

Modeling Procedure to Address The New Federal 1 Hour NO₂ Standard

Background:

EPA is has revised the primary NO₂ NAAQS in order to provide requisite protection of public health. Specifically, EPA has establishing a new 1-hour standard at a level of 100 ppb (188.68 ug/m³), based on the 3-year average of the annual 98th percentile of the daily maximum 1-hour concentrations, to supplement the existing annual standard. EPA has also established requirements for an NO₂ monitoring network that will include monitors at locations where maximum NO₂ concentrations are expected to occur, including within 50 meters of major roadways, as well as monitors sited to measure the area-wide NO₂ concentrations that occur more broadly across communities.

The final rule was signed on January 22, 2010 and the effective date of the new 1 hour standard is 60 days after the final rule has been published in the federal register. The final rule was published in the federal register on Feb 9, 2010, thereby having an effective date of April 12, 2010.

Applicability:

This guidance applies to those sources that as part of the District's NSR are determined to trigger the District's Public Notice thresholds and those sources under CEQA that are reviewed / are required to perform an Ambient Air Quality Analysis (AAQA).

Procedures:

Modeling:

In order to streamline the modeling process the District will take a three tiered approach to implementing the new 1 hour standard. This will allow for modeling to be done as before and allow for progressively more refined techniques to be used if a unit(s) fails the 1 hour standard.

The AERMOD model (with either the ozone limiting method or the plume volume molar ratio method) should be run using the latest year of meteorological and ozone data (one year only).

Please note: the District requires that 5 years of meteorological data be used when perform modeling runs, if the data are available (http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm). In some cases a selected site may not have 5 years of data; therefore the maximum number of years provided by the District should be used.

Tier I:

Tier I requires that maximum 1 hour modeling concentration be used in combination with the background noted by the nearest monitor in Table 2 below. This method is similar to that currently used to evaluate the state ambient air quality standard and is considered the worst-case scenario.

The following outlines the basic steps that should be done to complete a Tier I modeling analysis.

1. AERMOD shall be run using the concatenated meteorological dataset provide by the District.

2. The maximum 1 hour concentration over the modeling period shall be used when calculating the offsite NO₂ concentration for a project.

Tier II:

Tier II requires that the 8th highest maximum 1 hour modeling concentration be used in combination with the background noted by the nearest monitor in Table 2 below.

The following outlines the basic steps that should be done to complete a Tier II modeling analysis.

1. AERMOD shall be run for each year of the modeling period to determine the 8th highest maximum 1 hour concentration for each year.
2. The highest 8th highest 1 hour concentration predicted for any year over the modeling period shall be used when calculating the offsite NO₂ concentration for a project.

Tier III:

On 2/25/2010 EPA released their recommended procedure (revised) for complying with the NAAQS which can be found at http://www.epa.gov/scram001/no2_hourly_NAAQS_aermod_02-25-10.pdf. The District requires that these procedures be followed to determine the highest 5-year average 8th highest daily maximum 1 hour concentration. (Note that the average of the years available will be used if a full 5-year meteorological data set is unavailable.)

Background:

All background data for the purposes of complying with the federal 1 hour standard will be generated by the District. Background data developed from other sources will **not** be accepted.

The background data was developed using the procedures found in the final rule approved January 22, 2010 entitled "Primary National Ambient Air Quality Standard for Nitrogen Dioxide" Section IV. "Appendix S – Interpretation of the Primary NAAQS for Oxides of Nitrogen and Revisions to the Exceptional Events Rule". A copy of the amended Appendix S is found at the end of the final rule. A copy of the final rule can be downloaded in

[PDF](#)

<http://frwebgate4.access.gpo.gov/cgi-bin/PDFgate.cgi?WAISdocID=265109247209+1+2+0&WAIAction=retrieve>,

or
[HTML](#)

<http://frwebgate4.access.gpo.gov/cgi-bin/TEXTgate.cgi?WAISdocID=265109247209+1+1+0&WAIAction=retrieve>

Section 3.2 entitled "The 1-hour Primary NO₂ NAAQS." outlines the requirements for determining if a given year or set of years are acceptable for calculating the design values to be used when conducting modeling.

Criteria:

- The 1-hour primary NO₂ NAAQS is met at a site when the valid 1-hour primary standard design value is less than or equal to 100 parts per billion (ppb).
- The standard design value is valid if it encompasses three consecutive calendar years of complete data.

- A year meets data completeness requirements when all 4 quarters are complete.
 - A quarter is complete when at least 75 percent of the sampling days for each quarter have complete data.
 - A sampling day has complete data if 75 percent of the hourly concentration values, including state-flagged data affected by exceptional events which have been approved for exclusion by the Administrator, are reported.

Other alternative procedures are included in Appendix S if a given dataset does not pass the criteria above. The district will make every effort to use datasets that meet these parameters when determining the design value for a site.

Once a dataset is determined to meet the above criteria the design values are calculated. A site's design value is a 3 yr average of the 98th percentile of the annual distribution of the daily max 1 hour average concentration (monitored values).

Criteria:

- Determine # of valid days to compare to column 1 of Table 1 to find the nth maximum value (98th percentile)
 - Arrange all valid values in descending order
 - Use the nth value, see Table 1, to represent the year's 98th percentile value
 - Average the year's 98th percentile values to come up with the design value
- This procedure is repeated for each site that has been determined to have valid years. Table 2 represents the 3 yr average of the 98th percentile of the annual distribution of the daily max 1 hour average concentration for all sites that have been determined to have valid data.

Table 1

Annual number of days with valid data for year "y" (cn _y)	P _{0.98, y} is the nth maximum value of the year, where n is the listed number
1-50	1
51-100	2
101-150	3
151-200	4
201-250	5
251-300	6
301-350	7
351-366	8

Table 2 (ug/m³ = ppb * 1.8868)

County FIP	Site ID	County	Site Name	3yr Ave. of the 98th percentile of the annual distribution of the daily 1 hour max ppb / ug/m ³
19	7	Fresno	Fresno-Drummond Street	63.33 / 119.50
19	8	Fresno	Fresno-1st Street	59.67 / 1112.58
19	242	Fresno	Fresno-Sierra Skypark #2	42.67 / 80.50

County FIP	Site ID	County	Site Name	3yr Ave. of the 98th percentile of the annual distribution of the daily 1 hour max ppb / ug/m ³
19	4001	Fresno	Parlier	41.67 / 78.62
19	5001	Fresno	Clovis-N Villa Avenue	58.67 / 110.69
29	7	Kern	Edison	41.67 / 78.62
29	10	Kern	Bakersfield-Golden State Highway	62.33 / 117.61
29	14	Kern	Bakersfield-5558 California Avenue	63.67 / 120.13
29	5001	Kern	Arvin-Bear Mountain Blvd	*40.67 / 76.73
29	6001	Kern	Shafter-Walker Street	63.33 / 119.50
31	1004	Kings	Hanford-S Irwin Street	51.00 / 96.23
39	4	Madera	Madera-Pump Yard	41.67 / 78.62
47	3	Merced	Merced-S Coffee Avenue	44.00 / 83.02
77	1002	San Joaquin	Stockton-Hazelton Street	59.67 / 112.58
77	3005	San Joaquin	Tracy-Airport	41.33 / 77.99
99	6	Stanislaus	Turlock-S Minaret Street	49.67 / 93.71
107	2002	Tulare	Visalia-N Church Street	61.33 / 115.72

*2nd Qtr of 2008 not valid only 63 days reported out of 91 days. The performance test found in section 3.2(c)(ii)(B) of appendix S was used. 28 days substitute, max daily value = 47, to fill the Qtr to 100%. Total number of days after substitution = 330. The 7th highest value was used; see Table 1, to determine the 98th percentile. The original value of 27 was replaced with 47. Based on this result the year was considered valid.