptions for the four EIS codes. For example, CAERS could display a drop-down menu for the user to select as follows:

10.01 Electric Utilities – Boiler

10.01 Electric Utilities – Turbine

10.01 Electric Utilities – Combined cycle (Boiler/Gas Turbine)

10.01 Electric Utilities – Reciprocating IC Engine

3. SLTs can have more specific codes than EIS codes for the Unit Type data element so that multiple codes from one SLT are mapped to one EIS code, for a number of SLTs. Seven out of nine SLTs that have difference with EIS codes for the Unit Type data element show that behavior, including Colorado (CO), FL, Louisiana (LA), MN, MT, SCAA, and Wisconsin (WI). For example, "GENERATOR" and "IC ENGINE" from WIDNR, map to EIS code 160 for Reciprocating IC Engine. Similarly, "BURN OFF OVEN," "HEATER," "OVEN" and "HEATER, SPACE" map to EIS code 290 for Other Combustion.

B.3.3 Control Measure Data Element

1. SLTs have more specific codes for control measures than EPA uses in EIS. Nine out of 12 SLTs that have differences with EIS codes for the Unit Type data element show this behavior. For example:
   - EPA retired detailed control measures and combined multiple control measures to a new control measure, such as EIS code 127 for Fabric Filter / Baghouse, code 213 for Water Injection, and many different types of wet scrubbers to code 141 for Wet Scrubber.
   - In LA and MN, codes with the same descriptions as EIS retired codes are still used in their systems, such as Baghouse (EIS code 100), Steam or Water Injection (EIS code 28), and scrubber (EIS code 129).
   - Some EIS control measure codes are ambiguous and lead to confusion as to how to apply them, such as code 109 for Catalytic Oxidizer / Incinerator and code 133 for Thermal Oxidizer / Incinerator. Delaware (DE), Iowa (IA), and LA use code 109 only for Catalytic Oxidizer and code 133 only for Incinerator.
   - Multiple SLT control measures could be mapped to one EIS code. For example, MN uses control measure codes 906 for Fiberglass Filter with Cardboard Frame, and code 907 for Fiberglass Filter without Cardboard Frame. Those codes are mapped to the same EIS code 58 for Mat or Panel Filter.
2. Several SLTs do not report the Control Measure data element to EIS and usually use fewer codes in their systems than EIS. For example, WI and Wyoming (WY) do not report this data element to NEI. WI has 26 codes and WY has 21 codes, compared with 211 codes in EIS.

B.3.4 Calculation Material Data Element and Calculation Parameter Unit of Measure

1. Calculation Parameter Unit of Measure is not always a separate data element in SLT systems. For example, MT system uses a combination of a numerator and a denominator for an emission factors where the denominator represents the calculation parameter unit of measure.

2. Some SLTs do not actually transmit any of the Calculation Parameter Unit of Measure or Calculation Material data fields (which would be reported to SLTs as throughput) to NEI, for example, Louisiana, Wisconsin, and Wyoming.
3. It is not possible to find good matches for biomass solid, biomass liquid, and biomass dried in the EIS codes for Calculation Material. This is because biomass can include so many things that the materials list includes those very detailed items such as EIS codes: 1 Waste Material, 15 Wood, 18 wood waste, 425 agricultural products, 79 ethanol, etc. Perhaps there are missing items on the list such as certain types of waste that could be obtained from the Department of Energy's Energy Information Administration, and/or from those used specifically by SLTs.

B.3.5 Emissions Calculation Method Data Element

1. Calculation Method is the most controversial data element among five data elements studied in this project. Although this data element must be present in SLT reports to the NEI with EIS codes, the use of the same EIS code is different from one SLT to another. For example:
   - MI has an additional Emission Calculation Method Code "Facility EF", that is specifically for emission factors that come from that facility because emission factors could come from a variety of sources. This code is mapped to EIS code 10 "Site-Specific Emission Factor (no Control Efficiency used)", and used if the source and emission factor are uncontrolled or if the emission factor itself accounts for controls without need to apply a control efficiency in the emissions calculation.
   - EIS code 28 for "USEPA Emission Factor (pre-control) plus Control Efficiency," should be used if the selected emission factor was before controls and, therefore, a control efficiency was also used in the emissions calculation. However, some SLT system codes do not align exactly with EIS codes. For example, CT's classification for "EPA ALTERNATIVE EMISSION FACTOR" and "EPA EMISSION FACTOR" do not explicitly mention controls in their description. CT's current mapping behavior for reporting uncontrolled processes (combustion or otherwise) to EIS from its system would result in using the EIS Code 28. CAERS might need to present several "map to" options that could apply in this case, so the user can make the correct choice.
   - EIS does not have a description for Calculation Method code 2 "Engineering judgement." Some view it as a better factor to use than a "trade group emission factor" with respect to data quality, whereas others view it as the lowest level of data quality. In this case, the SLT might indicate a preference for when and how the engineering judgement code is used by the facility.
   - EIS code 8 "USEPA Emission Factor (no Control Efficiency used)," should be used if the source and corresponding Emission Factor are uncontrolled or if the Emission Factor itself accounts for controls without need to apply a control efficiency in the emissions calculation. However, North Carolina (NC) does not use EIS code 8 as defined. Instead, it uses it for any AP42 or WebFIRE emission factor regardless of whether a control efficiency is also used or not.

2. Incorrect mappings found during the survey got the attention of SLTs and will be improved in the future. For example, WY only takes uncontrolled WebFIRE emission factors in its system. If a process is controlled, WY will use uncontrolled emission factors plus control efficiencies. WY defines this calculation method as a throughput-based calculation method with code 109 that is

mapped to EIS code 8 “USEPA Emission Factor (no Control Efficiency used)” that is used if the source and Emission Factor are uncontrolled or if the Emission Factor itself accounts for controls without the need to apply a control efficiency in the emissions calculation. This mapping is correct for a process that is uncontrolled. However, if a process is controlled, WY’s method should be mapped to EIS code 28 “USEPA Emission Factor (pre-control) plus Control Efficiency.” WY is aware of the mismatch and will map it correctly in the future.

B.3.6 Others

1. Reasons for not submitting emission factors. For example: The SCAA currently does not submit emission factors to EPA. Part of the reason is that it has not yet transitioned to tracking factors in its local database; all emission factors are documented/verified on an annual basis as part of facility inspections. The other reason is that the rigid format of the EPA system does not necessarily translate well to many of the factors SCAA uses. For example, lumber kiln emission factors are based on variables such as wood species and temperature, which change throughout the year. At the end of the year all the emissions are summed, so there is no one factor that applies to the process on a continuous basis. SCAA could “brute force” a factor (total emissions divided by total wood processed) that would work mathematically, but that may not reflect the reality of the situation and is not useful for planning purposes.
2. Other use cases. As mentioned in Section B.2, there may be situations related to these codes and how they are used that this survey did not capture, given that not all SLTs responded to the survey.

B.4 Recommendations

1. Have default unit type assignment based on process SCCs in CAERS to auto-populate unit type codes for emission units without codes. CAERS can take the SCC for the first process for an emission unit type code if the emission unit has multiple processes with different SCCs. This could reduce the number of units reported blank or “unclassified”.
2. Add more detailed control measure codes to EIS, to help make their use less ambiguous and confusing. In addition, provide additional guidance to code definitions to assist the user in understanding the proper use of the code.
3. Add biomass solid, biomass liquid, and biomass dried to the codes for Calculation Material. One option is for CAERS map to and show as many EIS codes as apply to biomass for states whose codes are described as “biomass” of some kind.
4. Codes for Unit Type need to be defined more clearly.

Appendix C *Analysis of Codes Used in the Draft 2017 NEI*

The analysis was conducted based on draft 2017 NEI for point sources downloaded in October 2019 from EPA Emission Inventory website. Please note that because the 2017 NEI had not been finalized at the time of this report, data in the final version of the 2017 NEI may be different from that presented here.

C.1 Summary Information on Data Elements for the Project

A summary of data is shown in Table C. 1. It should be noticed unit type code records were accounted based on number of distinct emission units. Each emission unit can have multiple processes with emissions for multiple pollutants. Therefore, the total records for Unit Type data element are less than total records for other data elements. The released NEI data do not contain information on control measures. The following analysis could only be made for other four data elements.

Table C. 1. Summary of Data in the Draft 2017 NEI for the 5 Data Elements

Data Element	Number in EIS Code Table	Number of Codes in the 2017 NEI Data	Total Emissions Records in the 2017 NEI Data	Percent of Unclassified in the 2017 NEI Data (%)
Unit Type	201	73	433,757	37.2
Control Measure	124	N/A	N/A	N/A
Calculation Parameter Unit of Measure	69	63	6,312,347	48.9
Calculation Material	637	472	6,312,347	48.9
Emission Calculation Method	23	23	6,312,347	0

Note: In NEI an emissions unit can have multiple processes, each used to report multiple pollutants. An emission record is a reported process and pollutant combination.

C.2 Unit Type Data Element

For the Unite Type data element used in draft 2017 NEI reporting, about 37.2 % of emission units were not reported with meaningful codes, but instead, were reported as unclassified. On the other hand, for 26 unit type codes, less than 10 units were reported to each code (for example, “Dry Kiln” and “Smelt Dissolving Tank”. In addition, 128 EIS codes do not show up in the 2017 NEI. The nationwide distribution of number of emission units by codes for the Unit Type data element is listed in Table C. 2.

Table C. 2. Distribution of Number of Emissions Unit Type Codes Used

Unit Type	Number	Percent (%)
Unclassified	161,150	37.2
Storage Tank	44,452	10.2
Open Air Fugitive Source	33,309	7.7
Reciprocating IC Engine	30,573	7.0
Other process equipment	28,716	6.6
Boiler	23,818	5.5
Spray Booth or Coating Line	9,605	2.2

Unit Type	Number	Percent (%)
Process Heater	9,312	2.1
Transfer Point	8,293	1.9
Process Equipment Fugitive Leaks	7,904	1.8
Silo	7,292	1.7
Conveyor	5,580	1.3
Other combustion	5,567	1.3
Turbine	5,056	1.2
Other fugitive	4,814	1.1
Dryer, unknown if direct or indirect.	3,918	0.9
Flare	3,788	0.9
Other bulk material equipment	3,716	0.9
Furnace	3,443	0.8
Other evaporative sources	3,201	0.7
Screen	3,068	0.7
Crusher	2,924	0.7
Cooling Tower	2,859	0.7
Gasoline Loading Rack or Arm	2,601	0.6
Open Storage Pile	2,251	0.5
Printing Line	2,125	0.5
Incinerator	1,849	0.4
Grinder	1,579	0.4
Kiln	1,417	0.3
Mixer or Blender	1,294	0.3
Chemical Reactor	1,226	0.3
Degreaser	1,103	0.3
Process Equipment and Process Area Drains	1,016	0.2
Direct-fired Dryer	991	0.2
Distillation Column/Stripper	780	0.2
Open Tank or Vat	621	0.1
Roof vents/Building vents	611	0.1
Engine Test Cell	459	0.1
Indirect-fired Dryer	399	0.1
Combined Cycle (Boiler/Gas Turbine)	358	0.1
Calciner	255	0.1
Oxidation Unit	198	0.0
Open Burning	64	0.0
Duct Burner	57	0.0
Saw	57	0.0
Sander	12	0.0
Fermenter	10	0.0

Unit Type	Number	Percent (%)
Miscellaneous Coating Operation	8	0.0
Chipper/Flaker/Hammermill	6	0.0
Debarking Drum	5	0.0
Dry Kiln	5	0.0
Lumber Dry Kiln	5	0.0
Transfer System	5	0.0
Curing Oven	3	0.0
Electric Furnace	3	0.0
Smelt Dissolving Tank	3	0.0
Storage bin	3	0.0
Dechlorination Basin	2	0.0
Dry Rotary Dryer	2	0.0
Oil-Water Separator	2	0.0
Process Vent	2	0.0
Chip Conveyer	1	0.0
Chip Pile	1	0.0
Green Rotary Dryer	1	0.0
Non-TSDF Treatment, Storage, Disposal System	1	0.0
Paper Machine	1	0.0
Raw Material Grinder	1	0.0
Rotary Kiln	1	0.0
Rotary Strand Dryer	1	0.0
Secondary Crusher	1	0.0
Settling Pit	1	0.0
Softwood Veneer Dryer	1	0.0
Solvent Extraction Unit	1	0.0

Figure C.1. and Table C. 3. show the Unit Type data element codes used to report more than 10% of emission units in 2017 NEI reporting. Among those Storage: Tank, Open Air Fugitive Source, Reciprocating IC Engine, Other process equipment, and Boiler, are the top codes that contribute to more than 5% of reported emission units in the NEI.

Figure C. 1. Unit Type Codes to Report More Than 10% of Total 2017 NEI Emission Units

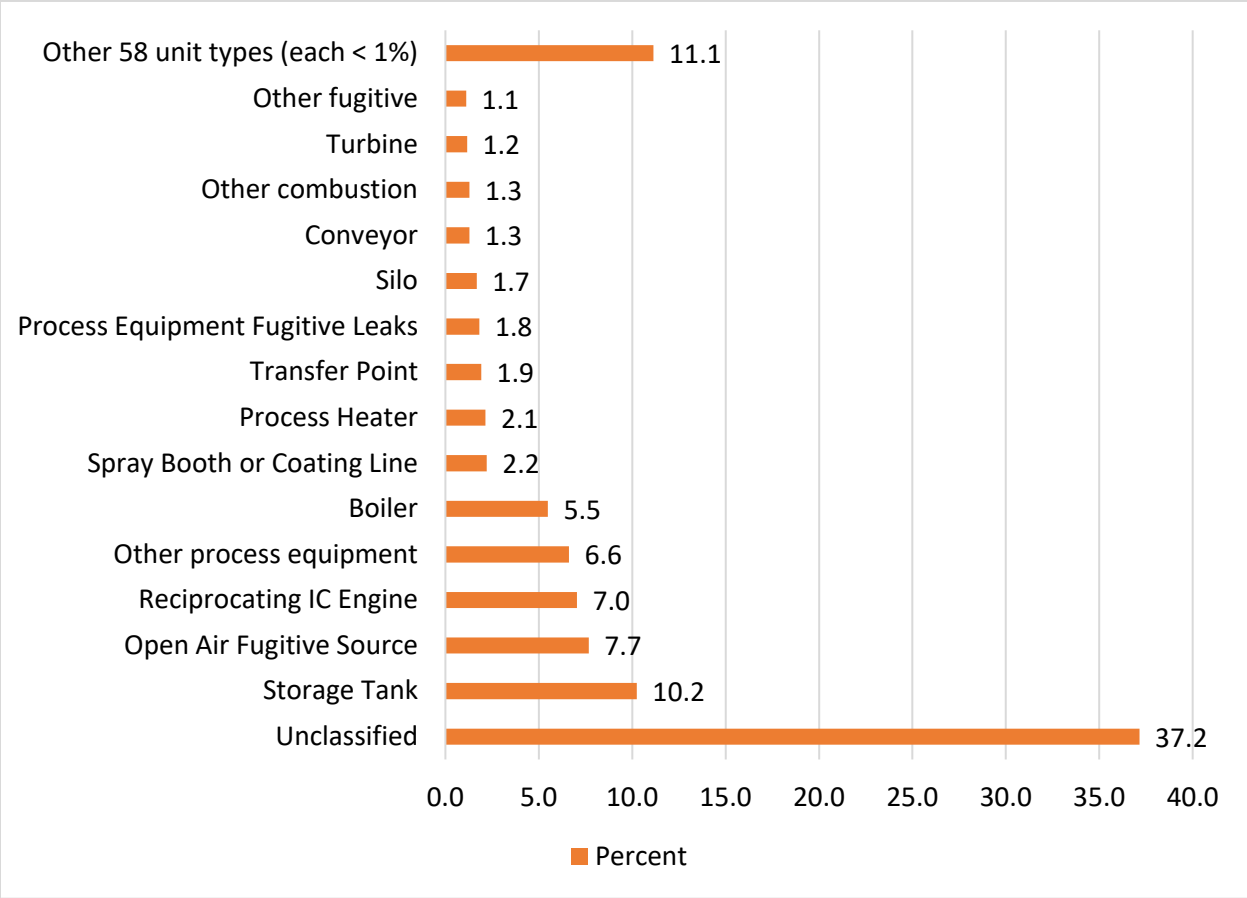

Table C. 3. Unit Type Codes to Report More Than 10% of Total 2017 NEI Emission Units

Unit Type	Number	Percent (%)
Unclassified	161,150	37.2
Storage Tank	44,452	10.2
Open Air Fugitive Source	33,309	7.7
Reciprocating IC Engine	30,573	7.0
Other process equipment	28,716	6.6
Boiler	23,818	5.5
Spray Booth or Coating Line	9,605	2.2
Process Heater	9,312	2.1
Transfer Point	8,293	1.9
Process Equipment Fugitive Leaks	7,904	1.8
Silo	7,292	1.7
Conveyor	5,580	1.3
Other combustion	5,567	1.3
Turbine	5,056	1.2
Other fugitive	4,814	1.1

Unit Type	Number	Percent (%)
Other 58 unit types (each < 1%)	48,147	11.1
Dryer, unknown if direct or indirect.	3,918	0.9
Flare	3,788	0.9
Other bulk material equipment	3,716	0.9
Furnace	3,443	0.8
Other evaporative sources	3,201	0.7
Screen	3,068	0.7
Crusher	2,924	0.7
Cooling Tower	2,859	0.7
Gasoline Loading Rack or Arm	2,601	0.6
Open Storage Pile	2,251	0.5
Printing Line	2,125	0.5
Incinerator	1,849	0.4
Grinder	1,579	0.4
Kiln	1,417	0.3
Mixer or Blender	1,294	0.3
Chemical Reactor	1,226	0.3
Degreaser	1,103	0.3
Process Equipment and Process Area Drains	1,016	0.2
Direct-fired Dryer	991	0.2
Distillation Column/Stripper	780	0.2
Open Tank or Vat	621	0.1
Roof vents/Building vents	611	0.1
Engine Test Cell	459	0.1
Indirect-fired Dryer	399	0.1
Combined Cycle (Boiler/Gas Turbine)	358	0.1
Calciner	255	0.1
Oxidation Unit	198	0.0
Open Burning	64	0.0
Duct Burner	57	0.0
Saw	57	0.0
Sander	12	0.0
Fermenter	10	0.0
Miscellaneous Coating Operation	8	0.0
Chipper/Flaker/Hammermill	6	0.0
Debarking Drum	5	0.0
Dry Kiln	5	0.0
Lumber Dry Kiln	5	0.0
Transfer System	5	0.0
Curing Oven	3	0.0

Unit Type	Number	Percent (%)
Electric Furnace	3	0.0
Smelt Dissolving Tank	3	0.0
Storage bin	3	0.0
Dechlorination Basin	2	0.0
Dry Rotary Dryer	2	0.0
Oil-Water Separator	2	0.0
Process Vent	2	0.0
Chip Conveyer	1	0.0
Chip Pile	1	0.0
Green Rotary Dryer	1	0.0
Non-TSDF Treatment, Storage, Disposal System	1	0.0
Paper Machine	1	0.0
Raw Material Grinder	1	0.0
Rotary Kiln	1	0.0
Rotary Strand Dryer	1	0.0
Secondary Crusher	1	0.0
Settling Pit	1	0.0
Softwood Veneer Dryer	1	0.0
Solvent Extraction Unit	1	0.0
Grand Total	**433,757**	

Table C. 4. lists the number of emission units reported as ”Unclassified” for the Unit Type data element and the percentage they represent from the total number of reported emission units for each SLT.

Table C. 4. Number of Emission Units Reported as “Unclassified” by SLTs for the Unit Type Data Element

Program System Code	Total number of Emission Units	Unclassified	Percent of Unclassified (%)
ADEM	4,720	515	10.9
AKDEC	4,089	183	4.5
ALJCBOH	915	888	97.0
ARDEQ	3,854	1,297	33.7
AZDEQ	704	286	40.6
AZMCAQD	960	182	19.0
CARB	79,261	76,332	96.3
CHC_APCB	544	235	43.2
CODPHE	10,096	499	4.9
COHDNREM	19	13	68.4
CTBAM	1,246	426	34.2
DEDNR	1,175	674	57.4
DOEE	162	12	7.4
FLDEP	5,671	1,791	31.6

Program System Code	Total number of Emission Units	Unclassified	Percent of Unclassified (%)
GADNR	5,800	474	8.2
HIDOHCAB	791	45	5.7
IADNR	11,315	2,364	20.9
IDDEQ	1,251	73	5.8
ILEPA	31,379	10,626	33.9
INDEM	5,304	4,475	84.4
KC_DAQM	34	5	14.7
KSDOHE	5,222	1,362	26.1
KYDAQ	20,199	12,245	60.6
KYJCAPCD	453	40	8.8
LADEQ08	22,884	3,508	15.3
LRAPA	139	35	25.2
MADEP	2,349	335	14.3
MDDOE	3,184	109	3.4
MEDEP	1,421	62	4.4
MIDEQ	10,162	1,616	15.9
MNPCA	16,724	4,314	25.8
MODNR	5,918	987	16.7
MSC_HD	705	346	49.1
MSDEQ	5,298	1,683	31.8
MTDEQ	2,260	70	3.1
NCBCRAQA	79	4	5.1
NCDAQ	10,610	604	5.7
NCFCEAD	252	6	2.4
NCMCAQ	146	30	20.5
NDC_MPHD	801	498	62.2
NDDOH	965	73	7.6
NEDEQ	2,954	138	4.7
NELLCHD	57	14	24.6
NEOPWD	191	64	33.5
NHDES	448	54	12.1
NJDEP	6,570	1,036	15.8
NMCOA	557	378	67.9
NMED	1,797	267	14.9
NVBAQ	3,043	88	2.9
NVCCDAQM	427	121	28.3
NVWCAQMD	43	4	9.3
NYDEC	2,837	778	27.4
OHEPA	9,918	7,364	74.2
OKDEQ	14,414	342	2.4

Program System Code	Total number of Emission Units	Unclassified	Percent of Unclassified (%)
ORDEQ	1,777	152	8.6
PAACHD	1,306	44	3.4
PACOP	1,391	19	1.4
PADEP	9,627	684	7.1
PAG	49	11	22.4
PIMA	347	17	4.9
Pinal	222	14	6.3
PREQB	916	79	8.6
RIDEM	1,263	1,212	96.0
SCDHEC	3,412	1,245	36.5
SDDENR	948	151	15.9
TNDEC	2,389	780	32.6
TR124	83	6	7.2
TR180	7	4	57.1
TR181	19	7	36.8
TR182	6	3	50.0
TR206	5		0.0
TR207	3		0.0
TR380	1		0.0
TR405	2		0.0
TR610	1	1	100.0
TR614	1	1	100.0
TR615	41	4	9.8
TR750	1,686	37	2.2
TR751	2		0.0
TR780	9	4	44.4
TXCEQ	57,702	12,491	21.6
UTDAQ	3,004	124	4.1
VADEQ	2,755	877	31.8
VTDEC	264	105	39.8
WAECY	1,274	161	12.6
WAORCAA	162	25	15.4
WAPSCAA	413	78	18.9
WASWCAA	317	30	9.5
WIDNR	10,250	500	4.9
WVDAQ	2,925	2,219	75.9
WYDEQ	6,828	86	1.3
(blank)	27	9	33.3
	6		
Grand Total	**433,757**	**161,150**	**37.2**

Some SLTs provide almost no information for emission units besides “Unclassified” such as California (CA) and Rhode Island (RI). A detailed look at the 161,150 unclassified units shows that the majority of the emission units are associated with descriptions that could be specified with codes of Unit Type. Only about 4 % (6,995) emissions units do not have descriptions.

C.3 Calculation Parameter Unit of Measure Data Elements

Information about the Calculation Material data element in the 2017 NEI was either reported directly by SLTs (46.7% or all emission records) or incorporated by EPA (53.3% of all emission records). About 74.1 % of emission records were shown as “unclassified”, blank, or null. From all emission records in the draft 2017 NEI, 48.9 % were blank or null. On the other hand, emission records identified for 12 codes for Calculation Parameter Unit of Measure are less than 100 each (such as “E6TON” or million tons, of which there are 66 instances, and “E6TON” or million tons, of which there are 42 instances) . In addition, 63 out of 69 EIS codes appear in the 2017 draft NEI and another 6 EIS codes do not appear in the 2017 draft NEI. The top fifteen most used units of measure used nationwide are shown in Figure C. 2 and the entire distribution of nationwide use of units of measure is listed in Figure C. 3. in descending order, excluding blanks and null entries.

Figure C. 2. Nationwide Distribution of Top 15 Codes (Excluding Blank and Null) Used in the 2017 NEI for the Calculation Parameter Unit of Measure Data Element

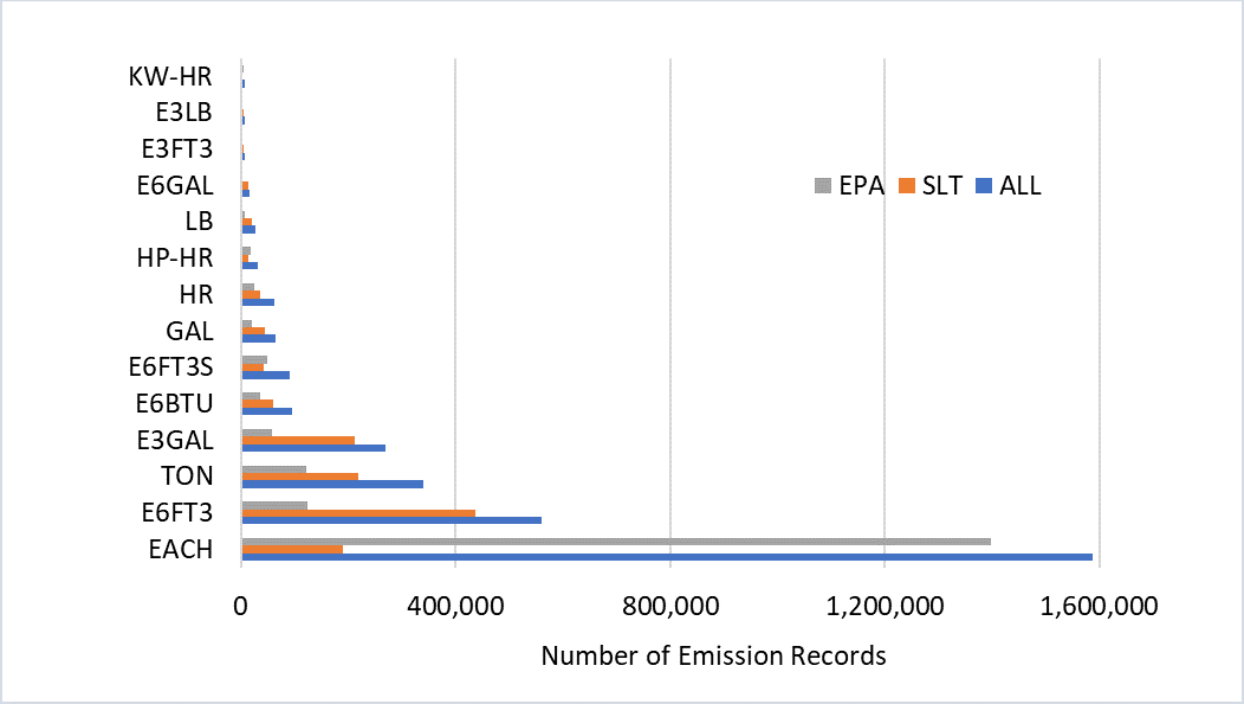

Figure C. 3. Distribution of Number of Emission Records by Codes for the Calculation Parameter Unit of Measure Data Element
Distribution of Number of Emission Records by Codes for the Calculation Parameter Unit of Measure Data Element

Calculation Parameter Unit of Measure Code	ALL	SLT	EPA
(blank)	1,830,044	764,871	1,065,173
EACH	1,588,149	190,389	1,397,760
Null	1,256,832	1,256,832	
E6FT3	559,832	436,468	123,364
TON	340,730	218,632	122,098
E3GAL	268,754	211,407	57,347
E6BTU	95,981	59,841	36,140
E6FT3S	92,178	42,983	49,195
GAL	65,634	45,607	20,027
HR	61,514	35,902	25,612
HP-HR	31,927	14,005	17,922
LB	27,764	20,754	7,010
E6GAL	15,783	14,017	1,766
E3FT3	8,282	5,094	3,188
E3LB	7,445	5,211	2,234
KW-HR	7,362	2,991	4,371
BBL	6,506	6,387	119
FT3	6,032	4,573	1,459
MILE	6,000	2,706	3,294
E3FT2	3,614	2,424	1,190
E3BDFT	3,607	2,376	1,231
E3FT3S	3,571	2,052	1,519
FT3S	3,170	1,944	1,226
E3BBL	2,859	2,724	135
ACRE-YR	2,585	1,850	735
FT3S/M-Y	1,891	834	1,057
YD3	1,856	869	987
E3HP-HR	1,550	1,173	377
BDFT	1,052	664	388
E3TON	935	573	362
GPM-YR	855	504	351
E3EACH	781	473	308
ACRE	752	354	398
E6LB	723	536	187
FT2	470	312	158
FT3SD	460	317	143
E2LB	435	289	146

Calculation Parameter Unit of Measure Code	ALL	SLT	EPA
E2TON	432	195	237
FT	390	251	139
THERM	331	193	138
YD2	321	255	66
E6FT2	315	182	133
BUSHEL	309	117	192
E6BDFT	309	178	131
DAY	253	174	79
E2BBL	226	226	
BALE	212	48	164
M3	203	170	33
KG	175	109	66
E3AMP-HR	141	84	57
YD3-MILE	137	54	83
MEGAGRAM	135	100	35
AMP-HR	120	52	68
E3FT	79	61	18
E3YD3	70	43	27
E3MILE	66	32	34
E4FT2	61	36	25
E6TON	42	37	5
ACRE-DAY	27	10	17
E5HP-HR	25	5	20
E3BU	20	11	9
TON-MILE	16	6	10
HECTR	15	9	6
BBL50GAL	1	1	
E3BBL31G	1	1	
Total	**6,312,347**	**3,361,578**	**2,950,769**

From Table C. 3, we can see that the code “EACH” is the most popular one used, but mainly by EPA. About 98.5% of the records using the code “EACH” are associated with a calculation material of the Landing-Takeoff Cycle used in estimating airport emissions by EPA. On the other hand, code “E6FT3” representing Million Cubic Feet is the most popular one used by SLTs, probably for representing the use of natural gas in combustion. Other top used codes seem related to combustion processes as well, such as “E3GAL” or thousand gallons, and “E6BTU” or million British Thermal Units.

Table C. 6. shows the distribution of the top 9 codes, including blank and null, for the Calculation Material Unit of Measure Data Element by reporting SLT in the draft 2017 NEI. It shows that 44 SLTs out of 82 did not report the Calculation Parameter Unit of Measure data element to the NEI, for example,

Alabama, California, Colorado, Illinoi, Wisconsin, and Wyoming. A detailed list of the SLTs that did not report this data element to the 2017 draft NEI is shown in Table C. 7.

Table C. 5. Distribution of Top 9 Codes (Including Blank and Null) for the Calculation Material Unit of Measure Data Element in the 2017 NEI

Program System Code	SLT Total	*Null*	(blank)	E6FT3	TON	E3GAL	EACH	E6BTU	GAL	E6FT3S
ADEM	32,552		32,552							
AKDEC	21,285	2,713		278	389	348		478	8,703	3,843
ALJCBOH	5,382		5,382							
ARDEQ	19,031	128		2,605	4,879	539	235	2,470	813	1,519
AZDEQ	13,373	1,886		917	3,131	337	72	1,674	198	840
AZMCAQD	1,916	1,916								
CARB	656,565	656,565								
CHC_APCB	1,878		1,878							
CODPHE	39,302	39,302								
CTBAM	17,443		103	6,486	1,389	9,329		9	88	
DEDNR	13,762		63	5,938	991	5,297	22	33	198	167
DOEE	2,244		2,244							
FLDEP	27,091		382	8,043	7,240	9,576	89		936	
GADNR	18,510		119	3,277	5,415	1,313	71	1,025	1,707	1,474
HIDOHCAB	7,324	138		11	595	4,639		111	133	1,571
IADNR	52,841	505		12,821	9,639	4,092	202	4,338	6,854	386
IDDEQ	4,048			1,240	1,249	1,077		187	10	
ILEPA	317,766		317,766							
INDEM	33,302		11,291				22,011			
KC_DAQM	82		82							
KSDOHE	36,167	1,316		6,202	4,433	3,996	306	7,135	709	1,097
KYDAQ	118,190		118,190							
KYJCAPCD	11,988		212	2,209	1,865	195	702	749	1,191	308
LADEQ08	100,100	100,100								
LRAPA	399	399								
MADEP	11,054		20	4,015	1,066	4,808	116	806	39	80
MDDOE	26,461		8,375		18,086					
MEDEP	18,828		40	6,207	2,865	8,239	11	119	1,010	26
MIDEQ	98,464		1,665	56,665	15,476	22,005	112	98	1,567	
MNPCA	305,798		20,046	131,986	48,329	69,692	14,026	2,454	649	
MODNR	25,037	25,037								
MSC_HD	5,359		5,359							
MSDEQ	45,877		45,877							
MTDEQ	7,849	7,849								
NCBCRAQA	1,614		1,614							

Program System Code	SLT Total	*Null*	(blank)	E6FT3	TON	E3GAL	EACH	E6BTU	GAL	E6FT3S
NCDAQ	84,376		611	8,929	19,387	1,781	1,402	5,318	13,741	5,208
NCFCEAD	2,167			482	258	6	818	75	99	25
NCMCAQ	301		301							
NDC_MPHD	5,004		5,004							
NDDOH	1,890	1,890								
NEDEQ	12,098	12,098								
NELLCHD	197	197								
NEOPWD	970	970								
NHDES	3,164		123	1,103	465	1,408			33	
NJDEP	53,547		49,414	3,104	10				1,019	
NMCOA	2,596	476		180	88	185			125	35
NMED	7,583	2,504			27				222	4,830
NVBAQ	12,872	12,872								
NVCCDAQM	1,835	1,835								
NVWCAQMD	48	48								
NYDEC	41,064		41,064							
OHEPA	109,565		4,448	72,918	18,267	11,564	282		783	161
OKDEQ	75,586	647		7,711	3,697	13,529	723	14,727	1,268	18,880
ORDEQ	12,430	54		3,811	3,001	476	560	806	55	
PAACHD	8,716		35	3,607	3,477	1,192	9	39	52	
PACOP	10,847			5,243	520	4,708		26	37	
PADEP	54,864		376	28,076	14,243	9,971	37	252	1,140	
PIMA	1,323	1,323								
PREQB	5,109		5,109							
RIDEM	8,278		8,278							
SCDHEC	99,519		17,635	35,421	12,253	15,244	305	13,630	860	371
SDDENR	2,333	2,333								
TNDEC	30,009		22,118	537	5,035	578	50	14	294	1,011
TR124	294	294								
TR180	46	46								
TR181	180	180								
TR182	29	29								
TR207	4	4								
TR615	406	406								
TR750	6,193	6,187								6
TR751	7	7								
TXCEQ	381,365	238,500					142,865			
UTDAQ	20,166	827		6,268	3,520	2,183	66	1,774	226	26
VADEQ	12,272		12,272							

Program System Code	SLT Total	*Null*	(blank)	E6FT3	TON	E3GAL	EACH	E6BTU	GAL	E6FT3S
VTDEC	836		836							
WAECY	7,930	1,085		2,879	1,332	1,071	6	137	121	60
WAORCAA	601	601								
WAPSCAA	1,141	1,141								
WASWCAA	1,448	88		214	115	139	592	38	41	16
WIDNR	23,570		23,570							
WVDAQ	25,581		417	7,085	5,900	1,890	4,699	1,319	686	1,043
WYDEQ	132,336	132,336								
Grand Total	**3,361,578**	**1,256,832**	**764,871**	**436,468**	**218,632**	**211,407**	**190,389**	**59,841**	**45,607**	**42,983**

Table C. 6. SLTs That Didn't Report to the 2017 Draft NEI for the Calculation Parameter Unit of Measure Data Element

Program System Code	Program System Code	Program System Code
ADEM	MTDEQ	SDDENR
ALJCBOH	NCBCRAQA	TR124
AZMCAQD	NCMCAQ	TR180
CARB	NDC_MPHD	TR181
CHC_APCB	NDDOH	TR182
CODPHE	NEDEQ	TR207
DOEE	NELLCHD	TR615
ILEPA	NEOPWD	TR751
KC_DAQM	NVBAQ	VADEQ
KYDAQ	NVCCDAQM	VTDEC
LADEQ08	NVWCAQMD	WAORCAA
LRAPA	NYDEC	WAPSCAA
MODNR	PIMA	WIDNR
MSC_HD	PREQB	WYDEQ
MSDEQ	RIDEM	

C.4 Calculation Material Data Element

For reporting, information for the Calculation Material data element is paired with the calculation parameter unit of measure. Therefore, distribution of emission records between the SLT and EPA is identical to the distribution of the Calculation Parameter Unit of Measure data element in the 2017 NEI. It was reported by either the SLTs (46.7% of emission records) or incorporated by EPA (53.3% or emission records).

About 48.9 % of emission records were shown as blank (null is not there but combined with blank due to the data format in the draft 2017 NEI). On the other hand, emission records identified for 92 codes for the Calculation Material data element are less than 10 each. In addition, 473 out of 637 EIS codes show up in the 2017 NEI and another 224 EIS codes are not found. The nationwide distribution of

codes between SLT and EPA in the draft 2017 NEI for the Calculation Material data element is in Table C. 8. The number in the table represents emission records.

Table C. 7. Distribution of Codes between SLT and EPA for the Calculation Material Data Element in the 2017 Draft NEI

Calculation Material Code	ALL	SLT	EPA	Calculation Material Code	ALL	SLT	EPA
(blank)	3,086,876	2,021,703	1,065,173	**Grit**	116	49	67
Landing-Takeoff Cycle	1,517,384	142,865	1,374,519	**Jet Naphtha**	112	94	18
Natural Gas	722,911	500,519	222,392	**Sulfur**	112	85	27
Fuel	101,325	74,964	26,361	**Refinery Crude Feed**	111	96	15
Distillate Oil (Diesel)	96,356	78,694	17,662	**Make-Up Solvent**	104	97	7
Diesel	81,391	47,794	33,597	**Blast**	100	75	25
Material	78,803	51,237	27,566	**Boat**	100	75	25
Distillate Oil (No. 2)	38,193	22,936	15,257	**Overburden**	95	32	63
Process Unit	28,117	20,062	8,055	**Butane**	92	86	6
Distillate Oil	20,713	16,600	4,113	**Crushed Stone**	92	29	63
Product	19,024	12,002	7,022	**Charcoal**	91	60	31
Residual Oil	16,247	9,861	6,386	**Cottonseed**	91	40	51
Wood	16,050	10,247	5,803	**Isopropanol**	89	87	2
Gasoline	15,403	14,250	1,153	**Ethylene Glycol**	87	83	4
Process Gas	14,814	12,894	1,920	**Shingles**	87	50	37
Body	14,400	13,495	905	**Sulfuric Acid**	85	47	38
Raw Material	14,053	7,395	6,658	**Polyester/Alkyd Resin**	84	60	24
Wastewater	13,345	13,256	89	**Zinc**	84	38	46
Grain	12,844	5,241	7,603	**Alloy**	80	44	36
Crude Oil	12,511	12,424	87	**Sodium Carbonate**	80	27	53
Wood/Bark	9,663	6,405	3,258	**Yeast**	77	44	33
Coating	9,614	7,158	2,456	**Cereal**	76	26	50
Work	9,407	5,554	3,853	**Lubrication**	76	42	34
Metal	9,370	5,847	3,523	**Thinning Solvent**	75	64	11
Propane	8,510	6,660	1,850	**Glaze**	73	25	48
Distillate Oil (No. 1 & 2)	8,397	6,006	2,391	**Polyvinyl Chloride**	71	67	4
Coal	8,333	4,858	3,475	**Pieces**	69	63	6

Calculation Material Code	ALL	SLT	EPA	Calculation Material Code	ALL	SLT	EPA
Paint	7,710	5,489	2,221	**Beans**	67	19	48
Landfill Gas	7,634	6,176	1,458	**Adipic Acid**	66	30	36
Heat	7,354	5,811	1,543	**Olefin**	66	40	26
Asphalt	7,220	6,015	1,205	**Resin or Wax**	66	46	20
Refinery Gas	7,142	5,980	1,162	**Fired Ceramic**	64	28	36
Hot Mix Asphalt	6,989	6,085	904	**Dextrose**	63	34	29
Coating Mix	6,613	4,937	1,676	**Nitric Acid**	63	55	8
Residual Oil (No. 6)	6,540	4,590	1,950	**Agent**	62	34	28
Distillate	6,484	6,141	343	**Extractor Feed Cake**	62	37	25
Cement	6,433	2,721	3,712	**Raw Beets**	61	28	33
Solvent	6,359	5,661	698	**Cans**	60	42	18
Lime	6,113	4,187	1,926	**Topsoil**	60	16	44
Liquified Petroleum Gas (LPG)	5,996	4,728	1,268	**Ethylene Oxide**	59	59	
Solvent in Coating	5,530	4,134	1,396	**Glycol Ethers**	59	45	14
Electricity	5,526	2,100	3,426	**Wet Mixed Slurry**	58	37	21
Unit	5,515	2,823	2,692	**Petroleum Distillate**	57	54	3
Equipment	5,411	3,487	1,924	**Whiskey**	57	55	2
Condensate	5,358	5,349	9	**Pressed Wet Pulp**	55	43	12
Bituminous Coal	5,280	4,420	860	**Raw Coke**	55	34	21
Clay	4,723	1,895	2,828	**Storage Pile**	55	21	34
Sand	4,577	1,825	2,752	**Wax**	55	28	27
Finished Product	4,349	2,516	1,833	**Phosphate Rock**	54	28	26
Vehicle	4,317	2,151	2,166	**Carbon Dioxide**	53	45	8
Ethanol	4,196	3,429	767	**Saturated Felt**	53	28	25
Energy	4,075	2,514	1,561	**Slip**	53	32	21
Steel	3,909	2,067	1,842	**Sinter**	52	25	27
Ink	3,768	3,543	225	**Tank Truck**	52	34	18
Liquid	3,761	3,623	138	**Acid**	51	30	21

Calculation Material Code	ALL	SLT	EPA	Calculation Material Code	ALL	SLT	EPA
Cooling Water	3,705	1,797	1,908	**Acetone**	50	40	10
Solid Waste	3,566	2,911	655	**Asphalt Shingles/Rolls**	48	31	17
Ore	3,474	2,752	722	**Reclaimed Solvent**	48	38	10
Limestone	3,303	1,446	1,857	**Triethylene Glycol**	48	43	5
Brick	3,283	2,210	1,073	**Area**	47	30	17
Petroleum Liquid	3,239	3,111	128	**Grader**	47	29	18
VOCs	3,221	2,832	389	**Coal Tar**	46	26	20
Pellets	3,218	2,462	756	**Cullet**	45	15	30
Black Liquor Solids	3,184	2,911	273	**Trichloroethylene**	45	44	1
Subbituminous Coal	3,156	2,615	541	**Seal**	42	42	
Corn	3,118	1,540	1,578	**Hydrogen Sulfide**	41	38	3
Waste Gas	2,863	2,360	503	**Waste Liquid**	41	35	6
Plastic	2,804	1,695	1,109	**Flange**	40	40	
Item	2,773	1,699	1,074	**Pipeline**	40	14	26
Paper	2,692	2,466	226	**Vacuum Feed**	40	40	
Soybeans	2,642	1,083	1,559	**Dried Blood Meal**	39	26	13
Clinker	2,627	1,590	1,037	**Pure Acid**	39	30	9
Steam	2,627	1,637	990	**Vinyl Acetate**	34	32	2
Air-Dried Unbleached Pulp	2,437	2,192	245	**Carbon Tetrachloride**	33	33	
Feed Material	2,436	1,191	1,245	**Methylene Chloride**	32	32	
Gas	2,383	1,975	408	**Tank Car**	32	26	6
Acrylonitrile	2,301	1,715	586	**Zinc Oxide**	32	19	13
Waste Oil	2,298	1,676	622	**Turpentine**	31	22	9
Average Airflow	2,289	961	1,328	**Cold Cleaner**	30	28	2
Wood Waste	2,255	923	1,332	**Cotton**	30	6	24
Exhaust Gas	2,071	1,427	644	**Hole**	30	23	7
Ash	2,041	1,033	1,008	**Benzene**	29	29	
Landfill	1,987	1,704	283	**Methyl Ethyl Ketone**	29	29	
Pulp	1,978	1,840	138	**Sour Gas**	29	25	4

Calculation Material Code	ALL	SLT	EPA	Calculation Material Code	ALL	SLT	EPA
Starch	1,931	960	971	**Acetylene**	28	21	7
Iron	1,894	955	939	**Solid Propellant**	28	18	10
Waste	1,827	1,305	522	**Wood/Vegetation/Leaves**	28	15	13
Rock	1,769	794	975	**Alkane**	27	27	
Styrene-Butadiene Rubber	1,650	1,294	356	**Bauxite Material**	27	15	12
Coke	1,601	1,199	402	**Chloroform**	27	27	
Resin	1,524	1,186	338	**Degreaser**	27	24	3
Bark	1,498	774	724	**Maleic Anhydride**	27	27	
Refinery Feed	1,487	1,433	54	**Photoresist**	27	27	
Kerosene	1,433	1,052	381	**Anhydrous Ammonia**	26	23	3
Jet Fuel	1,395	1,100	295	**Chromic Acid**	26	8	18
Oil	1,311	1,031	280	**Sodium Bicarbonate**	26	11	15
Abrasive	1,298	474	824	**Xylenes (Mixed)**	26	26	
Stone	1,298	432	866	**Beaded Glass**	25	13	12
Crude Gypsum	1,278	510	768	**Green Beans**	25	5	20
Exposed Area	1,264	918	346	**Thinned Resin**	25	18	7
Adhesive	1,252	986	266	**Drum**	24	12	12
Dried Sludge	1,249	1,084	165	**Lead Product**	24	13	11
Water	1,192	606	586	**Specialty Steel**	24	15	9
Glass	1,174	779	395	**Wafers**	24	24	
Distillate Oil (No. 4)	1,151	989	162	**n-Hexane**	23	19	4
Methanol	1,149	1,050	99	**Hydrogen**	22	16	6
Soybean Meal	1,146	483	663	**n-Propyl Alcohol**	22	18	4
Produced Water	1,105	1,098	7	**Phosphorous**	22	19	3
Oven-dried Wood	1,028	714	314	**Construction Activity**	21	13	8
Aluminum	967	626	341	**Fish**	21	14	7
Specialty Chemical	959	677	282	**Formaldehyde**	21	21	
Bituminous/Subbituminous Coal	920	764	156	**Alumina**	20	6	14

Calculation Material Code	ALL	SLT	EPA	Calculation Material Code	ALL	SLT	EPA
Tires	906	783	123	**Concentrate**	20	13	7
Sawdust	878	503	375	**Pipe**	20	8	12
Slag	844	340	504	**Ether**	19	11	8
Methane	827	561	266	**Ethyl Acetate**	19	19	
Electrode	825	403	422	**Toner**	19	13	6
Wood Refuse	804	757	47	**Phenol**	18	16	2
Jet Kerosene	786	654	132	**Isopentane**	17	17	
Dual Fuel (Gas/Oil)	774	497	277	**p-Cresol**	17	17	
Sludge	757	606	151	**Phosphoric Acid**	17	11	6
Refuse Derived Fuel	743	576	167	**Amine**	16	16	
3/8-inch Plywood	742	485	257	**Dried Grain**	16	11	5
Welding Rod	736	337	399	**EAF Dust**	16	15	1
Gray Iron	733	504	229	**Sulfur Dioxide**	16	14	2
Facility	732	449	283	**Coolant**	15	9	6
Board	721	500	221	**Dried Beans**	15	3	12
Naphtha	706	689	17	**Scraper**	15	5	10
Diesel/Kerosene	704	505	199	**Syrup**	15	12	3
Lead	700	557	143	**Perchloroethylene**	14	13	1
Anthracite	662	467	195	**Aqueous Ammonia**	13	13	
Coating Material	647	456	191	**Propylene Oxide**	13	13	
Sugar	639	248	391	**Solvent/Water**	13	9	4
Solvents: All	629	608	21	**Acetic Acid**	12	12	
Coke Oven Gas	607	520	87	**Anhydride**	12	4	8
Cores	604	411	193	**Deadener**	12	12	
3/8-inch Oriented Strand Board	597	391	206	**Propylene**	12	12	
Storage Area	592	374	218	**Sump Area**	12	12	
Logs	589	241	348	**Xylene**	12	12	
Residual Oil (No. 5)	578	442	136	**Monomer**	11	11	

Calculation Material Code	ALL	SLT	EPA	Calculation Material Code	ALL	SLT	EPA
Starting Monomer	562	537	25	**Anthracite Culm**	10	4	6
Castings	526	217	309	**Forests**	10	7	3
Chips	496	249	247	**Halogenated Organic**	10	10	
3/4-inch Particleboard	473	364	109	**MDI**	10	10	
Dry Material	469	223	246	**Aromatic**	9	9	
Concrete	468	132	336	**Creosote**	9	5	4
Molten Aluminum	445	334	111	**Final Acid**	9	5	4
Liquid Waste	442	340	102	**Hydrogen Chloride**	9	6	3
Salt	436	288	148	**Methyl Chloride**	9	9	
Tile	432	278	154	**Acetaldehyde**	8	5	3
Air-Dried Bleached Pulp	417	408	9	**Acetic Anhydride**	8	8	
Bagasse	410	369	41	**Hydrofluoric Acid**	8	4	4
Bentonite	408	325	83	**Isobutylene**	8	5	3
Carbon Black	402	204	198	**Methyl Isobutyl Ketone**	8	8	
Medical Waste	393	325	68	**n-Propyl Acetate**	8	8	
Urea	392	238	154	**tert-Butyl Alcohol**	8	8	
Makeup	376	193	183	**Butyl Acetate**	7	7	
Wafers/Chips	373	31	342	**Crude Ore**	7	7	
Peanuts	358	150	208	**Ester**	7	3	4
Concentrated Ore	355	305	50	**Hydrogen Fluoride**	7	7	
Digester Gas	340	232	108	**Appliance**	6	3	3
Dried Germ	340	221	119	**Asbestos**	6	2	4
TNT	330	250	80	**Clothes**	6	2	4
Refined Oil	327	321	6	**Dimethylformamide**	6	6	
Batteries	323	143	180	**Dryer Feed**	6	3	3
Dyes/Pigments	321	246	75	**o-Xylene**	6	6	
Jet A Fuel	317	264	53	**Residues/Skimmings**	6	3	3
Bread	315	255	60	**Toluene Diisocyanate**	6	6	
Storage Tank	312	312		**ABS Polymer**	5	4	1

Calculation Material Code	ALL	SLT	EPA	Calculation Material Code	ALL	SLT	EPA
Solvent in Ink	311	307	4	**Casein**	5	1	4
Parts	297	191	106	**Diethylene Glycol**	5	5	
Pigment	293	183	110	**Dried Malt**	5	4	1
Sealer	291	203	88	**Employee**	5	2	3
Fresh Feed	285	248	37	**Flue Dust**	5	4	1
Product Surface Area	279	196	83	**Land**	5	2	3
Fiber	277	169	108	**Methyl Amyl Ketone**	5	5	
Hydrated Lime	275	162	113	**Mixing Material**	5	1	4
Shot	270	102	168	**n-Heptane**	5	5	
Charge	269	167	102	**Silicomanganese**	5	2	3
Catalyst	262	152	110	**Aerosol**	4	4	
Ammonium Nitrate	252	154	98	**Butadiene**	4	4	
Hot Metal	250	138	112	**Cellosolve**	4	4	
Lead Oxide	247	135	112	**Formalin**	4	4	
Particleboard	247	139	108	**Freon**	4	4	
Glycol	242	241	1	**Isobutyl Alcohol**	4	4	
Solution	239	209	30	**Neoprene**	4	4	
Coke Oven or Blast Furnace Gas	236	181	55	**Thin Juice**	4	4	
Surface Area	226	159	67	**Area Sludge Applied**	3	3	
Corn Gluten Feed	224	141	83	**Carbon Monoxide**	3	3	
Ammonia	222	204	18	**Drain**	3	3	
Refuse	222	159	63	**Ketone**	3	3	
Beer	218	173	45	**m-Xylene**	3	3	
Varnish	216	162	54	**Printing Line**	3	3	
Feed	215	143	72	**Propane/Butane**	3	3	
Meal	214	89	125	**Propylene Glycol**	3	3	
Lube Oil	213	205	8	**Pure Solvent**	3	3	
Fabric	210	187	23	**p-Xylene**	3	3	

Calculation Material Code	ALL	SLT	EPA	Calculation Material Code	ALL	SLT	EPA
Stock	210	110	100	**Raw Juice**	3	3	
3/4-inch Medium Density Fiberboard	205	128	77	**Solvent in Drawing Compound**	3	3	
Primer	205	145	60	**2,4-Dichlorophenol**	2	2	
Dry Sawdust	200	147	53	**Acrylic Acid**	2	2	
Dried Hulls	196	95	101	**Butyl Cellosolve**	2	2	
Waste Material	194	101	93	**Carbon Disulfide**	2	2	
Carpet	189	116	73	**Containers**	2	2	
Meat	189	97	92	**Dimethyl Sulfoxide**	2	2	
Wine	189	165	24	**Dye**	2	2	
Coal Storage Area	184	80	104	**Ethyl Acrylate**	2	2	
Fertilizer	182	77	105	**Ethylene Dichloride**	2	2	
Sprayed Metal	179	77	102	**Mercury**	2	2	
Dried Material	177	81	96	**n-Butyl Alcohol**	2	2	
Asphaltic Concrete	176	70	106	**Phthalic Anhydride**	2	2	
Soil	176	124	52	**Tetrahydrofuran**	2	2	
Bulldozer	169	89	80	**Well**	2	2	
Finished Pellet	167	69	98	**1,4-Dioxane**	1	1	
Vegetation	167	104	63	**1-Pentene**	1	1	
Scrap	162	89	73	**Cyclohexanol**	1	1	
Natural Gas Liquids	160	140	20	**Cyclohexanone**	1	1	
Valve	160	160		**Dimethylamine**	1	1	
Gravel	159	44	115	**Ethane**	1	1	
Distillate Oil (No. 1)	153	126	27	**Ethyl Ether**	1	1	
Hydrochloric Acid	149	94	55	**Ethylbenzene/Styrene**	1	1	
Styrene	148	144	4	**Formic Acid**	1	1	
Liquor	147	130	17	**Head of Cattle**	1	1	
Coating Line	145	102	43	**Isobutyl-isobutyrate**	1	1	
Dry Product	138	68	70	**Isopropyl Acetate**	1	1	

Calculation Material Code	ALL	SLT	EPA	Calculation Material Code	ALL	SLT	EPA
Ethylene	138	125	13	**Malted Grain**	1	1	
Toluene	136	135	1	**Methyl-tert-Butyl Ether**	1	1	
Corn Gluten Meal	135	81	54	**Monoethanolamine**	1	1	
Wet Coal	129	115	14	**Naphthalene**	1	1	
100% Sulfuric Acid	128	103	25	**Nitrogen**	1	1	
Chlorine	127	91	36	**n-Pentane**	1	1	
Alcohol	125	121	4	**Perc & Trichloroethylene**	1	1	
Waferboard	125	93	32	**sec-Butyl Alcohol**	1	1	
100% Sulfur	121	104	17	**Solvents: NEC**	1	1	
Phosphate	120	48	72	**Special Naphthas**	1	1	
P2O5	119	56	63	**Vinyl Chloride**	1	1	
				Total	**6,312,347**	**3,361,578**	**2,950,769**

Figure C. 4. shows the nationwide distribution of the top 15 codes (excluding blank) used in the 2017 NEI for the Calculation Material data element. It shows that the code of Landing-Takeoff-Cycle is the most popular used one, but mainly by EPA. It is for the airport emissions that estimated mainly by EPA. On the other hand, the code of Natural Gas is the most popular one used by SLT, presenting the use of it in combustion processes. Other 13 out of the top 15 used codes are mainly used by SLTs. Most top 15 codes for the Calculation Material data element are related to combustion process as observed in the analysis for the calculation parameter unit of measure data element.

Figure C. 4. Nationwide Distribution of Top 15 Codes (Excluding Blanks) Used in the 2017 Draft NEI for the Calculation Material Data Element

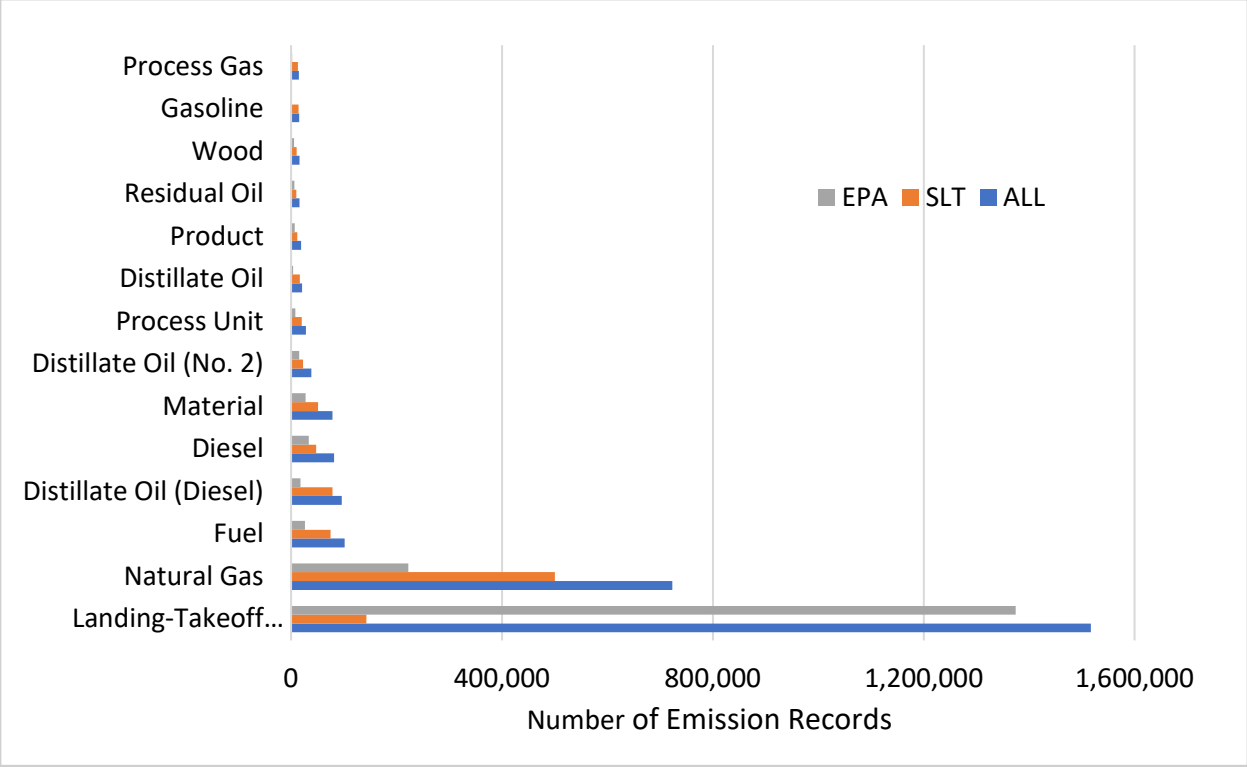

Table C. 9 lists the distribution of the top 20 codes (excluding blanks) used by SLTs for the Calculation Material data element in the 2017 NEI. The order of the columns in the table indicates the order of code usage in all SLTs from the most used to the least used. The number in the table represents emission records.

Table C. 8. Nationwide Distribution of Top 20 Codes (Excluding Blanks) Used in the 2017 Draft NEI for the Calculation Material Data Element

Calculation Material	ALL	SLT	EPA
(blank)	3,086,876	2,021,703	1,065,173
Landing-Takeoff Cycle	1,517,384	142,865	1,374,519
Natural Gas	722,911	500,519	222,392
Fuel	101,325	74,964	26,361

Distillate Oil (Diesel)	96,356	78,694	17,662
Diesel	81,391	47,794	33,597
Material	78,803	51,237	27,566
Distillate Oil (No. 2)	38,193	22,936	15,257
Process Unit	28,117	20,062	8,055
Distillate Oil	20,713	16,600	4,113
Product	19,024	12,002	7,022
Residual Oil	16,247	9,861	6,386
Wood	16,050	10,247	5,803
Gasoline	15,403	14,250	1,153
Process Gas	14,814	12,894	1,920
Body	14,400	13,495	905
Raw Material	14,053	7,395	6,658
Wastewater	13,345	13,256	89
Grain	12,844	5,241	7,603
Crude Oil	12,511	12,424	87
Wood/Bark	9,663	6,405	3,258

Table C.9. Distribution of Top 8 Codes (Excluding Blanks) Used by SLTs for the Calculation Material Data Element

Program System Code	SLT Total	(blank)	Natural Gas	Landing-Takeoff Cycle	Distillate Oil (Diesel)	Fuel	Material	Diesel	Distillate Oil (No. 2)	Process Unit
ADEM	32,552	32,552								
AKDEC	21,285	2,713	6,766		590	74	4	7083	126	
ALJCBOH	5,382	5,382								
ARDEQ	19,031	128	5,973		581	45	1,445	1224	200	10
AZDEQ	13,373	1,886	2,174		758	2	960	349	63	
AZMCAQD	1,916	1,916								
CARB	656,565	656,565								
CHC_APCB	1,878	1,878								
CODPHE	39,302	39,302								
CTBAM	17,443	103	6,477		33		119	3058	4,640	
DEDNR	13,762	63	5,024		1,870	1	238	636	747	4
DOEE	2,244	2,244								
FLDEP	27,091	382	7,211		4,329	33	1,606	1088	149	39
GADNR	18,510	119	6,352		239	99	31	491	1,351	7
HIDOHCAB	7,324	138	141		27			552	1,202	
IADNR	52,841	505	16,161		239	83	4,530	5165	811	
IDDEQ	4,048		1,099		246		612	118	6	
ILEPA	317,766	317,766								
INDEM	33,302	11,291	8,040		697	49	2,073	321	90	55
KC_DAQM	82	82								
KSDOHE	36,167	1,316	13,534		88	66	1,362	1667	616	251
KYDAQ	118,190	118,190								
KYJCAPCD	11,988	212	2,719				676	290	152	
LADEQ08	100,100	100,100								
LRAPA	399	399								
MADEP	11,054	20	4,432			21	201	2662	1,235	41

Program System Code	SLT Total	(blank)	Natural Gas	Landing-Takeoff Cycle	Distillate Oil (Diesel)	Fuel	Material	Diesel	Distillate Oil (No. 2)	Process Unit
MDDOE	26,461	8,375	9,093			199				
MEDEP	18,828	40	5,961		4,042		225	452	149	8
MIDEQ	98,464	1,665	55,254			43	2,353	15973	18	35
MNPCA	305,798	20,046	128,218		49,853	22	9,786	47	614	
MODNR	25,037	25,037								
MSC_HD	5,359	5,359								
MSDEQ	45,877	45,877								
MTDEQ	7,849	7,849								
NCBCRAQA	1,614	1,614								
NCDAQ	84,376	611				73,153	10,612			
NCFCEAD	2,167		696		32		433	22	234	
NCMCAQ	301	301								
NDC_MPHD	5,004	5,004								
NDDOH	1,890	1,890								
NEDEQ	12,098	12,098								
NELLCHD	197	197								
NEOPWD	970	970								
NHDES	3,164	123	670		505				330	
NJDEP	53,547	49,414	3,104		515				326	
NMCOA	2,596	476	648		248	24	67	424	12	20
NMED	7,583	2,504	4,445		38			39	1	
NVBAQ	12,872	12,872								
NVCCDAQM	1,835	1,835								
NVWCAQMD	48	48								
NYDEC	41,064	41,064								
OHEPA	109,565	4,448	69,345		6,016	1	4,805	20		34
OKDEQ	75,586	647	45,212		633	8	154	978	282	3

Program System Code	SLT Total	(blank)	Natural Gas	Landing-Takeoff Cycle	Distillate Oil (Diesel)	Fuel	Material	Diesel	Distillate Oil (No. 2)	Process Unit
ORDEQ	12,430	54	3,872			73	1,332	110		4
PAACHD	8,716	35	2,982					36	318	4,711
PACOP	10,847		4,685					428	2,315	2,627
PADEP	54,864	376	26,345			216		1519	4,724	7,648
PIMA	1,323	1,323								
PREQB	5,109	5,109								
RIDEM	8,278	8,278								
SCDHEC	99,519	17,635	36,626		6,252	295	3,514	2532	904	215
SDDENR	2,333	2,333								
TNDEC	30,009	22,118	1,582			45	590	99	662	1
TR124	294	294								
TR180	46	46								
TR181	180	180								
TR182	29	29								
TR207	4	4								
TR615	406	406								
TR750	6,193	6,187	6							
TR751	7	7								
TXCEQ	381,365	238,500		142,865						
UTDAQ	20,166	827	4,425		199	336	876	42	395	
VADEQ	12,272	12,272								
VTDEC	836	836								
WAECY	7,930	1,085	1,114		159	76	361	58	54	
WAORCAA	601	601								
WAPSCAA	1,141	1,141								
WASWCAA	1,448	88	244				37		174	
WIDNR	23,570	23,570								

Program System Code	SLT Total	(blank)	Natural Gas	Landing-Takeoff Cycle	Distillate Oil (Diesel)	Fuel	Material	Diesel	Distillate Oil (No. 2)	Process Unit
WVDAQ	25,581	417	9,889		505		2,235	311	36	4,349
WYDEQ	132,336	132,336								
Grand Total	**3,361,578**	**2,021,703**	**500,519**	**142,865**	**78,694**	**74,964**	**51,237**	**47794**	**22,936**	**20,062**

Table C.11., 44 out 82 SLTs that reported emissions did not report the calculation parameter unit of measure data element to the NEI, for example, Alabama, California, Colorado, Illinois, Wisconsin, and Wyoming. This observation is the same as that for the calculation parameter unit of measure data element in the 2017 NEI. The detailed list of SLTs that did not report the Calculation Material data element to the 2017 draft NEI is the same as that in Table C.8.

C.5 Emission Calculation Method Data Element

Information about the emission calculation method is a required data element in NEI. Each emission record must be associated with the data element. The 2017 NEI contains emission data for 102 SLTs. Among those, 23 SLTs reported more than 50% of emission records, 59 SLTs reported less than 50% emission records, and 10 locals and tribes did not report emissions to the NEI. Detailed information for where emissions came from is shown in Table C.12 for each SLT.

Table C.10. Emission Data Source in the 2017 Draft NEI for Each SLT

Program System Code	Total	SLT	EPA	SLT %	EPA %
ADEM	68,610	32,552	36,058	47.4	52.6
AKDEC	135,395	21,285	114,110	15.7	84.3
ALJCBOH	10,647	5,382	5,265	50.5	49.5
ARDEQ	61,083	19,031	42,052	31.2	68.8
AZDEQ	28,966	13,373	15,593	46.2	53.8
AZMCAQD	14,578	1,916	12,662	13.1	86.9
CARB	1,049,903	656,565	393,338	62.5	37.5
CHC_APCB	5,033	1,878	3,155	37.3	62.7
CODPHE	122,824	39,302	83,522	32.0	68.0
COHDNREM	967		967	0.0	100.0
CTBAM	28,074	17,443	10,631	62.1	37.9
DEDNR	21,207	13,762	7,445	64.9	35.1
DOEE	5,164	2,244	2,920	43.5	56.5
FLDEP	125,956	27,091	98,865	21.5	78.5
GADNR	76,252	18,510	57,742	24.3	75.7
HIDOHCAB	16,643	7,324	9,319	44.0	56.0
IADNR	115,102	52,841	62,261	45.9	54.1
IDDEQ	30,764	4,048	26,716	13.2	86.8
ILEPA	386,338	317,766	68,572	82.3	17.7
INDEM	94,287	33,302	60,985	35.3	64.7
KC_DAQM	727	82	645	11.3	88.7
KSDOHE	97,758	36,167	61,591	37.0	63.0
KYDAQ	245,852	118,190	127,662	48.1	51.9
KYJCAPCD	15,090	11,988	3,102	79.4	20.6
LADEQ08	236,546	100,100	136,446	42.3	57.7
LRAPA	3,286	399	2,887	12.1	87.9
MADEP	50,943	11,054	39,889	21.7	78.3

Program System Code	Total	SLT	EPA	SLT %	EPA %
MDDOE	65,124	26,461	38,663	40.6	59.4
MEDEP	40,146	18,828	21,318	46.9	53.1
MIDEQ	160,925	98,464	62,461	61.2	38.8
MNPCA	366,293	305,798	60,495	83.5	16.5
MODNR	83,075	25,037	58,038	30.1	69.9
MSC_HD	11,854	5,359	6,495	45.2	54.8
MSDEQ	77,329	45,877	31,452	59.3	40.7
MTDEQ	40,143	7,849	32,294	19.6	80.4
NCBCRAQA	2,690	1,614	1,076	60.0	40.0
NCDAQ	147,338	84,376	62,962	57.3	42.7
NCFCEAD	3,098	2,167	931	69.9	30.1
NCMCAQ	2,914	301	2,613	10.3	89.7
NDC_MPHD	10,942	5,004	5,938	45.7	54.3
NDDOH	24,568	1,890	22,678	7.7	92.3
NEDEQ	41,283	12,098	29,185	29.3	70.7
NELLCHD	1,689	197	1,492	11.7	88.3
NEOPWD	4,697	970	3,727	20.7	79.3
NHDES	16,546	3,164	13,382	19.1	80.9
NJDEP	87,671	53,547	34,124	61.1	38.9
NMCOA	6,680	2,596	4,084	38.9	61.1
NMED	30,875	7,583	23,292	24.6	75.4
NVBAQ	55,046	12,872	42,174	23.4	76.6
NVCCDAQM	8,665	1,835	6,830	21.2	78.8
NVWCAQMD	1,870	48	1,822	2.6	97.4
NYDEC	97,815	41,064	56,751	42.0	58.0
OHEPA	184,907	109,565	75,342	59.3	40.7
OKDEQ	165,613	75,586	90,027	45.6	54.4
ORDEQ	43,074	12,430	30,644	28.9	71.1
PAACHD	16,513	8,716	7,797	52.8	47.2
PACOP	22,934	10,847	12,087	47.3	52.7
PADEP	144,200	54,864	89,336	38.0	62.0
PAG	2,591		2,591	0.0	100.0
PIMA	3,333	1,323	2,010	39.7	60.3
Pinal	2,522		2,522	0.0	100.0
PREQB	15,803	5,109	10,694	32.3	67.7
RIDEM	18,106	8,278	9,828	45.7	54.3
SCDHEC	139,416	99,519	39,897	71.4	28.6
SDDENR	18,156	2,333	15,823	12.8	87.2
TNDEC	60,807	30,009	30,798	49.4	50.6
TR124	707	294	413	41.6	58.4

Program System Code	Total	SLT	EPA	SLT %	EPA %
TR180	77	46	31	59.7	40.3
TR181	362	180	182	49.7	50.3
TR182	45	29	16	64.4	35.6
TR206	304		304	0.0	100.0
TR207	97	4	93	4.1	95.9
TR380	63		63	0.0	100.0
TR405	85		85	0.0	100.0
TR610	9		9	0.0	100.0
TR614	1		1	0.0	100.0
TR615	589	406	183	68.9	31.1
TR750	16,409	6,193	10,216	37.7	62.3
TR751	21	7	14	33.3	66.7
TR780	177		177	0.0	100.0
TXCEQ	550,398	381,365	169,033	69.3	30.7
UTDAQ	41,969	20,166	21,803	48.0	52.0
VADEQ	60,497	12,272	48,225	20.3	79.7
VTDEC	6,929	836	6,093	12.1	87.9
WAECY	31,684	7,930	23,754	25.0	75.0
WAORCAA	5,359	601	4,758	11.2	88.8
WAPSCAA	15,038	1,141	13,897	7.6	92.4
WASWCAA	5,608	1,448	4,160	25.8	74.2
WIDNR	89,676	23,570	66,106	26.3	73.7
WVDAQ	47,984	25,581	22,403	53.3	46.7
WYDEQ	160,976	132,336	28,640	82.2	17.8
(blank)	2,037		2,037	0.0	100.0
Grand Total	6,312,347	3,361,578	2,950,769	53.3	46.7

There are 23 EIS codes. All of them are used by SLTs in the draft 2017 NEI, but not by EPA. Seven EIS codes were not used by EPA, including those from trade groups and vendors, some SLTs, and special resources. A distribution of codes between SLT and EPA in the 2017 NEI for the emission calculation method data element can be found in Table C.13. The number in the table represents emission records.

Table C.11. Distribution of Codes between SLT and EPA for the Calculation Material Data Element in the 2017 Draft NEI

Code for Emission Calculation Method	Emission Calculation Method Description	ALL	SLT	EPA
1	Continuous Emission Monitoring System	17,020	16,542	478
2	Engineering Judgment	494,945	381,557	113,388
3	Material Balance	136,716	132,545	4,171
4	Stack Test (no Control Efficiency used)	105,763	104,094	1,669
5	USEPA Speciation Profile	1,947,088	570,136	1,376,952
6	S/L/T Speciation Profile	73,006	72,883	123
7	Manufacturer Specification	54,409	54,171	238
8	USEPA Emission Factor (no Control Efficiency used)	907,789	891,693	16,096
9	S/L/T Emission Factor (no Control Efficiency used)	283,733	283,436	297
10	Site-Specific Emission Factor (no Control Efficiency used)	43,968	39,899	4,069
11	Vendor Emission Factor (no Control Efficiency used)	9,924	9,915	9
12	Trade Group Emission Factor (no Control Efficiency used)	24,048	24,048	
13	Other Emission Factor (no Control Efficiency used)	1,514,727	92,103	1,422,624
24	Stack Test (pre-control) plus Control Efficiency	11,497	11,495	2
28	USEPA Emission Factor (pre-control) plus Control Efficiency	443,724	443,567	157
29	S/L/T Emission Factor (pre-control) plus Control Efficiency	86,092	86,092	
30	Site-Specific Emission Factor (pre-control) plus Control Efficiency	14,148	14,146	2
31	Vendor Emission Factor (pre-control) plus Control Efficiency	632	632	
32	Trade Group Emission Factor (pre-control) plus Control Efficiency	1,917	1,917	
33	Other Emission Factor (pre-control) plus Control Efficiency	141,089	130,595	10,494
40	Emission Factor based on Regional Testing Program	20	20	
41	Emission Factor based on data available peer reviewed literature	90	90	
42	Emission Factor based on Fire Emission Production Simulator (FEPS)	2	2	
	Total	**6,312,347**	**3,361,578**	**2,950,769**

Figure C.4 shows a distribution of the top 20 codes used by SLTs and EPA in the 2017 NEI for the emission calculation method data element. EPA only contributes more records than SLTs for two codes, for that data element in the 2017 NEI, code 5, “USEPA Speciation Profile”, and code 13, “Other Emission Factor (no Control Efficiency used)”. Contributions to other codes are dominated by SLTs. The most popularly used code by SLTs is 8, “USEPA Emission Factor (no Control Efficiency used)”, followed by code 5, “USEPA Speciation Profile”, and code 28, “USEPA Emission Factor (pre-control) plus Control Efficiency”.

Figure C.5. Distribution of Top 20 Codes between SLT and EPA in the 2017 Draft NEI for the Emission Calculation Method Data Element

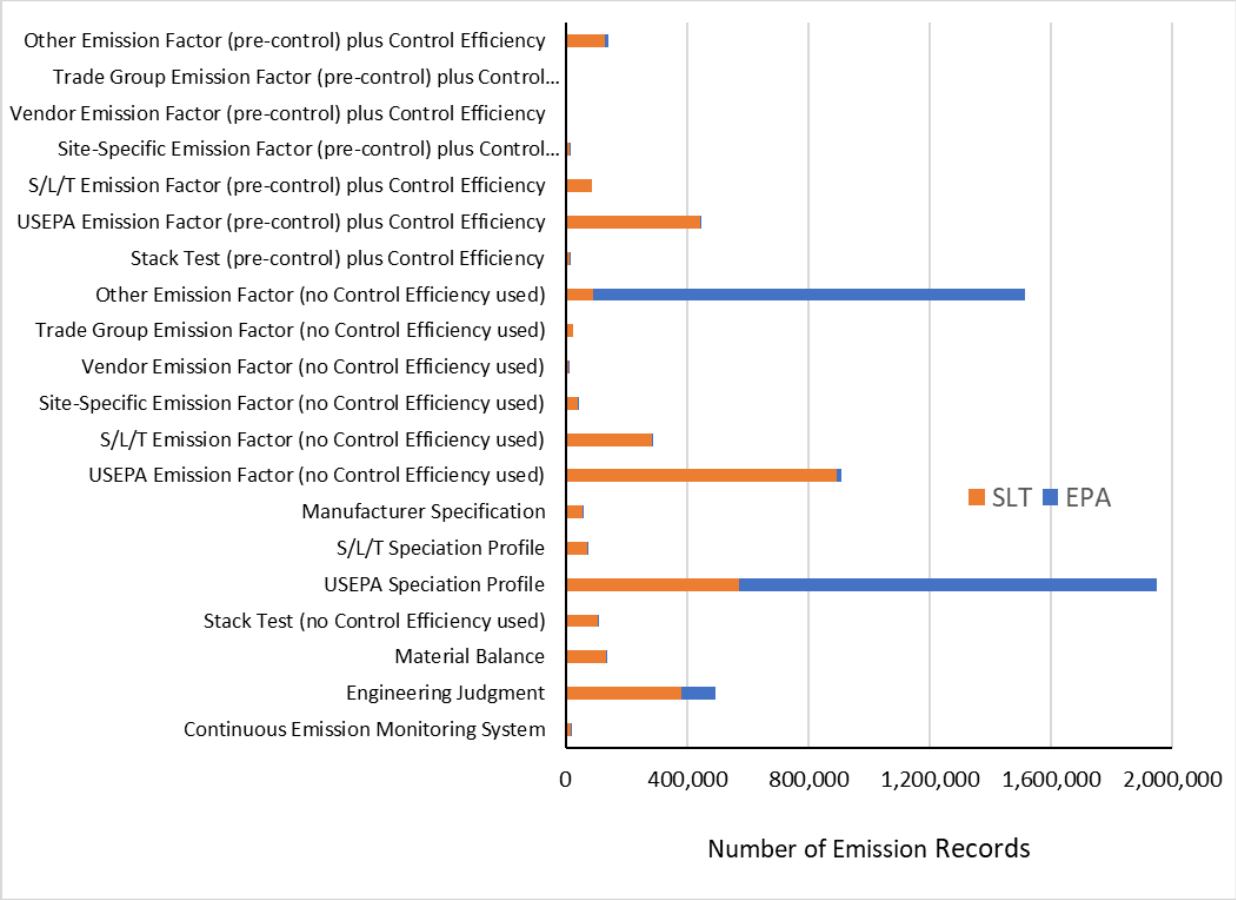

Table showing all numbers from figure.

Table C.12. Distribution of Top 20 Codes between SLT and EPA in the 2017 Draft NEI for the Emission Calculation Method Data Element

Emission Calculation Method Code	Emission Calculation Method Description	ALL	SLT	EPA
1	Continuous Emission Monitoring System	17,020	16,542	478
2	Engineering Judgment	494,945	381,557	113,388
3	Material Balance	136,716	132,545	4,171

Emission Calculation Method Code	Emission Calculation Method Description	ALL	SLT	EPA
4	Stack Test (no Control Efficiency used)	105,763	104,094	1,669
5	USEPA Speciation Profile	1,947,088	570,136	1,376,952
6	S/L/T Speciation Profile	73,006	72,883	123
7	Manufacturer Specification	54,409	54,171	238
8	USEPA Emission Factor (no Control Efficiency used)	907,789	891,693	16,096
9	S/L/T Emission Factor (no Control Efficiency used)	283,733	283,436	297
10	Site-Specific Emission Factor (no Control Efficiency used)	43,968	39,899	4,069
11	Vendor Emission Factor (no Control Efficiency used)	9,924	9,915	9
12	Trade Group Emission Factor (no Control Efficiency used)	24,048	24,048	
13	Other Emission Factor (no Control Efficiency used)	1,514,727	92,103	1,422,624
24	Stack Test (pre-control) plus Control Efficiency	11,497	11,495	2
28	USEPA Emission Factor (pre-control) plus Control Efficiency	443,724	443,567	157
29	S/L/T Emission Factor (pre-control) plus Control Efficiency	86,092	86,092	
30	Site-Specific Emission Factor (pre-control) plus Control Efficiency	14,148	14,146	2
31	Vendor Emission Factor (pre-control) plus Control Efficiency	632	632	
32	Trade Group Emission Factor (pre-control) plus Control Efficiency	1,917	1,917	
33	Other Emission Factor (pre-control) plus Control Efficiency	141,089	130,595	10,494
40	Emission Factor based on Regional Testing Program	20	20	
41	Emission Factor based on data available peer reviewed literature	90	90	
42	Emission Factor based on Fire Emission Production Simulator (FEPS)	2	2	
	Total	**6,312,347**	**3,361,578**	**2,950,769**

C.6 Findings

1. Not all codes for the Unit Type, calculation parameter unit of measure, and calculation material appear in the 2017 draft NEI. However, large amounts of records are associated with the code “unclassified”, blank, or null. This implies that SLTs do not collect the information, SLTs do not report the data element, or the EIS codes for those data elements might not be user-friendly.
2. Most of the emission units reported as “Unclassified” are associated with descriptions that could be specified with existing codes for the Unit Type element data element.

3. Codes used in the 2017 NEI could be reported by SLTs or by EPA for the calculation parameter unit of measure data element and Calculation Material data element. The same distribution between SLTs and EPA behavior is observed for the two data elements, 46.7% reported directly by SLTs and 53.3% by EPA. About 48.9 % of emission records were appeared as blank/null. Out of 82 SLTs that reported emissions to the 2017 draft NEI, 44 did not report anything for the calculation parameter unit of measure data element and Calculation Material data element.
4. Twelve out of 63 EIS codes in the 2017 NEI for the calculation parameter unit of measure data element were used in less than 100 emission records each. In addition, 6 EIS codes do not show up in the 2017 NEI.
5. The code of EACH for the calculation parameter unit of measure data element is the most popularly used one, but mainly by EPA. On the other hand, the code of E6FT3 is the most popular one used by SLTs, probably for representing the use of natural gas in combustion. Other top 10 used codes seem related to combustion processes as well.
6. Ninety two out of 473 EIS codes in the 2017 NEI for the Calculation Material data element were used in less than 10 emission records each. In addition, 224 EIS codes do show up in the 2017 NEI.
7. The code of Landing-Takeoff-Cycle is the most popular one used in the 2017 NEI for the Calculation Material data element, but mainly by EPA. It is for the airport emissions that are usually estimated by EPA for SLTs. On the other hand, the code of Natural Gas is the most popular one used by SLTs, presenting the use of it in combustion processes. Most top 15 codes for the Calculation Material data element are related to combustion process as observed in the analysis for the calculation parameter unit of measure data element.
8. All 23 EIS emission calculation method codes are used by SLTs in the draft 2017 NEI. However, 7 EIS codes are not used by EPA. Among emission data for 92 SLTs in the 2017 NEI, 23 SLTs reported more than 50% of emission records, 59 SLTs reported less than 50% emission records, and 10 locals and tribes didn't report emissions to the NEI.
9. EPA only contributes more than SLTs to two codes for the emission calculation method data element in the 2017 NEI: code 5, "USEPA Speciation Profile", and code 13, "Other Emission Factor (no Control Efficiency used)". Contributions to other codes are dominated by SLTs. The most popular code used by SLTs is 8, "USEPA Emission Factor (no Control Efficiency used)", followed by code 5, "USEPA Speciation Profile", and code 28, "USEPA Emission Factor (pre-control) plus Control Efficiency".

Appendix D *Options for CAERS and Recommendations*

D.1 Options for How the Different SLT Codes Will Be Housed and Maintained

The CAER system will have to supply the different SLTs with their codes as follows:

1. The SLT has the same codes as EIS so facilities from that SLT can enter those codes. This is the current default setting in CAERS. States such as Georgia only use NEI code for their EI system, 100 % matched and one-to-one relationship; so an SLT like Georgia uses NEI codes as they are.
2. The SLT has the same codes as EIS, but the nomenclature and coding system for the SLT is different. CAERS would have to contain a crosswalk so that the users can work with the SLT codes and then have the data sent with the corresponding EIS codes to EPA. E.g. Wyoming's Calculation Method definitions align with EIS, but code IDs do not match. Currently the Bridge Tool is used to map the WY IDs to EIS IDs before sending to EIS. See Table D. 1.

Table D. 1. IMPACT to EIS Comparison for Two Codes

IMPACT Code	IMPACT Description	IMPACT Long Description	Map to EIS Code	EIS Description
4	Time-based factor - Allowable	Emissions that are estimated by using the allowable emission rate.	10	Site-Specific Emission Factor (no Control Efficiency used)
2	Time-based factor - Stack Test	Emissions measured by periodic stack emission tests which have been accepted by the Division as being representative of normal source operation. Actual emissions are the hourly emission rates multiplied by the annual hours of operation. Note that estimated emissions for Title V facilities derived from measurements from portable analyzers cannot be accepted. For stack tests, older than one year, performed on reciprocating engines, the allowable emission limit will be used to calculate emissions, unless a more valid means of determining emissions has been established.	4	Stack Test (no Control Efficiency used)
201	Emissions	Emissions that are based on an engineering estimate.	2	Engineering Judgment

Note the overlap of the WY IMPACT code IDs (2 and 4) with the same EIS code IDs; i.e., same numbers but associated with different calculation methods.

3. The SLT has additional codes that do not map to EIS codes. In this case the CAERS will have to include, in its SLT customization, the additional SLT codes. If several states have additional codes that are not in EIS, the team recommends that these codes be reviewed by EPA and consider them for inclusion in the EIS codes. For example, 14 control measure codes were retired in EIS and are mapped to a more generic EIS code 141, Wet Scrubber, such as:
    - Wet Scrubber - High Efficiency (EIS code 1)
    - Impingement Type Wet Scrubber (EIS code 115)
    - Packed Scrubber (EIS code 117)
    - Floating Bed Scrubber (EIS code 120)

Some SLTs may retain those detailed codes in their state systems. Those codes need to be contained in the CAERS for the specified SLTs. They would be displayed for the facility reporting to that SLT and mapped to the EIS code accordingly.

4. The SLT has codes that map to EIS codes but are not identical to an EIS code. The CAERS would have to crosswalk those codes to the nearest EIS match, with input from the SLT. For example, Colorado uses unit type codes to support construction permit tracking activities and are not highly correlated with EIS types. In Colorado, 4 unit type codes are mapped to one EIS code 270, Incinerator, including Cremator, Hazardous Waste Incinerator, Incinerator, and Thermal Oxidizer.
5. Additional use cases that will need to be accommodated into CAERS: E.g., an SLT does not want to offer a specific EIS calculation method to its facilities. For example, OH does not use EIS code 8, USEPA Emission Factor (no Control Efficiency used), because Ohio already incorporated all UAEPA emission factors to their state-specific factors, OEPA (Ohio EPA) factors. The Ohio system performs auto calculation based on the OEPA factor if there is no process-specific emission information. In this case the SLT would request that the CAERS be customized so that calculation method code is not offered when the user is working with a facility from that state.

The team discussed the following two options for SLTs who use CAERS. The team also discussed how the different SLT codes should be provided to CAERS. Two options emerged:

1. <u>SLT provides its codes to CAERS</u>.

The SLTs would have ownership of their codes. As such, the SLTs would update their codes and provide the updates to EPA for inclusion in CAERS.

- Benefits of this approach:
  - Facilities will see the same codes when the report to CAERS as they report to the SLTs
  - It is easy to implement.
- Potential downsides of this approach:
  - In the long term there is a potential opportunity for an integrated coding system that everyone can adhere to. This opportunity may be lost with option 1.
- Information about the codes that would need to be provided for the CAERS would have to adhere to the following business rules in this case:
  a. The codes and use cases for each onboarded state would have to be located in a place where onboarded states can access it so they may update their codes as appropriate.
  b. SLTs should not update codes for other SLTs. However, if an SLT finds a code from another SLT that it would like to adopt, it can include it in its own SLT codes.
  c. SLTs take full responsibilities for their respective codes only, including adding, deleting, and modifying.
  d. EPA's responsibility will be limited to maintaining the EIS codes, such as adding, deleting, and modifying those codes.
  e. SLT codes must be mapped to EIS codes if the SLT wants to report data to NEI. SLT codes that are not mapped to EIS codes will be used by the SLT inventory only.
  f. Design for all code tables under this project are included in the Appendix. A similar design concept could be applicable for other CAERS code tables.

2. <u>Establish a standardized set of codes in CAERS.</u>

In this case, EPA would have ownership of the codes and would maintain them. The EPA would have to conduct out-reach educational work to train facilities with CAERS codes:

- Benefits:
  - There would be one centralized, standardized set of codes that everyone knows, understands, and can refer to.
- Downsides (potential) of this approach:
  - Similar to the first case, these CAERS codes would still need to be mapped to SLT codes if data is going to flow from the CAERS back to the SLT. It will be difficult for a map from CAERS codes to SLT codes when SLT codes are more detailed than the CAERS codes.
  - SLTs may choose to keep their coding systems and not adopt a new standardized system.
  - It would take time create and promote a new coding system to all within EPA models and systems that use these codes.
  - EPA would need to devote resources to maintaining this new coding system and accommodate SLT requests.

NOTE: Option 2 could be a longer-term option. In fact, it would likely evolve over time as a result of more SLT and EPA systems integrating with CAERS, using the Agile approach.

D.2 Proposed CAERS Tables

Proposed tables for CAERS can be found in the file: “Proposed CAERS Tables.xlsx”.

Appendix E *List of SLT Program System Codes in EIS*

Agency Name	Program System Code	Program System Description
Alabama Department of Environmental Management	ADEM	Alabama Department of Environmental Management
Alaska Department of Environmental Conservation	AKDEC	Alaska Department of Environmental Conservation
Allegheny County Health Department	PAACHD	Allegheny County Health Department
Arapahoe Tribe of the Wind River Reservation	TR281	Arapahoe Tribe of the Wind River Reservation, Wyoming
Arizona Department of Environmental Quality	AZDEQ	Arizona Department of Environmental Quality
Arkansas Department of Environmental Quality	ARDEQ	Arkansas Department of Environmental Quality
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation	TR206	Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, Montana
Blackfeet Tribe of the Blackfeet Indian Reservation of Montana	TR201	Blackfeet Tribe
Blue Lake Racheria	TR558	Blue Lake Rancheria
Cabazon Band of Cahuilla Mission Indians Reservation	TR568	Cabazon Band of Cahuilla Mission Indians of the Cabazon Reservation, California
California Air Resources Board	CARB	California Air Resources Board
Catawba Indian Nation, South Carolina	T032	Catawba Indian Nation
Chattanooga Air Pollution Control Bureau (CHCAPCB)	CHC_APCB	Chattanooga-Hamilton Cty APCB

Agency Name	Program System Code	Program System Description
Cherokee Nation, Oklahoma	CNEP	Cherokee Nation, Oklahoma
Chickasaw Nation, Oklahoma	TR906	Chickasaw Nation, Oklahoma
Citizen Potawatami Nation, Oklahoma	TR821	Citizen Potawatami Nation, Oklahoma
City of Albuquerque	NMCOA	City of Albuquerque
City of Huntsville Division of Natural Resources and Environmental Mgmt	COHDNREM	City of Huntsville Division of Natural Resources and Environmental Mgmt
Clark County Department of Air Quality and Environmental Management	NVCCDAQM	Clark County Department of Air Quality and Management
Coeur dAlene Tribe	TR181	Coeur d'Alene Tribe
Colorado Department of Public Health and Environment	CODPHE	Colorado Department of Public Health and Environment
Confederated Salish & Kootenai Tribes	TR203	Confederated Salish & Kootenai Tribe
Confederated Tribes of the Colville Reservation, Washington	TR101	Colville Reservation
Confederated Tribes of the Umatilla Reservation, Oregon	TR143	Confederated Tribes of the Umatilla Reservation, Oregon
Connecticut Department of Energy and Environmental Protection	CTBAM	Connecticut Department Bureau of Air Management
Cortina Band of Wintun Indians	TR513	Cortina Band of Wintun Indians
Coyote Valley Band of Pomo Indians of California	TR638	Coyote Valley Band of Pomo Indians
Crow Tribe	TR202	Crow Tribe
DC-District Department of the Environment	DOEE	District Department of the Environment

Agency Name	Program System Code	Program System Description
Delaware Department of Natural Resources and Environmental Control	DEDNR	Delaware Department of Natural Resources
Eastern Band of Cherokee Indians	TR001	Eastern Band of Cherokee Indians
Florida Department of Environmental Protection	FLDEP	Florida Department of Environmental Protection
Fond du Lac Band of Lake Superior Chippewa	TR405	Fond du Lac Band of the Minnesota Chippewa Tribe
Forest County Potawatomi Community	TR434	Forest County Potawatomi Community
Forsyth County Office of Environmental Assistance and Protection	NCFCEAD	Forsyth County Environmental Affairs Department
Fort Mojave Indian Tribe Reservation	TR604	Fort Mojave Indian Tribe of Arizona, California & Nevada
Georgia Department of Natural Resources	GADNR	Georgia Deparment of Natural Resources
Gila River Indian Community	TR614	Gila River Indian Community of the Gila River Indian Reservation, Arizona
Grand Portage of the Minnesota Chippewa Tribe	TR406	Grand Portage of the Minnesota Chippewa Tribe
Hawaii Department of Health Clean Air Branch	HIDOHCAB	Hawaii Department of Health, Clean Air Branch
Idaho Department of Environmental Quality	IDDEQ	Idaho Department of Environmental Quality
Illinois Environmental Protection Agency	ILEPA	Illinois Environmental Protection Agency
Indiana Department of Environmental Management	INDEM	Indiana Department of Environmental Management
Iowa Department of Natural Resources	IADNR	Iowa Department of Natural Resources, Air Quality

Agency Name	Program System Code	Program System Description
Jefferson County (AL) Department of Health	ALJCBOH	Jefferson County Board of Health (Alabama)
Kansas Department of Health and Environment	KSDOHE	Kansas Department of Health and Environment
Kaw Nation of Oklahoma	TR810	Kaw Nation of Oklahoma
Kentucky Division for Air Quality	KYDAQ	Kentucky Division of Air Quality
Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas	TR861	Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas
Kickapoo Tribe of Oklahoma	TR823	Kickapoo Tribe of Oklahoma
Knox County Department of Air Quality Management	KC_DAQM	Knox County DAQM
Kootenai Tribe of Idaho	TR183	Kootenai Tribe of Idaho
LaPosta Band of Mission Indians	TR577	La Posta Band of Diegueno Mission Indians of the La Posta Indian Reservation, California
Lac Vieux Desert Band of Lake Superior Chippewa Indians, Michigan	TR479	Lac Vieux Desert Band of Lake Superior Chippewa Indians, Michigan
Lane Regional Air Pollution Authority	LRAPA	Lane Regional Air Pollution Authority
Leech Lake Band of Ojibwe Reservation	TR407	Leech Lake Band of Ojibwe
Lincoln/Lancaster County Health Department	NELLCHD	Lincoln-Lancaster County Health Department
Little River Band of Ottawa Indians, Michigan	TR482	Little River Band of Ottawa Indians, Michigan
Little Traverse Bay Bands of Odawa Indians, Michigan	TR483	Little Traverse Bay Bands of Odawa Indians, Michigan

Agency Name	Program System Code	Program System Description
Louisiana Department of Environmental Quality	LADEQ08	Louisiana Department of Environmental Quality 2008
Louisville Metro Air Pollution Control District	KYJCAPCD	Air Pollution Control District of Jefferson County (Kentucky)
Maine Department of Environmental Protection	MEDEP	Maine Department of Environmental Protection
Makah Indian Tribe of the Makah Indian Reservation	TR108	Makah Indian Tribe
Maricopa County Air Quality Department	AZMCAQD	Maricopa County Air Quality Department
Maryland Department of the Environment	MDDOE	Maryland Department of Environment
Massachusetts Department of Environmental Protection	MADEP	Massachusetts Department of Environmental Protection
Mecklenburg County Air Quality	NCMCAQ	Mecklenburg County Air Quality
Memphis and Shelby County Health Department - Pollution Control	MSC_HD	Memphis-Shelby County Health Dept
Metro Public Health of Nashville/Davidson County	NDC_MPHD	Nashville-Davidson County MPHD
Michigan Department of Environmental Quality	MIDEQ	Michigan Department of Environmental Quality - Air Quality
Mille Lacs Band of Ojibwe	TR408	Mille Lacs Band of Ojibwe
Minnesota Pollution Control Agency	MNPCA	Minnesota Pollution Control Agency
Mississippi Dept of Environmental Quality	MSDEQ	Mississippi Department of Environmental Quality

Agency Name	Program System Code	Program System Description
Missouri Department of Natural Resources	MODNR	Missouri Department of Natural Resources, Air Pollution Control Program
Mohegan Tribe of Indians of Connecticut	TR033	Mohegan Tribe of Indians of Connecticut
Montana Department of Environmental Quality	MTDEQ	Montana Department of Environmental Quality
Morongo Band of Cahuilla Mission Indians of the Morongo Reservation, California	TR582	Morongo Band of Cahuilla Mission Indians of the Morongo Reservation, California
Navajo Nation	TR780	Navajo Nation
Nebraska Environmental Quality	NEDEQ	Nebraska Department of Environmental Quality
Nevada Division of Environmental Protection	NVBAQ	Nevada Bureau of Air Quality
New Hampshire Department of Environmental Services	NHDES	New Hampshire Department of Environmental Services
New Jersey Department of Environment Protection	NJDEP	New Jersey Department of Environmental Protection
New Mexico Environment Department Air Quality Bureau	NMED	New Mexico Environmental Department
New York State Department of Environmental Conservation	NYDEC	New York State Department of Environmental Conservation
Nez Perce Tribe	TR182	Nez Perce Tribe
North Carolina Department of Environmental Quality	NCDAQ	North Carolina Department of Air Quality
North Dakota Department of Environmental Quality	NDDEQ	North Dakota Department of Environmental Quality
Northern Cheyenne Tribe	TR207	Northern Cheyenne Tribe
Ohio Environmental Protection Agency	OHEPA	Ohio Environmental Protection Agency

Agency Name	Program System Code	Program System Description
Oklahoma Department of Environmental Quality	OKDEQ	Oklahoma Department of Environmental Quality
Olympic Region Clean Air Agency	WAORCAA	Olympic Region Clean Air Agency
Omaha Air Quality Control Division	NEOPWD	City of Omaha Public Works Department
Omaha Tribe of Nebraska	TR380	Omaha Tribe of Nebraska
Oneida Nation of Wisconsin	TR433	Oneida Tribe of Wisconsin
Oregon Department of Environmental Quality	ORDEQ	Oregon Department of Environmental Quality
Pechanga Band of Luiseno Mission Indians of the Pechanga Reservation, California	TR586	Pechanga Band of Luiseno Mission Indians of the Pechanga Reservation, California
Pennsylvania Department of Environmental Protection	PADEP	Pennsylvania Department of Environmental Protection
Penobscot Indian Nation	TR018	Penobscot Tribe of Maine
Philadelphia Air Management Services	PACOP	City of Philadelphia
Pima Association of Governments	PAG	Pima County Association of Governments
Pima County	PIMA	Pima County
Pinal County	Pinal	Pinal County, Arizona
Poarch Band of Creek Indians of Alabama	TR028	Poarch Band of Creek Indians of Alabama
Prairie Band of Potawatomi Indians	TR862	Prairie Band of Potawatomi Indians
Pueblo of Laguna, New Mexico	TR707	Pueblo of Laguna, New Mexico

Agency Name	Program System Code	Program System Description
Pueblo of Pojoaque	TR710	Pueblo of Pojoaque
Pueblo of Santa Ana, New Mexico	TR715	Pueblo of Santa Ana, New Mexico
Pueblo of Tesuque, New Mexico	TR719	Pueblo of Tesuque, New Mexico
Puerto Rico	PREQB	Puerto Rico
Puget Sound Clean Air Agency	WAPSCAA	Puget Sound Clean Air Agency
Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation, Nevada	TR651	Pyramid Lake Paiute Tribe
Quapaw Tribe of Indians, Oklahoma	TR920	Quapaw Tribe
Red Lake Band of Chippewa Indians, Minnesota	TR409	Red Lake Band of Chippewa Indians
Regional Air Pollution Control Agency	OHRAPCA	Regional Air Pollution Control Agency (Dayton, Ohio)
Reno-Sparks Indian Colony, Nevada	TR653	Reno-Sparks Indian Colony, Nevada
Rhode Island Department of Environmental Management	RIDEM	Rhode Island Department of Environmental Management, Office of the Air Resource
Sac & Fox Tribe of the Mississippi in Iowa	TR490	Sac & Fox Tribe of the Mississippi in Iowa
Sac and Fox Nation of Missouri in Kansas and Nebraska Reservation	TR863	Sac and Fox Nation of Missouri
Saginaw Chippewa Indian Tribe of Michigan	TR472	Saginaw Chippewa Indian Tribe of Michigan

Agency Name	Program System Code	Program System Description
Saint Regis Mohawk Tribe	TR007	St. Regis Band of Mohawk Indians of New York
Salt River Pima Maricopa Indian Community (SRPMIC) EPNR	TR615	Salt River Pima-Maricopa Indian Community of the Salt River Reservation, Arizona
Santee Sioux Nation	TR382	Santee Sioux Nation, Nebraska
Sault Ste. Marie Tribe of Chippewa Indians of Michigan and Wisconsin	TR469	Sault Ste. Marie Tribe of Chippewa Indians of Michigan and Wisconsin
Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho	TR180	Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho
South Carolina Department of Health and Environmental Control	SCDHEC	South Carolina Department of Health and Environmental Control
South Dakota Department of Environment and Natural Resources	SDDENR	South Dakota Department of Environment and Natural Resources
Southern Ute Indian Tribe	TR750	Southern Ute Indian Tribe
Southwest Clean Air Agency	WASWCAA	Southwest Clean Air Agency
Spirit Lake Nation	TR303	Spirit Lake Nation
Swinomish Indians of the Swinomish Reservation, Washington	TR122	Swinomish Indians of the Swinomish Reservation, Washington
Tennessee Department of Environmental Conservation	TNDEC	Tennessee Department of Environment and Conservation, Air Pollution Control Bureau
Texas Commission on Environmental Quality	TXCEQ	Texas Commission on Environmental Quality

Agency Name	Program System Code	Program System Description
Tohono O-Odham Nation Reservation	TR610	Tohono O'Odham Nation Reservation
Torres-Martinez Band of Cahuilla Mission Indians of California	TR595	Torres-Martinez Band of Cahuilla Mission Indians of California
Twenty-Nine Palms Band of Mission Indians of California	TR598	Twenty-Nine Palms Band of Mission Indians of California
Utah Division of Air Quality	UTDAQ	Utah Division of Air Quality
Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico, Utah	TR751	Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico & Utah
Vermont Department of Environmental Conservation	VTDEC	Vermont Department of Environmental Conservation
Virginia Department of Environmental Quality	VADEQ	Virginia Department of Environmental Quality
Washington State Department of Ecology	WAECY	Washington Emission Inventory Repository Database
Washoe County Health District	NVWCAQMD	Washoe County Air Quality Management Division
Washoe Tribe of California and Nevada	TR672	Washoe Tribe of California and Nevada
West Virginia Division of Air Quality	WVDAQ	West Virginia Division of Air Quality
Western North Carolina Regional Air Quality Agency (Buncombe Co.)	NCBCRAQA	Western North Carolina Regional Air Quality Agency - Buncombe County
White Mountain Apache Tribe of the Fort Apache Reservation, Arizona	TR607	White Mountain Apache Tribe
Winnebago Tribe of Nebraska	TR383	Winnebago Tribe of Nebraska
Wisconsin Department of Natural Resources	WIDNR	Wisconsin Department of Natural Resources

Agency Name	Program System Code	Program System Description
Wyoming Department of Environmental Quality	WYDEQ	Wyoming Department of Enviromental Quality
Yakama Nation Reservation	TR124	Yakama Nation
Yavapai-Apache Nation of the Camp Verde Indian Reservation, Arizona	TR601	Yavapai-Apache Nation