

User's Instructions for HRLYNAAQS

Software program HRLYNAAQS is provided by the North Dakota Department of Health (NDDH) to assist permit applicants and consultants in the demonstration of modeled compliance with new 1-hour NAAQS for NO₂ and SO₂. The program uses the optional formatted "post" file output from AERMOD (ISC-Prime) to fully implement EPA modeling guidance, and the form of the new standards. HRLYNAAQS provides the annual 98th (NO₂) or 99th (SO₂) percentile of maximum daily 1-hour concentrations averaged across five years, for each receptor location. Along with the total concentration, HRLYNAAQS also provides individual contributions for up to five source groups.

The program provides for the addition of concurrent hourly background concentrations to hourly model results, before processing the form of the standard. The program also works with either five-year post output and background concentration files, or one-year files. If five-year files are available, the program will fully implement the form of the new 1-hour NAAQS (and associated modeling guidance) by computing the five-year average of annual 99th (SO₂) or 98th (NO₂) percentile of maximum daily 1-hour concentrations. Background concentrations are added to modeled concentrations prior to computation. The program provides a result for each receptor location, and identifies the worst receptor.

The program allows the use of a single, fixed hourly background concentration rather than concurrent hourly concentrations from a file. To implement post processing without a background concentration(s), the fixed background concentration is simply set to zero.

Program HRLYNAAQS must be executed in the Windows DOS environment by entering the program name at the command prompt. All input information, including post and background file names, is obtained from a control input text file as discussed below. An individual post file is required for each source group, along with the total (source group 'ALL'). The program takes about an hour to run on an HP Compaq dc7700 computer for five-year files, 2000 receptors, and three source groups. Execution status messages are written to the screen. Note that the model post file output can become very large, approaching about 10 gigabytes (per file) for five years and 2000 receptors.

A text file with input information must be provided in the same directory (folder) where the HRLYNAAQS executable file is located. This text file must be named HRLYNAAQS.INP. The text file will consist of 5 to 10 lines and must be constructed using a text editor such as Windows Notepad (word processor will not work). Content of the text file is as follows:

LINE 1: Desired percentile – 98 for NO2 or 99 for SO2

LINE 2: Number of years (1 or 5, background and all post files must contain data for number of years specified)

LINE 3: Enter name for background concentration file (complete path up to 80 characters) or enter fixed background concentration (ppb). (Program assumes that anything less than 6 characters will be fixed background concentration rather than file name.)

LINE 4: Name of post file for total concentrations (complete path up to 80 characters)

LINE 5: Number of source group post files (0 to 5). Name for each file must be entered below.

LINE 6: Optional – Name of source group 1 post file (complete path up to 80 characters)

LINE 7: Optional – Name of source group 2 post file (complete path up to 80 characters)

LINE 8: Optional – Name of source group 3 post file (complete path up to 80 characters)

LINE 9: Optional – Name of source group 4 post file (complete path up to 80 characters)

LINE 10: Optional – Name of source group 5 post file (complete path up to 80 characters)

A sample input file is shown below for an SO2 analysis involving 3 source groups and concurrent hourly background concentrations:

```
99
5
SO2_0408S2_FGO.dat
TOTAL_0408_SO2.PST
3
SOURCE_GRP_1_0408_SO2.PST
SOURCE_GRP_2_0408_SO2.PST
SOURCE_GRP_3_0408_SO2.PST
```

A sample input file is shown below for an NO₂ analysis involving 2 source groups and a fixed background concentration:

```
98
5
4.0
TOTAL_0408_NO2 .PST
2
SOURCE_GRP_1_0408_NO2 .PST
SOURCE_GRP_2_0408_NO2 .PST
```

Output from HRLYNAAQS is written to a file named HRLYNAAQS.OUT, which is placed in the working directory (folder).

Additional notes regarding use of HRLYNAAQS follow:

- 1) The program currently accommodates up to 10,000 receptors (this can be increased by NDDH, if necessary).
- 2) The model post file must be constructed using the formatted (plot) option.
- 3) The model post file and the background concentration file must reflect the same time zone.
- 4) File name for the background concentration file must be at least 6 characters long (including extension).
- 5) If the analysis involves only one year, the background concentration file and all post files must contain data for one year, only.
- 6) HRLYNAAQS does not recognize missing data codes in hourly background concentration files. So missing codes (such as 999.9) must not be present in files. For NDDH background data files, the sequence "0408S2" in the file name designates a file with no missing codes. Earlier files with the sequence "0408S" in the file name must not be used with HRLYNAAQS.