Modeling Protocol Review

Procedures for Submitting Modeling Protocol

A modeling protocol must be approved prior to submission of any modeling report. The modeling protocol is generally submitted prior to the application, so that the actual modeling can accompany the application. Applications requiring modeling will only be considered complete when accompanied by modeling prepared according to an approved modeling protocol.

Items to be included in the Modeling Protocol

1. **Site Plan**

   A scale drawing of the site and property boundaries, including location of all existing and proposed stacks and on-site buildings. This diagram is to include a scale, key, and North indicator. This diagram is also to include pertinent features such as fence lines, major roads, railroads, etc.

2. **Buildings with Possible Downwash**

   Either the site plan or a separate map must show the locations of all buildings which are within the lesser of 5L or ½-mile of any stack.

3. **USGS Map**

   The location of the site and a three (3) mile surrounding radius are to be shown on one or more USGS 7.5' quad map(s). Use a twenty (20) kilometer radius if any stack exceeds fifty (50) meters.

4. **GEP Analysis**

   Building dimensions, Good Engineering Practice Stack Height, region of influence, and stacks within 5L for each on-site building and off-site buildings which are within 5L of any stack are to be provided using NC Form 1 - Good Engineering Practice (GEP) Stack Height Analysis.

5. **Cavity Analysis**

   A discussion of cavity calculation techniques is to be provided. This must identify which buildings and stacks are to be examined.

6. **Terrain Considerations**

   Complex terrain (greater than 100% of stack height) and rolling terrain (between 50% and 100% of stack height) are to be identified for a three (3) mile radius surrounding the site. The modeling of rolling and complex terrain is to be discussed. Use a twenty (20) kilometer radius if any stack exceeds fifty (50) meters.

7. **Urban/Rural Considerations**

   The modeling protocol must state whether the site is to be considered urban or rural for modeling purposes.

8. **Model Selection**

   Models to be used are to be identified and reasons for selection are to be discussed.

9. **Meteorological Data**

   Meteorological data to be used must be identified.

10. **Stack Parameters**

    Stack parameters are to be provided using NC Form 3 - Toxic Air Pollutant Emission Parameters. If the stack parameters submitted with the modeling protocol are likely to change when the actual modeling is submitted, this should be noted in the modeling protocol. When modeling merged stacks, provide calculation of merged stack parameters.

11. **Receptor Locations and Elevations**

    Receptor locations and elevations are to be identified and discussed. Also discuss discrete receptor locations and reason for discrete receptor placement.

12. **Pollutants/Emission Rates**

    Pollutants and emission rates should be submitted using NC Form 2 - Pollutant Emission Rates. If emission rates are not known at the time of the plan submittal, or are subject to change prior to actual modeling, best estimates should be provided and a note included in the modeling protocol that the emissions are expected to vary when final modeling is submitted.

Project/Source:	Date:	Regulator:

1. Site Plan

• Scale drawing of property boundaries	❑ Yes ❑ No ❑ N/A
• Location of existing stacks	❑ Yes ❑ No ❑ N/A
• Location of proposed stacks	❑ Yes ❑ No ❑ N/A
• Location of on-site buildings	❑ Yes ❑ No ❑ N/A
• Key, North indicator	❑ Yes ❑ No ❑ N/A
• Other pertinent features (i.e., fence line, major roads, railroads, etc.)	❑ Yes ❑ No ❑ N/A

2. Buildings with Possible Downwash

• Location of all buildings within the lesser of 5L or ½-mile radius of any stack	❑ Yes ❑ No ❑ N/A

3. USGS Map

• Site location and 3-mile surrounding radius	❑ Yes ❑ No ❑ N/A

4. GEP Analysis

• Building dimensions	❑ Yes ❑ No ❑ N/A
• Good Engineering Practice Stack Height	❑ Yes ❑ No ❑ N/A
• Region of Influence	❑ Yes ❑ No ❑ N/A
• Stacks within 5L for each on-site and off-site building	❑ Yes ❑ No ❑ N/A
• NC Form 1 - Good Engineering Practice (GEP) Stack Height Analysis	❑ Yes ❑ No ❑ N/A

5. Cavity Analysis

• Cavity calculation technique	❑ Yes ❑ No ❑ N/A
• Identification of which buildings and stacks examined	❑ Yes ❑ No ❑ N/A

6. Terrain Considerations

• Complex Terrain	❑ Yes ❑ No ❑ N/A
• Intermediate (Rolling) Terrain	❑ Yes ❑ No ❑ N/A
• Simple Terrain	❑ Yes ❑ No ❑ N/A

7. Urban/Rural Considerations

• Urban	❑ Yes ❑ No ❑ N/A
• Rural	❑ Yes ❑ No ❑ N/A

8. Model Selection

• Model Name and Version	❑ Yes ❑ No ❑ N/A

9. Meteorological Data

• Year	❑ Yes ❑ No ❑ N/A
• Station Identification	❑ Yes ❑ No ❑ N/A

10. Stack Parameters

• NC Form 3 - Toxic Air Pollutant Emission Parameters	❑ Yes ❑ No ❑ N/A
• Calculation of merged stack parameters	❑ Yes ❑ No ❑ N/A

11. Receptor Locations and Elevations

• Receptor locations	❑ Yes ❑ No ❑ N/A
• Receptor elevations	❑ Yes ❑ No ❑ N/A
• Discrete receptors	❑ Yes ❑ No ❑ N/A

12. Pollutants/Emission Rates

• NC Form 2 - Pollutant Emission Rates	❑ Yes ❑ No ❑ N/A