

9.2.4 Potable and Sanitary Water Systems (PSWS)

The potable and sanitary water systems (PSWS) provide one type of water throughout the plant which is referred to as potable and sanitary water. The water is used for human consumption, sanitary and domestic purposes and it is also used as source water for other systems inside the Nuclear Island (NI) and the Conventional Island (CI). The PSWS makeup water is pretreated at the source (site-specific) to meet the required water quality specifications. Potable and sanitary water is supplied to the users by the PSWS distribution system.

9.2.4.1 Design Bases

The PSWS serve no safety-related function and therefore have no safety design basis. However, design requirements are incorporated so that failure of the PSWS do not initiate or perpetuate the failure of any nearby safety related systems. No potential failure of the PSWS will affect the safe operation of the plant.

The PSWS have no connection to systems having the potential for containing radioactive materials. This requirement meets the guidelines of 10 CFR 50, Appendix A, GDC 60.

The PSWS are designed for a single unit and are not shared with other units.

The PSWS mitigate the potential for flooding of the Safeguard Building (SB) by actuation of isolation valves for the NI portion of the PSWS.

9.2.4.2 System Description

9.2.4.2.1 General Description

The PSWS provide potable and sanitary water throughout the plant. The systems provide water for human consumption and sanitary purposes, and are also used by other systems as a water source inside the NI and the CI. This water is pretreated to meet the site-specific user water quality specifications during normal plant operations and outages. The PSWS incorporate water heaters to provide hot water to users in the NI and CI.

The PSWS transfer the water from the source of the water (site-specific) to the respective users throughout the power plant. The layout of the systems piping and valves are designed so that a failure of any component or equipment of the PSWS does not jeopardize the operation of safety-related systems or components.

Two remotely operated isolation valves are provided in the SB. Closure of these valves mitigates the potential for flooding of the SB by the PSWS.

The PSWS supplies pretreated water to users in the NI and in the CI.

The processing of raw water makeup for potable and sanitary water is site-specific. A COL applicant that references the U.S. EPR design certification will provide site-specific details related to the sources and treatment of makeup to the PSWS along with a simplified piping and instrumentation diagram.

9.2.4.2.2 Component Description

Table 3.2.2-1 provides the seismic and other design classifications for the components in the PSWS.

Piping and Valves

The PSWS have flexibility in the design of the piping and valving arrangements to accommodate required inspection, maintenance or testing of system components.

The installed piping is made of materials that have no harmful effects on the drinking water quality.

The PSWS outdoor distribution lines are protected against freezing.

Piping joints, with the exception of flanged connections, are silver-soldered or threaded connections. Soldering material that contains lead is not used.

Water Heaters

Local water heaters are used to generate warm water at necessary locations throughout the NI and CI. These heaters are self-regulating and the water temperature can be adjusted manually at the local heaters.

Isolation Valves

Two remotely operated valves are located inside the SB. The closure of these two isolation valves is actuated by a main control room (MCR) water leakage detection system signal (located near the toilet areas), or a MAX2 level signal from the KTE sumps.

Backflow Preventers

Backflow prevention measures, such air gaps or reduced pressure backflow preventers, are provided to prevent possible contamination and backflow under abnormal conditions.

9.2.4.2.3 Operations

During normal plant operations (startup, power and shutdown/outage), the PSWS supply the plant with the necessary pretreated water for human consumption and sanitary flushing purposes.

During abnormal operating conditions, such as loss of offsite power, the PSWS will not be available.

9.2.4.3 Safety Evaluation

The PSWS serve no safety-related functions and require no safety evaluation. No failure of the PSWS will initiate or perpetuate the failure of any nearby safety-related systems and it is not connected to any other process system which could become contaminated. Potential failures of the PSWS do not affect the safe operation of the power plant.

All of the PSWS piping, venting, and valving arrangements are separated from other plant chemical or radiological processes, treatments and drainage systems. The separation is provided by not interconnecting PSWS piping with other piping that conveys radioactive materials. Where plant chemical processes, treatments or drainage conditions are involved, the PSWS is protected from contamination by the installation of backflow prevention measures, such as reduced pressure backflow prevention devices or air gaps, as necessary. These design features prevent the PSWS from potentially being contaminated with radioactive material and complies with the acceptance criteria relating to 10 CFR Part 50, Appendix A, GDC 60.

9.2.4.4 Inspection and Testing Requirements

Acceptance tests and in-service inspections of the PSWS are performed to verify the systems are installed in accordance with the acceptance criteria identified in the applicable plans, drawings and specifications for the structure, system and components. Preoperational testing is performed as described in Section 14.2, Test #225.

9.2.4.5 Instrumentation Requirements

Flow meters, pressure gauges and temperature sensors shall be located throughout the system piping based on requirements for systems operation.