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Appendix 5.5A
OCA Modeling Protocol

APPENDIX 5.5A

Modeling Protocol: Offsite Consequence Analysis for Ammonia

An offsite consequence analysis (OCA) for ammonia will be conducted for the Alamitos Energy Center (AEC). AEC is required by both the Clean Air Act and the South Coast Air Quality Management District to install Best Available Control Technology to control emissions of criteria air pollutants from the proposed natural-gas fired combustion turbines. Oxides of nitrogen emissions from the turbines will be reduced through the use of selective catalytic reduction (SCR). The SCR control system uses ammonia as the reduction reagent in the presence of a catalyst. The AEC will use a 19 percent aqueous ammonia solution, stored onsite in two 24,000-gallon aboveground storage tanks collocated within the same secondary containment structure. Ammonia is a hazardous material and has an Emergency Response Planning Guideline Level 2 (ERPG-2) toxic endpoint (Te) value of 150 parts per million (ppm).[1] The Te value is based on a 1-hour exposure or averaging time.

Aqueous ammonia is a liquid that has a boiling point of approximately 324 Kelvin. When spilled, aqueous ammonia will evaporate, releasing ammonia vapors to the surrounding atmosphere.

The OCA will be based on the design configuration of the AEC ammonia storage tanks and secondary containment structure. In addition to the type of ammonia stored onsite, the OCA will consider tank size, surface area of the containment structure, location of the storage area relative to potential offsite receptors, local climatology, and the type of release. An OCA will be performed for the worst-case release scenario, which involves the failure and complete discharge of contents of a single storage tank into the secondary containment structure. Using the worst-case release scenario to estimate the AEC's offsite impacts related to the use and storage of aqueous ammonia will provide a conservative estimate of potential public health impacts.

Ammonia emissions from the potential release scenario will be calculated following method provided in the U.S. Environmental Protection Agency's *RMP Offsite Consequence Analysis Guidance* document. The default meteorological data necessary for emission and dispersion calculation will be supplemented by daily temperature data as required by Title 19 California Code of Regulations Section 2750.2. The AEC will be located in Long Beach, California. The maximum temperature recorded in the area in the past 3 years will be used for emission and dispersion calculations.

OCA dispersion modeling will be conducted to predict the potential extent of offsite ammonia concentrations above the specified EPA Te of 150 ppm and the California Energy Commission (CEC) level of significance of 75 ppm, considered by CEC staff to be the ammonia concentration that results in no serious adverse effects to the public for a one-time exposure.[2] Potential offsite ammonia concentrations will be calculated using the SLAB numerical dispersion model. A complete description of the SLAB model is available in the *User's Manual for SLAB: An Atmospheric Dispersion Model for Denser-Than-Air-Releases*.[3] The SLAB user manual contains a substance database that includes chemical-specific data for ammonia. These data will be used in all modeling runs without exception or modification.

Results from the OCA will be tabulated showing the distance from the source release point to the downwind concentrations of 150 ppm and 75 ppm. The potential area of ammonia concentrations above these values and resulting from the worst-case release scenario will be shown in a figure drawn to scale that shows the ammonia storage location, the proposed AEC layout, and any nearby offsite sensitive receptors.

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[1] *RMP Offsite Consequence Analysis Guidance,* U.S. Environmental Protection Agency, April 1999

[2] *Preliminary Staff Assessment-Otay Mesa Generating Project*, 99-AFC-5, California Energy Commission, May 2000

[3] *User's Manual for SLAB: An Atmospheric Dispersion Model for Denser-Than-Air-Releases,* D. E. Ermak, Lawrence Livermore National Laboratory, June 1990