

August 30, 2018

## Instructions for Submitting Nonroad Inputs for MOVES for the 2017 NEI

The U.S. Environmental Protection Agency (EPA)'s Air Emissions Reporting Rule (<https://www.epa.gov/air-emissions-inventories/air-emissions-reporting-requirements-aerr>) requires state and local (S/L) agencies who submit to the National Emissions Inventory (NEI) to submit model inputs for mobile sources, rather than emissions. Emissions estimates may be submitted in addition, and will still be accepted as the sole submittal type from tribes.

For the 2017 NEI, EPA plans to use the most current version of the Motor Vehicle Emission Simulator (MOVES) model, MOVES2014b, to estimate both onroad and nonroad emissions. Agencies that want to submit MOVES nonroad inputs as county databases (CDBs) may do so and can follow instructions in this document to create the nonroad CDBs. **Note: MOVES2014b nonroad CDB submissions must be checked using a QA script provided by EPA. This MOVES2014b-specific nonroad CDB QA script and checklist will be available following the release of MOVES2014b.**

If you do not submit nonroad input data, EPA will generate emission estimates using EPA-derived defaults. Agencies may accept the EPA defaults in lieu of submittals by sending a "support request" to Emission Inventory System (EIS) that states this.

If there are specific questions about how to properly enter data for in the nonroad tables in the CDBs for use in MOVES, they should be directed by email to the OTAQ Mobile Inbox ([mobile@epa.gov](mailto:mobile@epa.gov)).

### I. MOVES2014b NONROAD CDB CREATION

MySQL county databases are folders that contain MySQL formatted tables. CDB folder names contain specific information about the county, calendar year of the database, and date of creation and must conform to the following structure:

- Must be 23 characters long and contain no spaces.
- For characters 1-6, start with a "c" followed by a five-character FIPS (e.g. c26161) code, including leading zeros, where necessary.
- For characters 7-11, start with a "y" character followed by a four-digit calendar year corresponding to the calendar year of the database (e.g. "y2017").
- For characters 12-23, start with the string "\_NR\_" followed by an eight-digit date of creation of the form YYYYMMDD (e.g. "\_NR\_20180601").

The submission quality checks will look for the above criteria and will reject a submission that has an improper name structure. An example of a properly formatted name is: c01001y2017\_nr\_20181211

MOVES2014b includes a Nonroad Data Importer, located in the Pre-Processing pull down menu of the MOVES GUI, to assist in the creation of nonroad-specific inputs for MOVES. These tools can be used to create a database that contains the tables required for nonroad modeling (Table 1) that incorporates local information.

When the MOVES2014b Nonroad Data Importer is opened, data entry tabs for specific inputs, including a Generic tab, are displayed. A user can create a database, create templates for the needed tables, and

export the default data into text files or MS Excel spreadsheets. The Generic tab allows the user to import data from text files or spreadsheets to populate specific tables in the database that do not have their own data entry tabs.

**Table 1 – Tables contained in MOVES nonroad CDBs**

<b>Table Name</b>	<b>Description</b>
fuelformulation	Describes the available fuels
nrbaseyearequippopulation	Source type base year populations for each nonroad SCC
nrdayallocation	Allocation of nonroad activity between day types (weekdays and weekend days)
nrfuelsupply	Indicates which fuels are used in which months
nrgrowthindex	Growth adjustments to the user supplied populations.
nrhourallocation	Allocation of nonroad activity to each hour of the day
nrmonthallocation	Allocates nonroad activity to each month of the year
nrretrofitfactors	Allow users to discount nonroad emissions to reflect local control scenarios
nrsouceusetype	Contains user input of annual nonroad activity
nrstatesurrogate	Contains the surrogate data that allocates state equipment populations to counties
zonemonthhour	Contains the temperature and humidity values by hour of the day in each month of the year

MOVES nonroad tables are based on the text files used by the stand-alone NONROAD model, and will require some re-arrangement to fit into the MySQL tables used by MOVES. The ZoneMonthHour and FuelFormulation tables are identical in format to the table used for onroad CDBs. For the NEI, EPA will be using regional fuel information and grid-based meteorological data converted to county-level, and not data supplied by states in these tables. Empty tables are allowed and will cause MOVES to use default values in the nonroad calculations.

The MOVES2014b Nonroad Data Importer will create a database with only three tables: FuelFormulation, NRFuelSupply and ZoneMonthHour. Additional tables must be created using the Generic tab. **A full set of all 11 tables must be in the submitted nonroad CDB to pass the QA check, even if they are empty.**

Empty tables can be created using the Generic tab

- Select the table you wish to create from the pull-down Table selection.
- Use the Create Template button to generate an empty template.
- Using the Browse button, select the template file.
- Use the Import button to create the table in your database. Since there is no data in the file, there may be errors and warnings reported.
- Use the Clear Imported Data to empty any (bad) data from the table. Your database will now have an empty table.

If you wish, you can use the template files to enter data into the tables you have created.

Development of nonroad input values should follow the guidance provided in other EPA documents available on the Office of Transportation and Air Quality (OTAQ) webpage for the stand-alone NONROAD model (<https://www.epa.gov/moves/nonroad-model-nonroad-engines-equipment-and-vehicles>).

If you wish to include fuel information in your submission, EPA recommends using the default fuel supply and fuel formulation data provided by EPA in MOVES. If you are not using EPA default fuel information, be sure to document this option in your submission. EPA regional fuel information will be used for the NEI nonroad calculations; fuel information provided in the CDBs will not be used. The temperature and humidity values in the ZoneMonthHour table should be identical to those provided for onroad sources.

## II. MOVES-NONROAD CDB DOCUMENTATION

All CDB submissions must include documentation of instances where local data were used and where default data from MOVES were used. References to additional documents containing more detail are encouraged. These additional files can be in any format (e.g., .pdf or .xls).

The documentation file name should contain an agency Program System Code (PSC) followed by “NR\_Documentation.doc (or .docx)”. For example, Delaware's state agency PSC is “DEDNR” and their documentation would be named “DEDNR\_NR\_Documentation.doc”. Any additional files provided can keep their original names and do not need to conform to any standard.

## III. MOVES-NONROAD CDB SUBMISSION

All data submissions should include documentation of the data sources and processes used to organize the information into the required format. This documentation may include existing presentations and papers in any format, but should include a summary that explicitly connects the documentation with specific tables provided.

The submission must also contain a spreadsheet checklist that indicates what county-specific data are provided. The purpose of the checklist is to provide a method to determine which parts of the overall submission contain new information. This will assist EPA in making projections to other calendar years. The checklist – MOVES2014b\_Nonroad\_County\_Checklist.xlsx – can be downloaded from the 2017 NEI FTP site ([ftp://newftp.epa.gov/Air/nei/2017/doc/supporting\\_data/nonroad](ftp://newftp.epa.gov/Air/nei/2017/doc/supporting_data/nonroad)). As shown in the example below, the checklist contains rows of counties and columns of CDBs. Place an “x” in each appropriate cell to indicate what data are provided for each county. If no data are provided, place an “x” in the cell which indicates that all EPA estimates are accepted for this county. The spreadsheet may be trimmed to include only the counties in your jurisdiction. (Note that even if CDBs are submitted for a portion of the counties in your jurisdiction, the final checklist **must** include all the counties in your jurisdiction.

The checklist file name should contain an agency Program System Code (PSC) followed by “\_NR\_Checklist.xls (or .xlsx)”. For example, Delaware's state agency PSC is “DEDNR”, so their checklist would be named “DEDNR\_NR\_Checklist.xls”.

**Figure 1 – National County Nonroad Checklist**

County				MOVES Nonroad County Database											
stateid	statename	countyid	countyname	Accept EPA Default Values	MOVES fueformulation (available fuels)	MOVES nrbaseyearpopulation (source populations)	MOVES nrdayallocation (allocation to day type)	MOVES nrfuel supply (allocation of fuels)	MOVES nrgrwthindex (population growth)	MOVES nrhourallocation (allocation to diurnal pattern)	MOVES nrmonthallocation (seasonal allocation)	MOVES nrretrofitfactors (retrofit information)	MOVES nrsourceuse type (yearly activity)	MOVES nrstater surrogate (allocations to counties)	MOVES nrzomemonthhour (monthly temperatures)
1	ALABAMA	1001	Autauga County												
1	ALABAMA	1003	Baldwin County												
1	ALABAMA	1005	Barbour County												
1	ALABAMA	1007	Bibb County												
1	ALABAMA	1009	Blount County												
1	ALABAMA	1011	Bullock County												
1	ALABAMA	1013	Butler County												
1	ALABAMA	1015	Calhoun County												
1	ALABAMA	1017	Chambers County												
1	ALABAMA	1019	Cherokee County												
1	ALABAMA	1021	Chilton County												

Nonroad CDB submissions must be checked using the QA checking script which will be provided by EPA following the release of MOVES2014b. The QA check script will check the contents of each of the tables in the database. CDBs must include all the tables in Table 1 and Figure 1, even if the tables are empty (i.e., they contain no-user supplied data). The QA script will provide a warning that the tables are empty, but this will not prevent the nonroad data from being submitted to the EIS. The EIS submission must have a QA script report for each CDB submitted.

Download and unzip “2017v1\_NR\_Input\_QA\_Checks\_MOVES2014b.zip” from the 2017 NEI FTP site ([ftp://newftp.epa.gov/Air/nei/2017/doc/supporting\\_data/nonroad](ftp://newftp.epa.gov/Air/nei/2017/doc/supporting_data/nonroad)). This file contains the QA Tool (NR\_QA\_Checks\_MOVES2014b\_v3.sql) and an example batch file (Example\_Run\_NR\_QA\_Checks\_MOVES2014b\_v3.bat). The batch file shows how to generate a QA report text file from the MySQL table after running the QA script and demonstrates how to automate the QA process for more than one county. Running the script will create the QA Report that is required in your MOVES CDB submittal. The report confirms that each CDB contains the appropriate tables and that

the values checked within those tables are valid. EIS will check to see that each county listed in the report has an associated CDB in the submission. Only include counties in the QA report that you will be submitting. If the counties in the QA report do not match those in the CDB folder, or if any errors are indicated in the QA report, EIS will indicate a critical error and will not accept the submission. Format for the report generated by the batch file is .txt, but this file can be opened as a table using Microsoft Excel to make it more readable.

If your state has many counties, you may wish to automate the checking process. Below is an example of a batch file written to check the three counties for the state of Delaware. The batch file deletes the old version of the report text file (named with the PSC), clears the MySQL buffer of previous work and drops the previous version of the database used to store the aggregated results from the individual checks. Then MySQL is directed to each county database (i.e., c10001y2017\_nr\_20181211) using the QA script (NR\_QA\_Checks\_MOVES2014b\_v3.sql).

Note that the directory path must be included so that the file can be properly located by MySQL. The path you use can be different than the location (C:\....\...) shown in this example. The final line in the batch file exports the results into the report text file. A directory path can also be added to this file name as well to help locate the file once it has been populated.

```
del "C:\....\DEDNR_NR_QA_Report.txt"
mysql -uXXXXXX -pYYYYYY -e "flush tables;"
mysql -uXXXXXX -pYYYYYY -e "drop database if exists all_nrddb_checks;"
mysql -uXXXXXX -pYYYYYY c10001y2017_nr_20181211 < "C:\....\NR_QA_Checks_MOVES2014b_v3.sql"
mysql -uXXXXXX -pYYYYYY c10003y2017_nr_20181211 < "C:\....\NR_QA_Checks_MOVES2014b_v3.sql"
mysql -uXXXXXX -pYYYYYY c10005y2017_nr_20181211 < "C:\....\NR_QA_Checks_MOVES2014b_v3.sql"
mysql -uXXXXXX -pYYYYYY -e "select * from all_nrddb_checks.all_county_database_checks;" > "C:\....\DEDNR_NR_QA_Report.txt"
```

The XXXXXX value is the MySQL user name and the YYYYYY value is the MySQL password. The file generated by this script (DEDNR\_NR\_QA\_Report.txt) is the quality assurance (QA) report required by the EIS process. You can name this report what you like by editing the text in the batch file.

In the example QA report below, the checks for Kent County (10001) have been successful. In the case of the nrretrofitfactors, the table was empty, which generated a Warning in the Status column (B). The Warning is informational for the state to indicate where data has not been provided. MOVES will use default values in cases where tables are left empty. However, only a Status of ***Error*** will prevent the report from being acceptable to the EIS. If an Error occurs, the problem must be identified, corrected and the script re-run to generate a report with no Errors.

## Example of QA Report Results

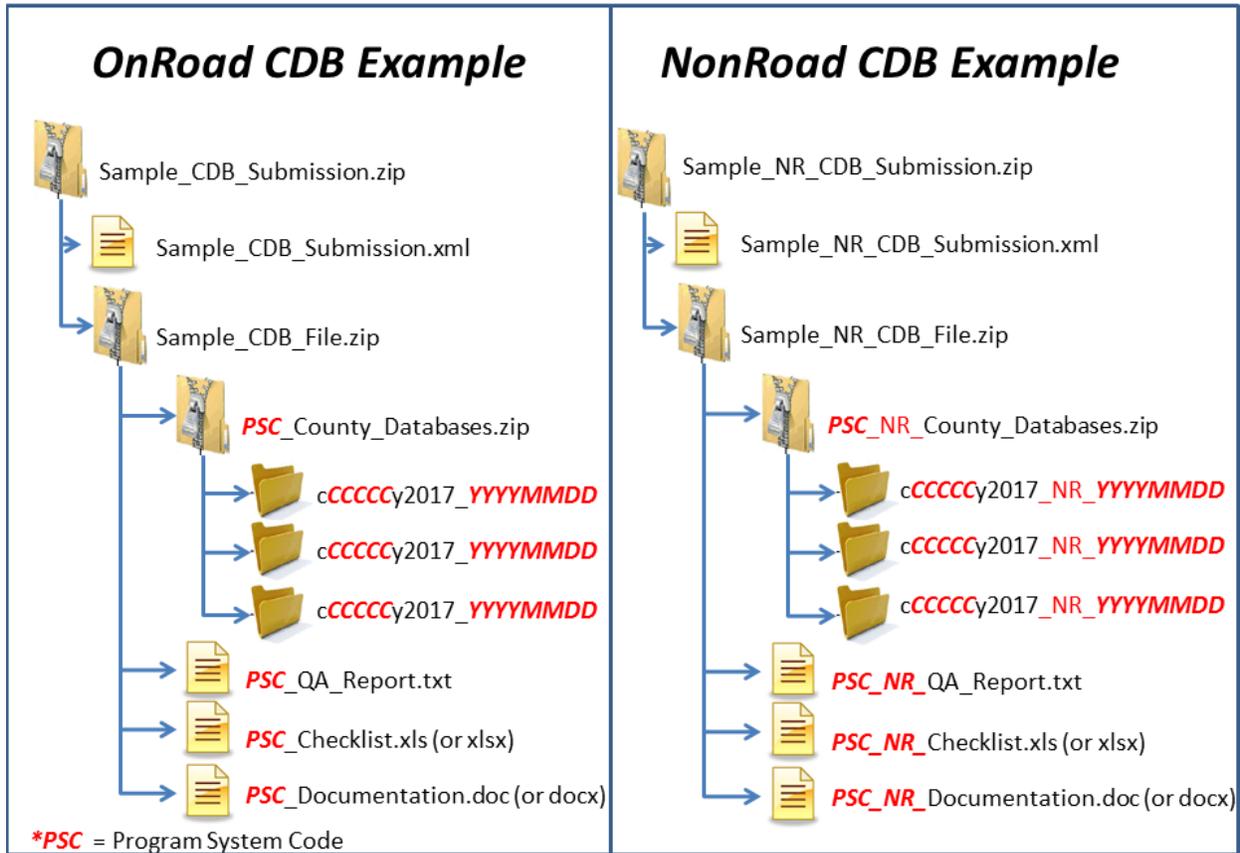
The screenshot shows an Excel spreadsheet titled "DEDNR NR Report results.xlsx" with the following data:

countyID	status	tableId	tableName	checkNumber	testDescription	testValue	count	dataBaseName	dayI
10001	Completed	11	nrbaseyearequippopulation	1	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	13	nrmonthallocation	3	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	14	nrdayallocation	4	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	15	nrHourAllocation	5	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Warning	16	nrretrofitfactors	6	Empty Table	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	16	nrretrofitfactors	6	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	17	nrsourceusetype	7	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	18	nrStateSurrogate	8	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	19	fuelFormulation	9	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	20	nrFuelSupply	10	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	21	zoneMonthHour	11	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL
10001	Completed	22	nrgrowthIndex	12	Table Check	NULL	NULL	c10001y2017_nr_20180601	NULL

## IV. BUNDLING CDB COMPONENTS FOR EIS SUBMITTAL

Once you have prepared the parts of your submittal, you'll need to zip them together in a specific way and reference them with the EIS/CDX required XML file. The CDBs are folders located in the MySQL/data directory on your system. Once you have completed creating/editing the CDBs for your state, these folders and their contents are to be included in the zip file for submission.

The graphic below shows that the individual CDBs are zipped into one zip file. That zip file and the remaining parts (QA report, checklist, and documentation) are then zipped into a zip folder.



## V. CREATING THE EIS/CDX-REQUIRED XML

To create the xml file, use

1. Use the EIS Access Bridge Tool
  - a. Download the “Area Emissions Inventory Bridge Tool” from <http://www.epa.gov/air-emissions-inventories/emission-inventory-tools>.
  - b. Open the file in Microsoft Access.
  - c. Choose the “Export Onroad/NonRoad XML Wrapper” from the Main Menu



d. Fill out the form with the appropriate information

The screenshot displays the 'Export CERS XML Wrapper for Activity Data' form. At the top, it says 'Export CERS XML Wrapper for Activity Data'. Below this, there is a 'File Location' field with a text input containing 'C:\Users\LDRIVER\OneDrive - Environmental Protection Agency (EPA)\LMD\1' and a 'Browse...' button. A sub-header reads 'Complete / Verify Header Information'. The form contains several fields: 'Data Category' (dropdown menu set to 'Nonroad'), 'Emissions Year' (text input '2017'), 'Submission Type' (dropdown menu set to 'Production'), 'Activity Database Type' (dropdown menu set to 'CDB'), 'Activity Database File' (text input 'YourZippedFileName.zip'), 'User Identifier' (text input 'YourEISID'), 'Author Name' (text input 'YourName'), 'Organization Name' (text input 'YourOrganization'), 'Program System Code' (text input 'Your\_PSC'), 'EPA Dataset' (empty text input), 'Keywords' (text input 'optional'), and 'Submission Comment' (text input 'optional' with a scroll bar). At the bottom right, there are 'Begin Export' and 'Cancel' buttons.

- i. File Location = The name and location where the resulting XML file will be generated.
- ii. Data Category: Choose “Nonroad”
- iii. Emissions Year: Set to 2017

- iv. Submission Type: Choose either “QA” or “Production”
  - v. Activity Database Type: Set to “CDB”
  - vi. Activity Database File: The name of the packaged set of zip files.  
Using the earlier example: “Sample\_CDB\_Submission.zip”
  - vii. User Identifier: Your EIS User ID
  - viii. Author Name: Your name (optional)
  - ix. Organization Name: The name of your organization (optional)
  - x. Program System Code: The program system code of your organization
  - xi. EPA Dataset: Leave blank
  - xii. Keywords: Any keywords you would like to submit about the document (optional)
  - xiii. Comment: Any comments about the document (optional)
- e. Press the “Begin Export” button. Your file will be generated to the location specified.

NOTE: Each CDB submittal is a total replacement to any CDBs previously submitted by that agency. Thus, if a state submits every county in one submittal, then submits only one county in a subsequent submittal, only the one county will be present in EIS.

## **VI. ADDITIONAL RESOURCES**

For additional assistance contact

### Submittal Issues

-Sally Dombrowski – [dombrowski.sally@epa.gov](mailto:dombrowski.sally@epa.gov); 919-541-3269

### Inventory Issues

-Laurel Driver – [driver.laue@epa.gov](mailto:driver.laue@epa.gov); 919-541-2859

### CDB Content Issues

-Jaehoon Han – [Han.Jaehoon@epa.gov](mailto:Han.Jaehoon@epa.gov), 734-214-4299

### MOVES Issues

-[mobile@epa.gov](mailto:mobile@epa.gov)