APPENDIX 5.5A

Modeling Protocol for OCA for Ammonia

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Modeling Protocol: Offsite Consequence Analysis for Ammonia

An offsite consequence analysis (OCA) for ammonia will be conducted for the Competitive Power Ventures, Incorporated (CPV), CPV Vaca Station (CPVVS). CPV is required by both the Clean Air Act and the Yolo-Solano Air Quality Management District to install Best Available Control Technology to control emissions of criteria air pollutants from the proposed Siemens or GE Energy natural-gas fired combustion turbines and one steam turbine. Oxides of nitrogen (NOx) emissions from the Siemens or GE Energy natural-gas fired turbines will be reduced through the use of selective catalytic reduction (SCR). The SCR control system utilizes ammonia as the reduction reagent in the presence of a catalyst. The CPVVS will use a 19 percent aqueous ammonia solution, stored in two 12,000 gallon tanks (24,000 gallon total capacity), in the SCR systems. Ammonia is a hazardous material and has an Emergency Response Planning Guideline level 2 (ERPG-2) toxic endpoint (Te) value of 150 ppm (*RMP Offsite Consequence Analysis Guidance, EPA, April 1999*). The Te value is based on a one-hour exposure or averaging time.

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

The OCA will be based on the final design configuration of the CPVVS ammonia storage tanks and secondary containment structure. In addition to the type of ammonia stored on-site, the OCA will consider tank size, surface area of the containment structure, location of the storage area relative to potential off-site receptors, local climatology, and the type of release. Pursuant to the CalARP regulations (federal Risk Management Plan regulations do not apply to sources storing/using aqueous ammonia solutions below 20 percent), the OCA will be performed for the worst case release scenario, which involves the failure and complete discharge of the storage tank, as well as an alternative release scenario.

Ammonia emissions from two potential release scenarios will be calculated following methods provided in *RMP Offsite Consequence Analysis Guidance, EPA, April 1999*. The default meteorological data necessary for emission and dispersion calculations will be supplemented by daily temperature data as required by CCR Title 19, Section 2750.2. The CPVVS will be located in the City of Vacaville, CA. 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 off-site ammonia concentrations above the specified EPA Te of 150 ppm and the CEC level of significance of 75 ppm, considered by CEC staff to be the ammonia concentration what results in no serious adverse effects on the public for a one-time exposure (*Preliminary*

Staff Assessment-Otay Mesa Generating Project, 99-AFC-5, May 2000). Potential off-site ammonia concentrations will be calculated using the SLAB numerical dispersion model. A complete description of the SLAB model is available in *User's Manual for SLAB: An Atmospheric Dispersion Model for Denser-Than-Air-Releases, D. E. Ermak, Lawrence Livermore National Laboratory, June 1990*. The SLAB user manual contains a substance database which includes chemical-specific data for ammonia. This 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 for both release scenarios. 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, which shows the ammonia storage location, the proposed CPVVS and any nearby off-site sensitive receptors.