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DISPERSION MODELING PROTOCOL

Plant-wide C8 Emissions

DuPont Chambers Works Facility
Deepwater, New Jersey

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April 9, 2003

DuPont Chambers Works
Air Quality Modeling Protocol

The following sections describe the dispersion modeling methodology to be employed in order to assess the locations of maximum ambient air concentrations resulting from C8 emissions at the DuPont Chambers Works facility located in Deepwater, New Jersey.

1. Emissions Inventory

The following emission inventory information will be assembled in order to conduct the air quality modeling:

1. Stack locations
2. Stack base elevations
3. Stack heights
4. Stack diameters
5. Stack gas exit temperatures
6. Stack gas flow rate or exit velocities
7. Detailed plant layout, including all building dimensions (provided in a scaled plot plan)
8. C8 emission rate

The detailed plant layout is necessary to evaluate the building dimensions in the vicinity of each stack and to identify the plant perimeter for defining the starting point of the receptor grid.

2. Model Selection

The area surrounding Chambers Works is primarily non-urban as previously determined by recommended U. S. EPA classification procedures. The U. S. EPA procedures classify land use within 3 kilometers of the site by the Auer method (Auer, 1978). Previous review of U. S. Geological Survey (USGS) maps, aerial photographs, and site visits clearly indicated that the area is over 50% non-urban. The terrain immediately surrounding the plant is primarily flat.

The Industrial Source Complex Short Term Model (ISCST3) will be used as the primary model to estimate pollutant concentrations. ISCST3 is a steady-state Gaussian model recommended by the U.S. EPA, included in the "Guidelines on Air Quality Models" (40 CFR 51, Appendix W) for modeling of pollutant emissions from industrial-type sources subject to significant building downwash. Refined ISCST3 modeling will be conducted using five years of sequential hourly meteorology from the Greater Wilmington New Castle County Airport (NCC), located in Wilmington, DE as described below.

3. Receptor Selection

A Cartesian grid of receptors will be utilized in this modeling analysis. This grid will consist of receptors placed at 200 m intervals on a grid extending a minimum distance of 6 km from any plant

boundary. The nearest residences to the Chambers Works site will be covered by this receptor grid. All receptors will be located outside the plant boundary.

A Cartesian receptor grid such as the one described above is considerably more dense than recommended by the U.S. EPA in the Guidelines on Air Quality Models (U.S. EPA, 1998) for modeling a facility of this type. Additional discrete receptors will be placed at 100 m intervals along the plant boundary. Although the topography in the immediate vicinity of Chambers Works is primarily flat, there is some elevated terrain to the Northwest of the site. Since the receptor grid will extend into this region, terrain elevations will be included in the modeling study.

Additional modeling will be conducted at a dense grid of receptors in the vicinity of the highest predicted concentration. This dense grid will consist of a 1 km by 1 km Cartesian grid of receptors with 100 meter spacing between each receptor.

4. Meteorological Data

The Chambers Works facility is located approximately 9 km from the Greater Wilmington (Delaware) New Castle County (NCC) Airport. Meteorological observations at the airport are considered representative of the site and of conditions affecting transport and dispersion of stack emissions. Therefore, five years of hourly surface observations from the National Weather Service (NWS) station at NCC airport will be used in the refined air quality dispersion analysis.

Hourly meteorological data for the period 1989-1993 will be used in this study. Concurrent twice daily upper air data from the Dulles International Airport NWS station located in Sterling, VA will be used along with NCC surface temperatures to obtain hourly mixing depths.

5. Modeling Procedures

The most recent version of ISCST3 (version 02035) will be used in the air quality dispersion modeling of all receptors. All model options will be set to the U.S. EPA regulatory default version of ISCST3. The model will be run in the rural mode since the land area in the immediate vicinity of Chambers Works is more than 50% rural. Any effects of aerodynamic downwash caused by structures adjacent to the modeled stack will be included in the ISCST3 modeling analysis, along with a summary of the building downwash input files (BPIP). Air quality dispersion modeling will be conducted on an hour-by-hour basis using the five years of meteorological data described above. The results will be summarized for annual averaging periods.

6. Report

A report will be prepared upon completion of the modeling analysis. This report will describe the procedures, results and conclusions of the study as described above. The report will include a wind rose of the meteorological data used and concentration isopleths of the final prediction modeling results. All modeling input and output files will be provided on a CD, including a summary of building downwash influences (BPIP files).