2.4.7 Reactor Containment Vessels Units 1 and 2

Description

The containment for each Unit was designed by Pioneer Service and Engineering Company and consists of two systems:

- A primary containment consisting of a free-standing, low-leakage steel vessel, including its penetrations, isolation systems, and heat removal systems designed to withstand the internal pressure accompanying a loss-of coolant accident, and
- A secondary medium leakage concrete Shield Building surrounding the primary containment, including special ventilation systems for its annulus and adjacent Auxiliary Building.

The primary containment system, also referred to as the Reactor Containment Vessel, consists of steel cylinder walls, a hemispherical dome, and an ellipsoidal bottom. A five foot wide annular space exists between the Reactor Containment Vessel walls and the Shield Building walls, and a seven foot clearance exists between the top of the vessel and Shield Building roof dome permitting in-service inspection and collection of containment out-leakage. The steel pressure vessel and all penetration assemblies form the primary containment boundary. The Reactor Containment Vessel cylinder wall outside diameter is 105'-3", dome radius is 52'-6", overall height is 206'-7 7/8", vessel wall thickness varies from 3/4" to 1 1/2", and vessel material is ASME SA516 Grade 70 steel. With the exception of the unreinforced concrete placed underneath and near the ellipsoidal knuckle sides of the vessel, there are no structural ties between the Reactor Containment Vessel and the Shield Building above the foundation. The unreinforced concrete supporting its ellipsoidal bottom is tightly bonded to the outside of the vessel and the underlying reinforced concrete mat foundation, and is approximately 2'-10 1/2" thick (minimum). The mat foundation, which is common to the Shield Building, is 4'-0" thick and is placed on a 4" mud mat and weatherproofing membrane resting on controlled recompacted soils. The mat foundation also has structural continuity with the Auxiliary Building and Turbine Building foundations.

The Reactor Containment Vessel internal structure is for the most part conventionally reinforced concrete. The concrete forms floor slabs and compartments that support and protect the reactor pressure vessel (RPV) and components associated with engineered safeguards systems, and it provides the primary biological shield for the RPV. At various levels, concrete slabs are supported by structural steel framing which is supported off the central concrete core and peripheral steel columns. The internal structure is supported by reinforced concrete placed in the bottom and knuckle region of the Reactor Containment

Vessel. Except for the contact at the base, the internal structure is completely isolated from the inside face of the Reactor Containment Vessel.

Reactor Containment Vessel major internal structural components include:

- Reactor/refueling cavity/biological shield wall
- Steam Generator and Pressurizer vaults
- Refueling floor - El. 755'-0"
- Operating floor - El. 733'-9"
- Mezzanine floor - El. 711'-6"
- Basement floor - El. 697'-6"

System Function Listing

A comprehensive listing of functions associated with the Reactor Containment Vessels Units 1 and 2, or specific components contained in the structure, is provided in the summary below.

Code RCV-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Reactor Containment Vessels and their internal structures provide structural support to safety related components.	X						

Comment: Reactor Containment Vessels and their internal structures are designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code RCV-02	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Reactor Containment Vessels and their internal structures provide flood protection from internal flooding events.	X						

Comment: Reactor Containment Vessels and their internal structures provide flood protection from internal flooding events.