UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Transcontinental Gas Pipe Line Corporation's Use of a Non-guideline Approach for Estimating the Amount of NO that is Converted to NO_2

DATE: JUL 8 1992

FROM: Marcia L. Spink, Chief
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TO: Dean Wilson
Office of Air Quality Planning & Standards (MD-14)

The Virginia Department of Air Pollution Control (VDAPC) conducted an analysis of the NO2 impacts from a compressor station owned and operated by the Transcontinental Gas Pipe Line Corporation (TGPL) near Unionville, Virginia. The VDAPC modeling assumed complete conversion of NO to NO2. The VDAPC also applied the Ozone Limiting Method to the modeled annual NOx estimates using a representative annual average ozone concentration. Both the initial screen and second level screen showed violations of the NO2 NAAQS. The third level screen, that applies the Ozone Limiting Method separately for each hour of the year, was not applied because there is no known set of ambient ozone and NO2 concentration data that is clearly representative of the hourly variation of the concentrations in the Unionville area.

Upon notification of the modeled violations, TGPL decided to remodel the station using a non-guideline method for estimating the amount of NO that is converted to NO2. The methodology proposed by TGPL employs an exponential decay function and a half-life of five minutes. The initial concentration of NO2 in the stack gas is approximated at 1/10th of the total NOx emitted. For your convenience, we have attached to this memo the information that was used by TGPL's consultant to develop this procedure. The application of this methodology is outlined in the following six step process.

Step 1

The ISCLT model is run assuming all NOx emissions are in the form of NO2. This produces the maximum NO2 impact by assuming NO is instantly converted to NO2.

Step 2

Ten percent of the NOx emissions are assumed to be NO2. The impact of stack emissions of NO2 is referred to as "direct" NO2 impact. Therefore, direct NO2 impact is 0.01 times the total NOx impact.

Step 3

The results of the total NOx run is used to determine the maximum potential impact of NO emissions. Assuming 90 percent of the NOx (as NO2) is in the form of NO and correcting for molecular weight (multiply by 30/46), the potential undecayed NO impact is estimated.

Step 4

A second modeling run is performed using NO emission rates. In this case the model will be run with a half-life of five minutes. The results from this run represent the impact of decayed NO emissions.

Step 5

The amount of NO that has decayed to NO2 is determined by subtracting the decayed NO impact (**Step 4**) from the maximum potential NO impact (**Step 3**). These results are corrected for molecular weight (multiply by 46/30) to produce the NO2 concentration that results from decayed NO.

Step 6

The direct NO2 impact (**Step 2**) is added to the decayed NO2 impact (**Step 5**) to determine the total NO2 impact.

Although the proposed non-guideline approach seems reasonable, we would appreciate comments from the Model Clearinghouse concerning the validity of the approach as an alternative to the third level screen. We have recommended that the VDAPC initiate stack testing to verify the assumption that the in-stack concentration of NO2 is one tenth of the total NOx. Because this source has been a concern to Virginia for approximately three years, an expeditious review of this issue by the Model Clearinghouse would be very much appreciated.

If you have any questions, please contact me at (215) 597-2906.

Attachment

cc: M. Spink (3AT10) R. Knapp (3AT12)
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