

ATTACHMENT 8



Energy Answers International

PSD Air Quality Modeling Protocol

For the proposed

**Arecibo Renewable Energy Project
Arecibo, Puerto Rico**

Barrio Cambalache, Arecibo, Puerto Rico

Revision Submitted May 2011

ARCADIS

calculations to best approximate actual site aerodynamic conditions. The model options and input parameters that will be used for this analysis are discussed in further detail below.

The AERMOD Modeling System includes preprocessor programs (AERMET (11059), AERSURFACE (updated January 2008), and AERMAP (11103)) to create the required input files for meteorology and receptor terrain elevations. AERMOD is the recommended model in USEPA's *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W) (USEPA 2005). The regulatory default option will be used. Specifically, the regulatory default option directs AERMOD to use:

- The elevated terrain algorithms requiring input of terrain height data for receptors and emission sources;
- Stack tip downwash (building downwash automatically overrides);
- The calms processing routines;
- Buoyancy-induced dispersion; and
- The missing meteorological data processing routines.

5.2 Meteorological Data

Careful consideration must be given to selecting a location from which to obtain meteorological data that were representative of conditions at the proposed project site. One year of meteorological data (August 1992 to August 1993) is available from the Puerto Rico Energy Power Authority (PREPA) in Cambalache Barrio which operated a meteorological station within one mile of the proposed AREP site in Arecibo. Figure 4 shows the proximity of the PREPA station to the proposed Energy Answers site. Per the recommendation of USEPA, this data set will be used.

The Cambalache data include wind direction, wind speed, temperature, solar radiation, sigma theta, sigma phi, and temperature difference between levels. The wind speed and wind direction data were measured at a height of 10 meters and 30 meters. Figure 5 shows a wind rose of the Cambalache data. Additional meteorological parameters, however, are required for executing AERMOD. To complete the Cambalache meteorological data set, cloud cover, ceiling height, pressure, and relative humidity were extracted from the 1992-1993 San Juan surface station Hourly US Weather Observation (HUSWO) data. Additionally, substitutions for missing data (winds) were extracted from the 1992-1993 San Juan surface station data. Figure 4 illustrates the location of San Juan relative to the proposed site and the PREPA site.