Incorporation of State, Local, and Tribal Emission Inventory Data into the 1999 National Emission Inventory

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ABSTRACT

The National Emission Inventory (NEI) is a comprehensive inventory covering criteria pollutants and hazardous air pollutants (HAPs). The NEI is created by the EPA's Emission Factor and Inventory Group (EFIG) in Research Triangle Park, North Carolina. For 1999, many State, Local, and Tribal (S/L/T) Agencies submitted emission data to EFIG to be incorporated into the 1999 NEI. For the criteria air pollutant component of the NEI, this paper discusses the procedures used to incorporate the S/L/T Agency data, the format and data issues encountered during the incorporation process, solutions used to address the issues, data augmentation procedures, quality control (QC) and quality assurance (QA) procedures, and the current status of the work.

INTRODUCTION

Overview

The 1999 NEI includes both criteria pollutants and their precursors (SO_2, VOC, NO_x, CO, PM_{10}, $PM_{2.5}$, and NH_3). Upon completion, the 1999 NEI is expected to be used for the following:

- Initial inventory for EPA regional- and local-scale modeling efforts to predict ambient concentrations, exposures, and the resultant risks to human health and the environment;
- Initial inventory for S/L/T and regional planning organization modeling efforts;
- Emission estimates for the "National Air Quality and Emissions Trends Report"; and
- Other EPA, S/L/T, and public analyses requiring emission inventories. Some examples include:
    - Implementation of the 1990 Clean Air Act Amendments,
    - The Industrial SO_2 Report to Congress, published every 5 years; and
    - Tracking progress toward program goals of the federal Government Performance and Results Act (GPRA).

To support these uses, the NEI must be comprehensive, covering all criteria pollutants for all areas of the United States. It must also cover all significant emission sources, including all stationary and mobile sources. The NEI must include the following types of criteria air pollutant sources:

- Point: Stationary sources with actual emissions >100 tons/yr of any criteria pollutant, and smaller sources wherever reported on an individual facility basis.
- Area: All other stationary sources.

- Onroad: Mobile sources licensed for use on highways or roadways.
- Nonroad: Other mobile sources (e.g., construction, lawn/garden, boats, trains, airplanes)

Our Plan was to solicit data from State, Local, and Tribal Agencies, combine the submitted S/L/T data into a national dataset, augment and fill in the data gaps where appropriate, and prepare for a public review and comment. After the review period, the comments will be evaluated and processed, where appropriate, and a final inventory (version 2.0) will be prepared.

This paper;

- Discusses how EPA is preparing Version 2.0 of the criteria component of the 1999 NEI.
- Discusses lessons learned from the application of augmentation procedures to produce a complete county-level inventory for the entire United States,
- Summarizes the Oracle database system EPA is developing to process S/L/T data to update the NEI, and
- Identifies data quality issues for S/L/T Agencies to address before submitting their inventory to update future versions of the NEI. The reader is referred to EPA's "Revised 1999 National Emission Inventory Preparation Plan," dated February 2001 for details on the NEI planning and S/L/T inventory submittal process (http://www.epa.gov/ttn/chief/publications.html).

PREPARING VERSION 2.0 OF THE DRAFT 1999 NEI FOR S/L/T REVIEW

Processing of June 2001 S/L/T Inventory Submittals

For each data submittal received as of June 2001, the data were converted into a Microsoft Access file and sent through the NEI Input Format (NIF) QA/QC software (this software is available on the CHIEF website). Referential integrity errors and other errors found in the mandatory fields were corrected mostly by contacting the S/L/T contact. Errors in non-mandatory fields were ignored initially. They would either be corrected by the appropriate S/L/T Agency during the review period or we would use EPA procedures for filling in missing (or bad) data to correct (or to populate if null) those fields. Then, we combined all S/L/T inventories into a single data set in Version 2.0 of the NIF.

For onroad mobile sources, EPA's preferred model was MOBILE6, with EMFAC2000 acceptable for California. None of the State and Local Agency submissions included MOBILE6-based emission factors. Thus, the only criteria emissions EPA accepted for updating the NEI were the California emissions. However, EPA did use 1999 vehicle miles traveled (VMT) data provided by seven State and Local Agencies for use in the NEI. These States included Alabama, Colorado, Maine, Massachusetts, Mississippi, Tennessee (for the Chattanooga area only), and Utah. Other than the Tennessee submission, the VMT data covered the entire state. In addition, EPA accepted PM_{10} exhaust emissions submitted by Colorado, which were generated using PART5TOX. EPA calculated onroad emissions for these states using the VMT supplied.

For nonroad sources, EPA accepted and incorporated NONROAD model source category data for California and Pennsylvania. California provided an annual criteria pollutant inventory for all pollutants, with the exception of NH_3. The inventory provided was a complete replacement for EPA's NONROAD model based inventory, for all counties in California. For Pennsylvania, EPA used typical summer day emission estimates provided for the recreational marine category, since Pennsylvania used State-specific equipment populations as input for this category for their NONROAD model runs. Pennsylvania provided daily emission estimates for all criteria pollutants, except for $PM_{2.5}$ and NH_3.

A total of 35 State and 11 Local Agencies submitted new statewide point source inventories by June 2001 (see Table 1). Fourteen States, 2 Local Agencies, and 1 Tribal Authority submitted new area source

inventories by June 2001 (see Table 2). Point and area source inventories submitted by S/L/T Agencies were combined into a single data set, and combined with emissions data in Version 1.5 of the 1999 NEI for States that did not submit a point or an area source inventory (Version 1.5 is a complete 1999 inventory but it contains no state-submitted 1999 data. The point source data is grown from previous inventories). The statewide inventory for New York was not incorporated into the NEI because it lacked emission release point identification (ID) codes. The point source inventory for Buncombe County, North Carolina was not incorporated into the NEI because it lacked data for several mandatory fields. For point sources, Version 1.5 of the 1999 NEI was used to populate inventories that did not contain NO_x or SO_2 emissions. For area sources, data in Version 1.5 of the area source NEI was used to populate a S/L/T inventory with source categories and pollutants missing from the S/L/T inventory. EPA then applied the augmentation procedures discussed on the following pages. EPA posted documentation of how Version 2.0 of the draft 1999 NEI was prepared for each source sector on its File Transfer Protocol (FTP) server (ftp://ftp.epa.gov/EmisInventory/draftnei99ver2/ criteria/).

Point Source Data Augmentation

Emission Units Subject to Part 75 Continuous Emissions Monitoring Requirements

NO_x and SO_2 emissions data collected by Emissions Tracking System/Continuous Emissions Monitoring (ETS/CEM) Scorecard Data Base procedures by EPA's Clean Air Market Division (formerly know as the Acid Rain Division) have been deemed more reliable and accurate than other reported data. Thus, for ETS/CEM units, EPA plans to replace the NO_x and SO_2 emissions in S/L/T inventories with the emissions reported to the ETS/CEM data base.

During preparation of the draft 1999 NEI (Version 2.0), an attempt was made to update the S/L/T NO_x and SO_2 emissions from the ETS/CEM data by electronically matching on State and County FIPS codes, Site ID code, and Emission Unit ID code. However, this electronic matching process did not work well because the Site and Emission Unit IDs used in the ETS/CEM utility inventory rarely matched with those provided in State and Local inventories. When a match was not found, EPA added the ETS/CEM facility to the inventory. This resulted in some double counting of sites and emissions in the draft 1999 NEI Version 2.0. Unfortunately, this error was not identified until shortly after releasing the draft 1999 NEI for review. It became apparent that it will be necessary to manually prepare a crosswalk to match sites and emission units in the ETS utility inventory to each S/L/T inventory. During October 2001, EFIG requested that S/L/T Agencies not comment on the augmented utility inventory, but wait until EFIG could complete this augmentation procedure using a crosswalk to correctly match ETS emission units to those in S/L/T inventories.

Ammonia

Ammonia emissions in Version 1.5 of the 1999 NEI are added to a state's inventory if missing in the state inventory. If total ammonia emissions in a state's inventory are less than the 1999 NEI version 1.5 total for the state, the difference between the totals is allocated to emission processes with NO_x emissions in the state's inventory. This is done by multiplying the ratio of process-to-site level NO_x emissions for sources in the state's inventory by the total ammonia emissions in the NEI. The goal is to keep the total ammonia emissions in a state's inventory roughly equal to the state's total ammonia emissions in the NEI.

Similar to the situation previously discussed for the ETS/CEM augmentation procedure, site IDs for the same sites in some state inventories and Version 1.5 of the NEI were different. Consequently, electronic matching on state and county FIPS codes and site IDs resulted in double-counting of ammonia emissions for some sites. Thus, for sites in state inventories with ammonia emissions, the site IDs must be manually matched to those in the NEI to avoid double-counting of emissions.

PM_{10} and $PM_{2.5}$ Emissions

Version 2.0 of the NIF requires that PM_{10} and $PM_{2.5}$ emissions be reported as primary, filterable, and condensable (primary PM is the sum of filterable and condensible PM). Previously, only "total" PM_{10} and $PM_{2.5}$ emissions were included in the NEI (with the meaning of "total" open to confusion. Does it mean the entire size fraction or does it mean the sum of filterable and condensible?). The S/L/T point source inventories received last June typically included PM or PM_{10} emissions without identifying the form of the emissions. For the draft 1999 NEI, EPA changed the pollutant codes to add the form of PM or PM_{10} emissions. For most S/L/T inventories, the pollutant codes were changed to filterable emissions unless a S/L/T Agency indicated that the emissions represent primary PM or PM_{10}. S/L/T Agencies for which EPA was unable to confirm the form of PM and/or PM_{10} emissions were asked to correct their pollutant codes during the review period. EPA has been developing procedures to estimate primary, filterable, and condensable PM_{10} and $PM_{2.5}$ emissions from primary or filterable PM or PM_{10} emissions provided in S/L/T inventories. These procedures were not completed by October 2001. Thus, the PM augmentation procedures for the draft NEI were not applied to include primary, filterable, and condensable PM_{10} and $PM_{2.5}$ emissions missing from S/L/T inventories.

Area Source Data Augmentation

EPA prepares county-level emissions for several area source categories for the NEI each year using the most current activity and emission factor data available. If a S/L/T agency did not provide emissions for these categories, the NEI version 1.5 emissions were carried forward to the version 2.0 to provide more complete area source and pollutant coverage. Documentation on how EPA prepares the emissions for the area source categories was included in the area source documentation for the draft 1999 NEI available on EPA's FTP server (ftp://ftp.epa.gov/EmisInventory/draftnei99ver2/ criteria/). The categories are:

- Residential Construction (2311010000)
- Non-Residential Construction (2311020000)
- Roadway Construction (2311030000)
- Mining and Quarrying (2325000000)
- Residential Municipal Solid Waste Burning (2610030000)
- Residential Leaf Burning/Brush Burning (2610000100/2610000400)
- Land Clearing Debris Burning (2610000500)
- Cotton Ginning (2801000000)
- Agricultural Tilling (2801000003)
- Fertilizer Application (28017xxxxx)
- Animal Husbandry/Beef Cattle Feedlots (2805001000)
- Animal Husbandry/Cattle and Calves (2805020000)
- Animal Husbandry/Hogs and Pigs (2805025000)
- Animal Husbandry/Poultry (2805030000)
- Animal Husbandry/Horses and Ponies (2805035000)
- Animal Husbandry/Sheep (2805040000)
- Animal Husbandry/Goats (2805045001)
- Wildfires (2810001000)
- Prescribed Burning (2810015000)
- Structure Fires (2810030000)
- Paved Roads (22940xxxxx)
- Unpaved Roads (22960xxxxx)

S/L/T REVIEW

In early October 2001, EPA released the draft 1999 NEI Version 2.0. EPA placed each State's inventory for each sector into an Access97 database in NIF 2.0 and posted these data files on its FTP server (ftp://ftp.epa.gov/EmisInventory/draftnei99ver2/criteria/). The S/L/T Agencies had 4 months to review and provide comments to EPA. Also available were some summary data files that we produced that were intended to assist the S/L/T agencies in conducting their review. We e-mailed all S/L/T inventory contacts that the inventory was ready for review. Plus, we sent the same e-mail to everyone on EPA's CHIEF inventory list serve and to a number of trade associations and public interest groups. All comments were due to EPA by February 1, 2002. In our e-mails, we reminded everyone of the acceptable procedures and formats for corrections.

Nineteen of the 35 States that submitted point source inventories by June 2001 provided comments on the draft 1999 NEI (see Table 1). Of the 11 Local Agencies that submitted new point source inventories by June 2001, 4 of the agencies provided comments on the draft 1999 NEI. Seven of the 14 States that submitted area source inventories by June 2001 provided comments, and both of the Local Agencies that submitted area source inventories by June 2001 provided comments (see Table 2).

EPA received new point source inventories from 2 States, 3 Local Agencies, and 2 Tribal Authorities by February 2002. One additional State and 2 Tribal Authorities submitted new area source inventories by February 2002. The new Tribal area source inventories were not included in the NEI pending development of an approach to avoiding duplication or confusion in relation to state-submitted county level area source inventories..

For the February 2002 submission, EPA received new onroad inventories from two Tribal Authorities and Texas for 16 nonattainment and near nonattainment counties. None of these inventories were accepted by EPA for use in the NEI. The Tribal inventories contained errors in coding the emissions by proper Source Classification Codes (SCC) and did not include county FIPS codes. The Texas emissions were not included in the NEI because they are based on MOBILE5 rather than MOBILE6.

For the NONROAD model categories, EPA received comments from Pennsylvania on the draft 1999 NEI, Version 2. The comments related to daily emission estimates for aircraft, including ground-support equipment, commercial marine vessels, and locomotives. The estimates provided were for all counties and for all criteria pollutants (except for $PM_{2.5}$ and ammonia). EPA accepted and incorporated these data from Pennsylvania.

PREPARING FINAL VERSION 2.0 OF THE 1999 NEI

Our plan is to complete the incorporation of the S/L/T comments into the inventory, then incorporate the ETS/CEM data, augment the PM and ammonia data, and finally, augment the stack parameters, locational data, and operating parameters.

Emission Units Subject to Part 75 Continuous Emissions Monitoring Requirements

For the ETS/CEM augmentation procedure, EPA prepared a crosswalk to match sites and emission units in its ETS inventory to those in the S/L/T inventories. Process-level NO_x and SO_2 emissions in S/L/T inventories were adjusted by the ratio of ETS-to-S/L/T emission unit-level emissions. By using this approach, site, emission unit, and process IDs and SCCs are not changed in S/L/T inventories. In addition, a crosswalk was also prepared for non-ETS utility units. EPA will use the two crosswalks to update its utility inventory with the site, emission unit, and process IDs used by S/L/T inventories to facilitate future matching of its utility inventory to S/L/T inventories.

Ammonia

EPA developed a crosswalk to match sites with ammonia emissions in state and local inventories with those in the 1999 NEI. To the extent possible, sites in S/L/T inventories that do not have ammonia emissions were also matched to the same sites in the 1999 NEI with ammonia emissions. This crosswalk will be used to add ammonia emissions in the 1999 NEI to S/L/T inventories. The crosswalk will also help to avoid adding NEI emissions to sites in S/L/T inventories with ammonia emissions.

PM_{10} and $PM_{2.5}$ Emissions

EPA will estimate primary, filterable, and condensable PM_{10} and/or $PM_{2.5}$ emissions from primary or filterable PM or PM_{10} emissions provided in S/L/T inventories. The estimated emissions will then be added to provide a complete inventory for these pollutants. In addition, total PM emissions will be removed from S/L/T inventories since total PM is not a criteria pollutant. For point sources, the PM Calculator will be used to estimate filterable PM_{10} and $PM_{2.5}$ emissions from filterable PM emissions (or $PM_{2.5}$ from filterable PM_{10} emissions) provided in S/L/T inventories. Factors developed from AP-42 particle size data will be used to estimate filterable from primary PM or PM_{10} emissions in S/L/T inventories for use in the PM Calculator. Filterable PM_{10} emissions in S/L/T inventories will be retained in the NEI. Factors will also be applied to estimate condensable PM emissions from filterable PM_{10} emissions. Filterable and condensable emissions will be summed to estimate primary emissions. These procedures will be applied using source-specific particle size data when available. When not available, the procedures will be based on particle size data for similar sources for which particle size data are available. For the area source inventory, primary, filterable, and condensable emissions will be estimated for the fuel combustion sources using factors developed for similar point sources.

EPA's procedure for data augmentation are described in a memorandum, which can be found on the CHIEF website at http://www.epa.gov/ttn/chief/emch/invent/qaaugmemo_final.pdf. In summary, because of the detail in emissions processing, valid parameters for the physical characteristics of each release point (stack height, diameter, temperature, velocity, and flow) are necessary to correctly place facility release points and associated emissions into vertical layers for proper air quality modeling. However, it is frequently noted that not all of the physical characteristics of each release point are reported for the units identified in the submittals (for example, stack height, stack temperature, and stack diameter). We use QA routines that fill in null fields and that flag the parameters that seem "out of range". For locational data (latitude/longitude), we either check against EPA's Facility Registry System (not available for version 2.0) or we map each point source, and if it falls within 5 km of the FIPS county code reported, it is considered valid.

ORACLE DATABASE SYSTEM, OR HOW EPA INCORPORATES S/L/T AGENCY DATA INTO THE NEI

EPA has been developing an Oracle database system in which to process updates to the NEI and conduct QA/QC review of S/L/T data and the NEI. The data management and QA/QC procedures involve the following four steps.

Step 1 - Loading S/L/T Inventories Into Oracle

S/L/T Access database files are loaded into Oracle to create a consolidated set of data in NIF 2.0 for each source sector.

Step 2 - Transfer Database

The Oracle NIF 2.0 Transfer database is a temporary holding area for the data. Processing here is minimal - this database holds the data until it is transferred into the Transaction database. The transfer process trims text fields, rounds decimal fields, and produces a Structured Query Language (SQL) log and audit records. The SQL log records the activity of the transfer process and provides record counts to ensure that all records are transferred properly. The audit tables retain back-up copies of records as they are transferred to the Transaction database.

Step 3 - Transaction Database

Oracle scripts are executed against the Transaction database run to "Diagnose" and "Scrub" QA/QC issues. A Diagnose script identifies format and data issues; no data is changed by a diagnose script. For example, a diagnose script identifies data values that are outside of specified range limits (e.g., stack parameters), identifies null values in mandatory fields, cross-checks data values against reference lookup tables (e.g., NIF 2.0 data codes), identifies improper use of submittal flags (i.e., record to be revised or deleted does not exist in the NEI), and identifies referential integrity issues.

A Scrub script checks the value of a specific field. If the value is incorrect and a default value is known, the field is updated to the default value. There are two types of scrub scripts - standard and ad-hoc. Standard scrub scripts are always run (e.g., correct the record type in a table). Ad-hoc scripts are written based on the outputs of the diagnose scripts and guidance from S/L/T Agencies or EPA. For example, if an invalid Standard Industrial Classification (SIC) code was used, the agency would provide the appropriate SIC code and a script would be created to update the SIC code.

The outputs from the Transaction database include an SQL log to verify program activity and a QA log report that documents the results of diagnose and scrub scripts. Summary reports are created from these detailed logs for review and to develop plans for resolving format and data issues. The Transaction database step also produces backup copies of records that are added, deleted, or updated in case it is necessary to restore the records later.

Step 4 - Staging Database

The Staging database contains the draft 1999 NEI Version 2.0 to which S/L/T comments and data augmentation procedures are applied to produce the final 1999 NEI. The S/L/T data in the Transaction database are applied to update the Staging database based on the directions indicated by the "Submittal Flag" codes in each table. Any data updates which need to be performed on the entire inventory are also performed on the Staging database. An example of this might be to QA all latitude and longitude data for emission release points. The outputs from the Staging database include an SQL log and audit tables. A QA log report is also produced when diagnose scripts are run on the Staging database.

FORMAT AND DATA ISSUES ENCOUNTERED DURING THE DATA INCORPORATION PROCESS

Access to Oracle Transfer QA Issues

For original inventory submittals, typical QA issues encountered when loading Access database files into Oracle include missing fields, and field and table names which did not match EPA's Access database shell. The programs used to load Access database files into Oracle are written to read the table and field names in

EPA's NIF 2.0 Access database shell. Consequently, table and field names frequently had to be changed manually to enable the programs to load Access databases into Oracle.

In some inventories, decimal/numeric values in fields were too long for NIF 2.0. For example, the size of the Exit Gas Flow Rate field in the Emission Release Point Table is defined as a 10-digit decimal number in NIF 2.0. The Access data type definition for a decimal number
(as found in the NIF 2.0 Access shell) does not limit the size of the field. Therefore, it is possible to input a number larger than 10 digits. The Oracle database defines the Exit Gas Flow Rate field as a 10 digit number with 8 digits to the left of the decimal point and 2 digits to the right (the level of detail recommended by the EPA). If an Exit Flow Rate of one hundred million is entered into the Access NIF 2.0 shell, the transfer to Oracle will fail. A similar issue occurs when a value in the Access NIF 2.0 field is very small. For example, an Emission Numeric Value is supplied as 0.0002 ton. This is permitted in the Access NIF 2.0 shell, however, upon transfer to Oracle, it will be rounded to 0. The appropriate value to send would be 0.4 pounds.

When loading 1999 S/L/T comments with these issues, an attempt was made, where possible, to change the units of the numeric values to fit the NIF 2.0 field length. However, in some cases, data was lost because values were truncated or rounded. For inventories submitted to EPA, it is important to follow NIF 2.0 field length specifications for decimal/numeric fields to avoid the loss of data.

Transaction Database QA Issues

Table 3 categorizes QA issues found in S/L/T inventories into data content (i.e., code and range values), referential integrity, and submittal flag issues. The table also shows the priority for resolving issues. For example, high priority is given to resolving issues with mandatory fields, referential integrity, and submittal flags because resolution of the issues usually require that the S/L/T agency be contacted. Low priority means that the issue will be resolved without contact with S/L/T agency due to time and/or budget constraints associated with preparing the draft NEI by October 1 and final NEI by June 1 of each year.

Data Content Issues

Typical data content issues include (1) out-of-range or missing values for stack parameters, seasonal throughput values, operating times, and emission release point coordinates; and (2) invalid or missing unit codes, SCCs, SIC codes, and material input/output codes.

Referential Integrity/Duplicate Issues

The typical referential integrity issue that occurred in comments submitted on the draft NEI was to add a record without adding parent records (e.g., adding an emission record without adding its associate emission period record). Comments also included duplicate records (i.e., records with the same data key), but with different data for fields that are not part of the data key. These records cannot be processed unless the S/L/T Agency is contacted to determine which record to use.

Submittal Flag Processing

Submittal flag processing offers a variety of QA challenges. NIF 2.0 utilizes the submittal flag to process comments against the draft NEI. An "A" flag is a new record, a "D" flag indicates the deletion of a record (and all its children), and an "RA/RD" pair indicates a revision to a single record - the "RD" identifies

the original record and the "RA" identifies the new record. An important point to note is that matching and QA diagnosis rely upon the key values of each table to identify a record. For example, in the emission table for a point source, the key values are State FIPS, County FIPS, Site ID, Emission Unit ID, Emission Process ID, Emission Release Point ID, Pollutant Code, Start Date, End Date, and Emission Type.

When an "A" flag is submitted, all of its accompanying parent records should be submitted unless they exist in the draft already. For example, if a site has an emission unit that is in the draft 1999 NEI, but new pollutant information is added, it is likely that only the emission record and any accompanying control equipment information should be added. Another important point to note about the submittal flags is that "RA/RD" pairs should not be used to change key values - for example, emission unit ID renaming should not be submitted via the "RA/RD" pair. If a key value requires a change (in the case of renaming), then a delete record should be submitted for the highest affected record, and a set of add records should be created to replace the deleted records. For example, if a process ID is renumbered - a delete record would be created at the emission process level which would cascade through the emission period, emission, and control equipment tables. Then a set of add records would be submitted for the emission process, emission period, emission, and control equipment tables with the new process ID. Typical submittal flag errors include using an "A/D" pair to revise a record (as opposed to an "RA/RD" pair) and using an "RA/RD" pair to revise key values. Another submittal flag issue which creates processing difficulties is to submit a record with multiple actions requested. An example of this would be an emission record for the same key values submitted with an "A/RA/RD" - essentially, three references to the same information.

Another component of submittal flag processing is consistency of application. It is important that the S/L/T Agency submits comments on the draft 1999 NEI file. When an agency comments on a file other than the draft 1999 NEI (for example, the original Access file prior to submission to EPA), it is possible that records to be added already exist, records to be deleted do not exist, and records to be revised cannot be matched to the NEI.

CONCLUSIONS

The key QA issues with the greatest impact on EPA's ability to incorporate S/L/T data into the NEI accurately are as follows:

Incorrectly Formatted Access Database Shell

Before creating the S/L/T inventory for submittal to EPA, the most recent version of the NIF Access shell should be downloaded, and the field names and tables names should be kept intact in the file submitted to EPA. Particularly for numeric/decimal fields, it is important to note the number of digits permitted for the field as documented in NIF 2.0. The Access shell will permit both to be exceeded, but it will create errors and/or rounding when loaded to Oracle. The latest version of EPA's Access database shell can be downloaded from http://www.epa.gov/ttn/chief/nif/index.html.

Code and Range Values

- Use the most recent valid code and range values published by the EPA, particularly for mandatory and necessary fields. The latest NIF 2.0 codes can be downloaded from http://www.epa.gov/ttn/chief/nif/index.html. EFIG has recently released a memorandum entitled "NEI Quality Assurance and Data Augmentation Steps," which explains how EFIG will apply default values for fields in the NEI containing stack parameters, emission release point

coordinates, and operating parameters that are missing or do not meet range checks specified in the memorandum. The default values will serve to prepare the NEI to support air quality modeling. To avoid application of the default values to S/L/T inventories, S/L/T agencies should make an effort to provide accurate data for these fields which are important for supporting modeling efforts. This memorandum can be downloaded from http://www.epa.gov/ttn/chief/emch/invent/.

- SCCs: Many inventories contained SCCs that are not in EPA's master list. S/L/T agencies should submit a request to EPA to add SCCs to the mater list when they submit their inventories to EPA. Both the SCC number and description need to be submitted. EPA will periodically update its master list. EPA's master SCC list is available from the CHIEF website at http://www.epa.gov/ttn/chief/codes/index.html.

- County FIPS codes: Several point source inventories contained county FIPS code 777. This code is not valid and data associated with the code is not included in the NEI because coordinates needed for air quality modeling cannot be assigned. If this code is used to identify stationary sources that are moved from one county to another during a year, S/L/T agencies should contact EPA to determine the best approach for including these sources in the NEI using the fields in NIF 2.0.

- Avoid Renumbering of Site, Emission Unit, Emission Release Point, and Process IDs if Possible: The ability to electronically match sites for the ETS/CEM and ammonia augmentation procedures is critical in order to avoid double counting of emissions. When it is necessary to renumber a site, it will be helpful if S/L/T Agencies provide EPA with documentation of the old and new site numbers when submitting inventories to EPA.

- Emission Unit and Emission Process ID Codes: We found in some S/L/T inventories that a single emission unit was given different emission unit IDs to differentiate between different fuel types. To comply with the NIF 2.0 coding convention, a single emission unit should have the same site ID for multiple processes, and different process IDs should be given to different processes for the same emission unit. This will ensure that emissions are kept with the same emission unit when preparing site level summaries of emissions.

- Office of the Regulatory Information System (ORIS) IDs: Very few of the S/L/T inventories included the ORIS ID for electric power facilities (sites). The ORIS ID is a unique ID that the Department of Energy assigns to utility and nonutility electric power sites. The ORIS ID is permanently assigned to each site and does not change due to changes in owners or operators. EPA will add ORIS IDs to the "ORIS Facility Code" field in the Site table in the final 1999 NEI so that electric power sites can be accurately matched with the same sites in other inventories and databases. Given that electric power sites are undergoing ownership changes (which often results in a facility name change), the ORIS ID will be very useful for matching purposes if a S/L/T agency needs to change the name of a site.

Referential Integrity/Duplicate Issues

Ensure that each emission record has its "chain" of parent records above it, linking it eventually to the transmittal record. To prevent duplicate records, use the key values for each table to ensure that records are unique.

Submittal Flag Usage

It is important to use the submittal flags as intended. Submittal flag errors require follow-up with the S/L/T agencies to determine their intent. The submittal flags are a new component of NEI processing, and if there are any questions on how to approach a particular data submission problem, it is best to contact the EPA representative. There may be a number of ways to accomplish a particular task; however, the approaches may differ considerably in time and potential for error.

Submit Comments on the Correct Version of the NEI

For purposes of consistency, it is important to comment on the latest version of the NEI posted at the EPA's website. Commenting on other versions may lead to errors in processing submittals or prevent updating the NEI with your data. EPA accepts statewide replacement inventories or comments on the latest final version of the NEI by June 1 each year. However, comments submitted in February must be directed at revising the draft NEI EPA prepares after incorporating the prior year submittals.

KEY WORDS

National Emissions Inventory
Point Sources
Area Sources
Mobile Sources

Table 1. State/local 1999 point source criteria pollutant inventories submitted to EPA.

State	Emission Type[1]	Number of Counties[2]	Pollutants in Inventory
State and local agencies that submitted inventories by June 1, 2001			
Alabama[3]	Annual	66	CO, NO_x, PM-PRI, PM10-PRI, SO_2, VOC
California[3]	Annual	56	CO, NO_x, PM10, ROG, SO_x
Colorado[3]	Annual/OSD/ Winter CO day	60[2]	CO, NO_x, PM-PRI, PM10-PRI, SO_x, VOC
Connecticut	Annual/OSD	8	CO, NO_x, PM10-PRI, SO_x, VOC
Florida	Annual/Seasonal	62	CO, NH_3, NMOC, NO_x, PM-FIL, PM10-FIL, SO_2, VOC
Illinois	Annual	102	CO, NO_x, PM-PRI, PM10-PRI, SO_2, VOC
Indiana[3]	Annual	87	CO, NO_x, PM, PM10, SO_2, VOC
Kansas	Annual	105	CO, NH_3, NO_x, PM, PM10, SO_2, VOC
Kentucky	Annual	116	CO, NH_3, NO_x, PM-PRI, PM10-PRI, SO_2, VOC
Louisiana	Annual	61[2]	CO, NO_x, PM10-PRI, SO_2, VOC
Maine[3]	Annual/OSD	16	CO, NO_x, PM10-PRI, PM25-PRI, SO_2, VOC
Maryland[3]	Annual/AAD	23	CO, NO_x, PM10, SO_x, VOC
Massachusetts[3]	Annual	14	CO, NH_3, NO_2, PM10, SO_2, TSP, VOC
Michigan[3]	Annual	80	CO, NMOC, NO_x, PM-FIL, PM-PRI, PM10-FIL, PM10-PRI, PM25-PRI, SO_2, SO_x, VOC
Minnesota	Annual	82[2]	CO, NO_x, PM10-PRI, VOC
Mississippi	Annual	82	CO, NO_x, PM-PRI, PM10-PRI, SO_2, VOC
Missouri[3]	Annual/AAWD	103[2,4]	CO, NO_x, PM10-PRI, SO_x, VOC
Montana	Annual/ Winter CO day	41	CO, NH_3, NO_x, PM10, SO_2, VOC
Nebraska	Annual	75[2]	CO, NH_3, NO_2, PM10, SO_2, VOC
Nebraska - Omaha[3]	Annual	1	CO, NO_x, PM-PRI, PM10-PRI, PM10-RPI, SO_x, VOC
Nebraska - Lincoln	Annual	1	CO, NO_x, PM10-PRI, SO_2, VOC
Nevada - Washoe	Annual	1	CO, NO_x, PM10, SO_2, VOC
New Hampshire[3]	Annual/OSD	10	CO, NH_3, SO_2, VOC
New Mexico - Albuquerque	Annual	1	CO, NO_x, PM10-PRI, PM10-FIL, SO_2, SO_x, VOC
New Mexico[3] - State	Annual	27[2]	CO, NH_3, NO_x, PM, PM10, SO_2, SO_x, VOC
New York[5]	Annual/OSD	62	CO, NO_x, NMOC, PM-PRI, PM10-PRI, SO_2, VOC
North Carolina - Buncombe County[6]	Annual	1	CO, NO_x, PM-10-FIL, PM2.5-FIL, SO_2, VOC
North Carolina - Forsyth County	Annual	1	CO, NO_x, PM-PRI, PM10-PRI, SO_2, VOC
Ohio - Dayton[3]	Annual	6	CO, NO_x, PM-FIL, S02, SO_2, VOC
Ohio - State	Annual	84	CO, NO_x, PM-PRI, PM10-PRI, VOC
Oklahoma	Annual	71	CO, NO_x, PM-PRI, PM10-PRI, SO_x, VOC
Oregon	Annual	29	CO, NH_3, NO_x, PM-PRI, PM10-PRI, SO_2, VOC
Pennsylvania - Allegheny County[3]	Annual/AAD	1	CO, NH_3, NO_x, PM-CON, PM-FIL, PM10-FIL, PM25-FIL, SO_2, VOC
Pennsylvania - Philadelphia[3]	Annual/OSD	1	CO, NH_3, NO_x, PM-FIL, PM10-FIL, SO_2, VOC
Pennsylvania - State	Annual	63	CO, NH_3, NO_x, PM10-PRI, SO_x, VOC
Rhode Island	Annual/OSD	5	CO, NH_3, NO_x, PM-PRI, SO_x, VOC
South Carolina[3]	Annual	44[2]	CO, NO_x, PM-FIL, PM10-FIL, PM25-FIL, NH_3, SO_2, VOC
Tennessee - Chattanooga[3]	Annual	1	CO, NH_3, NO_x, PM-PRI, SO_x, VOC
Utah	Annual	26	CO, NO_x, PM10-PRI, PM25-PRI, SO_x, VOC
Vermont[3]	Annual/AAD/OSD	13	CO, NO_x, PM-FIL, PM10-FIL, SO_x, VOC

Table 1. (continued)

State	Emission Type [1]	Number of Counties [2]	Pollutants in Inventory
Virginia [3]	Annual/OSD	115 [4]	CO, NMOC, NO_x, PM10-PRI, SO_2, VOC
Washington - Puget Sound [3]	Annual	4	CO, NO_2, PM10-PRI, PM25-PRI, SO_2, VOC
Washington - State [3]	Annual	18	CO, NH_3, NO_x, PM10-FIL, PM10-PRI, SO_2, VOC
West Virginia	Annual/OSD	54	CO, NH_3, NO_x, PM-FIL, PM10-FIL, PM25-FIL, SO_2, VOC
Wisconsin [3]	Annual/OSD	71	CO, NO_x, PM-PRI, PM10-PRI, ROG, SO_2
Wyoming	Annual	22	CO, NH_3, SO_2, VOC
S/L/T agencies that submitted new inventories by February 1, 2002			
Alabama - Jefferson County	Annual	1	CO, SO_2, PM-FIL, VOC
Arizona - Maricopa County	Annual	1	CO, NO_x, SO_x, VOC, PM10-PRI
Colorado - Tribal (Ute)	Annual	Unknown	PM10-PRI (for Construction Sand and Gravel SCCs)
Kentucky - Louisville	Annual/OSD	1	CO, NO_x, PM10-FIL, PM-FIL, SO_2, VOC
New Mexico - Tribal (Laguna)	Annual	Unknown	CO, NO_x, SO_x, VOC
North Carolina - State	Annual/OSD/ Winter CO day	93	CO, NO_x, PM10-PRI, PM25-PRI, PM-PRI, SO_2, VOC
Texas	Annual/OSD	205	CO, NO_x, PM10-PRI, SO_2, VOC

[1] OSD=ozone season day; AAD=average annual day; AAWD=average annual weekday.

[2] Excludes county code 777.

[3] Agency submitted comments by February 1, 2002.

[4] Includes independent cities.

[5] New York's inventory was not incorporated into the NEI because it lacked emission release point ID codes.

[6] Buncombe County's inventory was not incorporated into the NEI because it lacked data for several mandatory fields.

Table 2. State/local/tribal 1999 area source criteria pollutant inventories submitted to EPA.

State	Emission Type [1]	Number of Counties	Pollutants in Inventory
S/L/T agencies that submitted inventories by June 1, 2001			
Alabama [2]	Annual/OSD	67	CO, NO_x, PM, SO_2, VOC
California	Annual	58	CO, NO_x, PM10, ROG, SO_x
California - Tribal (Robinson Rancheria Band of Pomo Indians)	Annual	1	CO, NMOC, PM10-PRI, SO_x (for residential wood stoves)
Colorado [2]	Annual	63	CO, NO_x, PM-PRI, PM10-PRI, PM10, PM25, SO_2, SO_x, and VOC
Kansas [2]	Annual	105	VOC (for agricultural pesticides)
Louisiana - Baton Rouge [2]	Annual/OSD	5	NO_x, VOC
Maine	OSD	16	CO, NO_x, VOC
Maryland [2]	Annual/Seasonal/ OSD	24	CO, NO_x, PM, PM10, PM25, SO_2, SO_x, VOC
Massachusetts [2]	Annual/Seasonal/ AAD/OSD	14	CO, NO_x, PM10-PRI, SO_2, VOC
Michigan [2]	Annual/OSD	83	CO, NMOC, NO_x, PM-FIL, PM-PRI, PM10-FIL, PM10-PRI, SO_2, SO_x, and VOC
Missouri [2]	Annual/OSD	115	CO, NO_x, VOC
Pennsylvania	OSD	67	CO, NO_x, VOC
South Carolina	Annual	46	CO, NO_2, NO_x, VOC
Utah	Annual/Seasonal/ AAD/OSD	29	CO, NH_3, NO_x, PM10-PRI, SO_x, VOC
Washington - Puget Sound [2]	Annual	4	CO, NO_2, PM10-PRI, PM25-PRI, SO_2, VOC
West Virginia	Annual	55	CO, NO_x, PM-PRI, PM10-PRI, SO_2, VOC
Wisconsin	Annual/OSD	72	CO, NO_x, VOC
S/L/T agencies that submitted new inventories by February 1, 2002			
Colorado - Tribal (Ute)	Annual	Unknown	CO, NO_x, PM10-PRI, SO_2, VOC
New Mexico - Tribal (Laguna)	Annual	Unknown	CO, NO_x, PM10-PRI, SO_x, VOC
Texas	Annual/OSD/ Winter CO day	16	CO, NOx, VOC

[1] OSD=ozone season day emissions; AAD=annual average day.

[2] Agency submitted comments by February 1, 2002.

Table 3. Typical data content and referential integrity issues found in S/L/T inventories.

QA Issue	Priority for Resolution[1]	Resolution Method(s)
Content		
A mandatory field is null.	High	Determine if it can be derived from other information or contact agency.
A mandatory field contains an invalid/null code.	High	Determine if it can be derived from other information or contact agency.
A necessary or optional field contains an invalid/null code.	Low	Determine if data can be derived from other information, if not, contact agency for data if time permits. Otherwise, apply EPA default values.
A field contains out-of-range values (e.g., days per week is greater than seven).	Low	Contact agency for clarification if time permits. Otherwise apply EPA default values.
Referential Integrity		
A record is submitted for addition without emissions or parent records.	High	Contact agency.
Submittal Flag		
A record is submitted for addition to the NEI that already exists in the inventory.	High	Determine if the record has different values for relevant fields, it is possible that it was intended to be a revision. Contact the agency for clarification.
A record is submitted for deletion from the NEI that does not exist in the inventory.	High	In all probability, this submittal record does not need to be processed, but contact the agency if further information is needed.
A record is submitted for revision that does not exist in the NEI.	High	Contact agency.
A record is submitted with multiple activities requested (e.g., a record is submitted for addition and revision in the same submission round).	High	Contact agency.

[1] For the purpose of prioritizing work to resolve QA issues, high priority is given to resolving issues with mandatory fields, referential integrity, and submittal flags because resolution of the issues usually require that the S/L/T agency be contacted. Low priority means that the issue will be resolved without contact with S/L/T agency due to time and/or budget constraints associated with preparing the draft NEI by October 1 and final NEI by June 1 of each year.