

Appendix R
Fuel Handling Design Criteria

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1.0 INTRODUCTION

Control of the design, engineering, procurement, and construction activities on the project will be completed in accordance with various predetermined standard practices and project specific programs / practices. An orderly sequence of events for the implementation of the project will be planned consisting of the following major activities:

- Conceptual design
- Licensing and permitting
- Detailed design
- Procurement; Construction and construction management
- Start-up, testing, and checkout; and,
- Project completion.

The purpose of this appendix is to summarize the codes, standards, standard design criteria and practices that will be used during the project. The codes and standards listed shall be applicable to the supply, delivery, storage and dispensing of both gasoline and diesel fuel systems installed at the site for the fuel requirements of the maintenance vehicles. Storage of pre-filled propane tanks for lift truck refueling will be incorporated into the fuel storage and dispensing design. The general fuel storage and dispensing system design criteria defined herein form the basis of the design for the outdoor fuel systems. More specific design information will be developed during detailed design to support equipment and erection specifications. It is not the intent of this appendix to present the detailed design information for each component and system, but rather to summarize the codes, standards, and general criteria that will be used.

Section 2.0 of this appendix summarizes the applicable codes and standards. Section 3.0 of this appendix includes the general design criteria for fuel storage tanks, storage tank refilling, interconnection piping, dispensing of fuels, and fuel spill containment for gasoline and diesel fuels utilized in site vehicles, as well as an outline of the codes for storage and handling of propane cylinders.

2.0 DESIGN CODES AND STANDARDS

The design and specification of all work shall be in accordance with all applicable laws, ordinances, regulations, codes and standards (LORS) of the federal government, the State of California, local and regional governmental agencies, and accepted industry standards organizations. Applicable LORS to be used in design and construction of the SOLAR TWO include, but are not limited to, those published by the following entities:

- American National Standards Institute (ANSI)
- American Society for Non-Destructive Testing (ASNT)
- American Society for Testing and Materials (ASTM)
- American Society of Mechanical Engineers (ASME)
- Environmental Protection Agency (EPA)
- IAPMO Codes (after January 1, 2008)
- Instrument Society of America (ISA)
- National Bureau of Standards (NBS)
- National Electrical Code (NEC)
- National Fire Protection Association (NFPA)
- Occupational Safety and Health Administration (OSHA)
- Pipe Fabrication Institute (PFI)
- Underwriters Laboratory (UL)

2.1 NEC/NFPA 70 - NATIONAL ELECTRICAL CODE

- Article 500 to 504 – Hazardous (Classified) Locations, Classes I, II and III, Divisions 1 and 2.
- Article 514 – Motor Fuel Dispensing Facilities
- California Electrical Code 2004 (California Code of Regulations Title 24, Part 3)
- City or County amendments to the codes.

2.2 STATE OF CALIFORNIA

- 2001 California Fire Code Title 24, Part 9 (CFC 8003.1.3.2) Spill Control Requirements.
- California Code of Regulations Title 13, Motor Vehicles Division 1, 2 and 3 where applicable.

- California Code of Regulations Title 27, Environmental Protection, as applicable
- California Mechanical Code (CMC)
- California Code of Regulations, Title 8, Industrial Relations, Chapter 4, Industrial Safety
- Health and Safety Code, Section 13240 – 1343.6 (California Propane Storage and Handling Safety Act)

2.3 NATIONAL FIRE PROTECTION AGENCY

- NFPA 30 – Flammable and Combustible Liquids Code
- NFPA30a – Code For Motor Fuel Dispensing Facilities And Repair Garages
- NFPA 58 – Liquefied Petroleum Gas Code
- NFPA 101 – Life safety Code
- NFPA 329 – Recommended Practice For Handling Releases Of Flammable And Combustible Liquids And Gases
- NFPA 385 – Standard For Tank Vehicles For Flammable And Combustible Liquids
- NFPA 600 – Standard on Industrial Fire Brigades

2.4 FEDERAL

- Federal Water Pollution Control Act (Clean Water Act)
- CFR – Code of Federal Regulations
 - Title 29, Labor, Part 1910 – Occupational Health and Safety Standards
 - Title 49, Transportation, Parts 100-199 – Hazardous Materials
- Occupational Safety and Health Act (OSHA)

2.5 IAPMO CODES (AFTER JANUARY 1, 2008)

2.6 ASME - AMERICAN SOCIETY OF MECHANICAL ENGINEERS

- Boiler and Pressure Vessel Code: Section II - Materials Specification

2.7 THE AUTHORITY HAVING JURISDICTION

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 edition and/or addenda to a law, ordinance, code, or standard that has been adopted and is in place at time of plant design and construction shall apply to work performed for this Facility.

3.0 GENERAL DESIGN CRITERIA

The Solar Two gasoline and diesel storage tanks and fuel dispensing systems will be delivered to the site, assembled and installed in accordance with the codes listed in Section 2.0 of this appendix.

A secure storage compound will be constructed for the storage of full and empty propane cylinders.

Personnel familiar with proper practices with reference to their construction and use will supervise the assembly of all systems.

These assemblies will be protected against physical damage and against tampering during delivery and installation.

3.1 MOTOR VEHICLE FUEL STORAGE TANKS

The capacities of the gasoline and diesel storage tanks will be a nominal 5,000 gallons each. Each fuel tank will be dual wall construction with internal leak monitor detection for spill containment. The tanks will be outside and mounted on suitably designed and reinforced concrete containment pads located a minimum 20 feet from the dispensing apparatus. Gasoline and diesel fuel storage tanks will be located a minimum 20 feet from the propane gas storage and hydrogen gas storage.

3.2 FUEL FILL PIPING

The fill piping, tubing, flanges, bolting, gaskets, valves, fittings, flexible connectors, the pressure containing parts of other components such as expansion joints and strainers and devices that serve such purposes as mixing, separating, snubbing, distributing, metering, controlling flows or secondary containment of liquids and associated vapors will be suitable for hazardous fuel service and for the pressure and temperatures involved. All pipe and fittings utilized will be in accordance with the applicable NFPA 30– Chapter 5, ASME, ANSI, CMC, ASTM and applicable California codes. The piping will run underground from the storage tanks to the pumping units and will be specified in accordance with the site soil conditions to prevent corrosion.

3.3 FUEL TANK FILLING REQUIREMENTS

Only experienced and properly instructed personnel will handle refueling of the storage tanks. To prevent static discharge during refueling of the tanks, grounding and bonding provisions will be installed. Venting of the fuel tanks will be in accordance with NFPA 30 and will extend to a distance of 12 feet above grade in a vertical upward direction only. Spill containment will be incorporated into the structural pad designs for the storage tanks. During

refueling of the main fuel storage tanks, all safety requirements will be implemented and shall be in place to maintain personal safety, spill containment procedures and materials.

3.4 MOTOR VEHICLE FUEL DISPENSING PUMPS

Fuel dispensing will be designed in accordance with all applicable codes as listed in Section 2.0 of this appendix, maintaining a minimum 18 inches of curbed clearance from the vehicular access to the pumping units. A minimum radius of 20 feet will be maintained between the pumping units and the nearest installation of any designation. Spill containment will be incorporated into the concrete pad at the pump locations by depressing the vehicle area by a minimum 18 inches. Fuel dispensing to site vehicles will be comply with the requirements of the NFPA 30 and 30A, Code of Federal Regulations, State and local Occupational Health and Safety standards, and will incorporate leak detection for all buried piping connected to the system. Spill containment provisions shall be provided at each dispensing location. All required signage shall be posted in accordance with local requirements. The fuel source will be clearly identified to prevent the cross over of fuels.

3.5 PROPANE CYLINDER STORAGE

A secure, enclosed area will be constructed for the storage of 20 full 30-pound propane cylinders and 10 empty units. The compound will incorporate clearance, grounding and all provisions as required to comply with the applicable NFPA 58 codes and the California Propane and Handling Safety Act. The storage area will be constructed on a concrete pad with perimeter fencing having the posts set in the concrete base, adequate maneuverable space for cylinder transfer and a lockable gate access.

3.6 FIRE PREVENTION SYSTEMS

The storage of gasoline, (a flammable liquid having a flash point of approximately – 45 deg. C), diesel fuel, (a flash point of approximately – 38 deg. C), and propane, (a flash point of approximately -104 deg. C), requires the prevention of ignition of the fuels as a primary objective. The local area will have a foam extinguishing system installed for immediate fire protection.

Installation of these systems will be in accordance with all required codes, adequate training of personnel and good housekeeping practices. In the event of ignition of one or more of the fuels, a reaction plan, which includes early notification of the fire brigade and immediate evacuation of all non-essential personnel, will be in place.

The local on-site fire brigade will be fully trained as required by NFPA 600 – Standard on Industrial Fire Brigades. This will include instructions on the proper personal protection, equipment and extinguishing mediums. The fire prevention program will be a critical division of the SES Fire and Safety Code for the power plant.