Excerpt 8

PSD Air Quality Modeling Analysis Amendments, February 16, 2012, AR I.A.12.a

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Energy Answers International
Resource Recovery Solutions

Energy Answers Arecibo, LLC

PSD Air Quality Modeling Analysis Amendment for Startup Periods

For the proposed
Arecibo Renewable Energy Project
Arecibo, Puerto Rico

Barrio Cambalache, Arecibo, Puerto Rico

Submitted February 2012

duplicate
Feb 16, 2012

ARCADIS

Energy Answers Arecibo Renewable Energy Project

Arecibo, Puerto Rico

PSD Air Quality Modeling Amendment for Startup

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not available for Puerto Rico. The one degree datum is acceptable internationally and adequately captures changes in elevation such as the mountainous region southwest of the subject site.

5.6 *Good Engineering Practice Stack Height and Building Downwash*

Section 123 of the Clean Air Act, as amended, required the EPA 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 GEP or by any other dispersion technique. These regulations have been promulgated under 40 CFR 51, dated July 8, 1985. A GEP stack height analysis is required for new and existing air pollution sources subject to a modeling analysis in order to determine if wake effect and downwash conditions need to be accounted for in the dispersion modeling analysis. Building wake effects may cause the predicted concentrations near a point source to be higher.

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.

A second definition of GEP stack height is "regulatory" GEP stack height. Regulatory GEP stack height is either 65 meters (m) or formula GEP stack height, whichever is greater. Sources are not allowed to take credit for ambient air concentrations that result from stacks that are higher than regulatory GEP stack height.

The EPA Building Profile Input Program (BPIP) (USEPA 1995) was used to evaluate GEP stack height for each of the proposed stacks and to produce the model input parameters necessary to account for building wake effects, based on the dimensions of buildings in the vicinity of the stacks when the stack height is determined to be below GEP. The "PRIME" version of BPIP (BPIPPRM) (Schulman et al. 1997) is used for models such as AERMOD for calculating potential air quality impacts with the building "cavity" region. BPIPPRM requires a digitized blueprint of the facility's buildings and stacks as well as other nearby structures. The position and height of buildings relative to the stack positions must be evaluated in the GEP analysis. Coordinates for each

building tier corner were identified using a digitized geo-referenced AutoCAD survey. BPIPPRM input and output files are provided on the attached DVD.

The stack heights for all sources at the proposed facility are determined to be below the GEP stack height. Table 5-1 provides a summary of the GEP analysis for the sources included within this study. Therefore, building downwash effects are taken into account in this dispersion modeling analysis.

Table 5-1: GEP Stack Height Values

Stack ID	Stack Height (m)	Base Elevation Differences (m)	GEP Stack Height Value (m)
BOILER1	95.52	1	101.73
BOILER2	95.52	1	101.73
GEN	10	1	65
FIREPUMP	10	0.38	65
COOL1	10.7	1	65
COOL2	10.7	1	65
COOL3	10.7	1	65
COOL4	10.7	1	65
ASH	20	1	65
TRANS1	16.5	1	65
TRANS2	16.5	1	65
SILO1	13.1	1	65
SILO2	30.5	1	65
SILO4	38.1	1	65

5.7 *Source Input Data*

The air dispersion model program AERMOD requires the input of certain site-specific data to produce results that are representative of the actual site conditions. These data include stack coordinates, height, diameter, emission rates exit temperature and exit flow rate. The primary sources of emissions at the new facility are the boiler units.