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APPENDIX 10F

Chemical Engineering Design Criteria

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10F1 Introduction

This appendix summarizes the codes, standards, criteria and practices that will be generally used in the design and installation for chemical engineering systems for the facility. More specific project information will be developed prior to construction of the Project to support detailed design, engineering, material procurement specification and construction specifications as required by the California Energy Commission.

10F2 Design Codes and Standards

The design and specification of all work will be in accordance with the laws and regulations of the federal government and the state of California. Industry codes and standards partially unique to chemical engineering design to be used in design and construction are summarized below.

- ANSI—American National Standards Institute
  ANSI B31.1—Power Piping Code
- ASME—American Society of Mechanical Engineers
  ASME—Performance Test Code 31, Ion Exchange Equipment
- ASTM—American Society for Testing and Materials.
  ASTM D859-94—Referee Method B for Silica as SiO_2
  ASTM D888-96—Referee Method A for Dissolved Oxygen
  ASTM D513-96—Referee Method D for CO_2
- OSHA—Occupational Safety and Health Administration
- SSPC—Steel Structures Painting Council Standards
  SSPC SP3—Power Tool Cleaning
  SSPC SP7—Brush-Off Blast Cleaning
  SSPC SP1—Solvent Cleaning
  SSPC SP6—Commercial Blast Cleaning
  SSPC SP5—White Metal Blast Cleaning
- UL—Underwriters Laboratories
- AWWA—American Waterworks Association
  WWA 2540-95—Method C for TDS

Other recognized standards will be used as required to serve as design, fabrication, and construction guidelines when not in conflict with the above listed standards.

The codes and industry standards used for design, fabrication, and construction will be the codes and industry standards, including all addenda, in effect as stated in equipment and construction purchase or contract documents.

10F3 General Criteria

10F3.1 Design Water Quality

10F3.1.1 Circulating Water

Folsom-South Canal water will supply the Project with circulating water makeup.

Data obtained from sampling performed in June and July 2001 indicates that the Folsom-South Canal water has the characteristics defined in Section 8.14, Water Resources.

The Rancho Seco Reservoir will supply the Project with a backup supply of circulating water makeup.

10F3.1.2 Service Water

The Folsom-South Canal will be used to supply CPP with all general service water requirements such as sanitary, process needs for HRSG, plant utilities, and gas turbine inlet fogger water. The Rancho Seco Reservoir will serve as backup to the Folsom-South Canal water supply.

A typical water analysis range for this water is presented in Section 8.14.

10F3.1.3 Cycle Makeup

Folsom-South Canal water will be supplied to the Cycle Makeup Treatment System (demineralization system). The high quality effluent from the Cycle Makeup Treatment System will serve as makeup to the steam cycle. In addition, cycle makeup water will be used also to supply water for various uses during unit startup and for the gas turbine inlet fogger.

Water for cycle makeup will be the highest quality practical. Minimum quality requirements for cycle makeup water will be as follows.

- Total dissolved solids--0.1 mg/L
- Silica as SiO_2--0.02 mg/L
- Specific conductance at demineralizer effluent--0.1 μS/cm
- pH--8.8 to 9.6

10F3.1.4 Construction Water

Water for use during construction will be supplied from the Folsom-South Canal.

10F3.1.5 Fire Protection Water

The source of water for fire protection will be the Rancho Seco Reservoir with a dedicated portion of the raw water storage tank as a backup water source should the Rancho Seco Reservoir be temporarily unavailable.

10F3.2 Chemical Conditioning

10F3.2.1 Cycle Chemical Conditioning

Condensate-feedwater chemical conditioning will consist of an oxygen scavenger supplemented as required by a volatile, alkaline material such as ammonia for pH control.

HRSG chemical feed will consist of a mixture of sodium phosphates to control boiler water pH and to minimize scale formation and provide boiler water buffering capacity.

10F3.2.2 Circulating Water System Chemical Conditioning

Circulating water chemical conditioning will consist of chemicals to minimize corrosion and to control the formation of mineral scale and biofouling. Corrosion and scaling will be controlled by the use of sulfuric acid for alkalinity adjustment in conjunction with inhibitors, as required, for scale and corrosion control. Chlorination using sodium hypochlorite (bleach) will be used to minimize biofouling of the condenser tubes and the cooling tower.

10F3.2.3 Closed-Cycle System Chemical Conditioning

Bypass chemical feeders will provide water-conditioning chemicals to the Closed Cycle Cooling System. Makeup water to the closed systems will be condensate quality and an inhibitor will be used for corrosion control.

10F3.3 Chemical Storage

10F3.3.1 Storage Capacity

Chemical storage tanks will, in general, be sized to store a minimum of 1.5 times the normal bulk shipment. The minimum acceptable volume of the SCR aqueous ammonia storage tank will provide at least 4 days storage.

10F3.3.2 Containment

Curbing will surround chemical storage tanks containing corrosive fluids. Curbing and drain piping design will allow a full tank capacity spill without overflowing the curbing. For multiple tanks located within the same-curbed area, the largest single tank will be used to size the curbing and drain piping.

10F3.3.3 Closed Drains

Waste piping for volatile liquids and wastes with offensive odors will use closed drains to control noxious fumes and vapors.

10F3.3.4 Coatings

Tanks, piping, and curbing for chemical storage applications will be provided with a protective coating system. The specific requirements for selection of an appropriate coating will be identified prior to equipment and construction contract procurements.

10F3.4 Wastewater Treatment

Metal cleaning wastes from pre-operational and operational chemical cleaning of the boiler and preboiler systems of the HRSG will be collected, treated, and disposed offsite by the chemical cleaning contractor. Cooling tower blowdown will be discharged directly from the circulating water system into the wastewater system. Ultrafiltration concentrate will also be discharged to wastewater. Reverse osmosis brine will be discharged directly to the cooling tower basin.. Wastewater from equipment drains will be passed through an oil/water separator and then fed into the sanitary waste system. Other plant process wastewaters will be collected in the plant wastewater collection system for offsite discharge. Plant effluent to be discharged offsite will meet all applicable criteria of federal, state, and local permits.

Sanitary wastewater will be collected and treated in an onsite package treatment system with disposal to an onsite leach field.