5.3.4 Receptors

A tiered Cartesian grid of receptors in the near-field grid was set using 100-meter spacing out to 1.5 km from the facility, then 200-meter spacing out to 3 km from the facility, and 300-meter spacing out to 7.5 km from the facility. A separate system of receptors was set along the property boundary, with a spacing frequency of 25 meters or less. All receptor coordinates were referenced using the NAD83 datum (zone 17). Elevations were assigned to each receptor using the US EPA's AERMAP utility, which extracts elevations from the United States Geological Survey (USGS) National Elevation Dataset (NED) data available for the area. In this evaluation, the 1/3 degree (approximately 10 m) resolution data in GeoTIFF format was used.

5.3.5 Good Engineering Practice and Stack Height Downwash

Section 123 of the Clean Air Act, as amended, required the USEPA to promulgate regulations to assure that the degree of emission limitation required for the control of any air pollutant under an applicable SIP is not affected by that portion of any stack height which exceeds Good Engineering Practice (GEP) or by any other dispersion technique.

The formula for GEP stack height is given as:

$$H_{GEP} = H_B + 1.5L_B$$

where:

- H_{GEP} = formula GEP stack height;
- H_B = the building's height above stack base; and
- L_B = the lesser of the building's height or maximum projected width.

If a stack height is greater than 65 meters, the modeled height of the stack cannot exceed the GEP formula height. None of the existing or proposed stack heights exceed the minimum GEP height of 65 meters so the actual height was used in the modeling. However, the potential for downwash effects must be evaluated and incorporated in the model since the stacks are also less than 2.5 times the height of the Arglass buildings. The modeled stack heights do not exceed the 65-meter threshold for using the GEP formula height.

To include the potential influence that buildings may have on the dispersion of pollutants from the stack, the USEPA Building Profile Input Program "PRIME" version (BPIPPRM) was used. BPIPPRM requires a geo-referenced depiction of the facility's buildings, stacks, and other nearby structures which may influence dispersion. The position and height of buildings relative to the stack positions must be evaluated to determine how it will influence dispersion for each wind direction. The BPIPPRM utility produces the necessary direction-specific dimensions that are subsequently used by AERMOD to account for building wake effects. UTM coordinates for the stacks and the Arglass buildings including the proposed new structures were identified using a geo-referenced mapping utility.

5.3.6 Source Input Data

When setting up the AERMOD model, it is necessary to identify and input the emission source locations, dimensions, and exhaust parameters to best capture the actual site conditions that directly influence exhaust plume formation and dispersion patterns predicted by the model. For point sources (i.e., stacks), these data include stack coordinates, height, diameter, exit temperature, and exit flow rate. Table 5-2 provides a list of these model input parameters for existing and proposed sources. A plot plan, included in Appendix A, illustrates the locations of the modeled sources.

5.3.7 Model Emission Rates

Emission rates for this analysis are based on the facility's potential to emit for the proposed new and existing sources. Maximum short-term (1-hour, 24-hour) emissions are represented in the model assuming that the maximum short-term emission rate from each operation/source at the facility occurs simultaneously and continuously for the period. Although in practice this condition may be infrequent