

Spent Fuel Bay

Chemistry Control

Spent Fuel Bay System

Objectives

- **State the purpose of the Spent Fuel Bay System.**
- **List the main components that make up the Spent Fuel Bay System. For each of these components, state the purpose and mode of operation under normal plant conditions.**
- **List the primary objectives of Chemistry Control of the Spent Fuel Bay System**

Spent Fuel Bay System

Objectives

- **List the main Chemical parameters monitored in the Spent Fuel Bay System as well as their approximate values under normal conditions.**
- **For each of the parameters monitored in the Spent Fuel Bay water, state the rationale behind the chemistry specification for each parameter.**

Spent Fuel Bay System

Objectives

- **State the possible causes as well as corrective actions to employ for each of the following out-of-spec. parameters:**
 - **pH - *High or Low***
 - **Conductivity - *High***
 - **Chloride - *High***
 - **Gas Release from SFB Water (H₂, O₂, N₂) - *High***
- **State the main hazards (conventional & radiological) associated with the Spent Fuel Bay System.**

Spent Fuel Bay System

Objectives

- **List all operational (Chemical) or sampling requirements associated with the Spent Fuel Bay System for the following conditions:**
 - **Prior to transfer of spent fuel from the reactor**
 - **During reactor shutdown**
- **Correctly obtain a sample from the Spent Fuel Bay System both main System and the outlet of the purification System.**

Spent Fuel Bay System

System Purpose

- **Provides a means of short-term (ie up to 7 years) storage and cooling of used nuclear fuel which is discharged from the reactor.**
- **The volume of light water contained in the SFB compartments can be:**
 - adjusted simultaneously to achieve bulk level control in all compartments during normal operation.
 - controlled independently to control the amount of shielding provided during normal operation, and to facilitate inspections.

Main Components

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- **Pumps - 3481-P1, P2 and P3**
 - » three 100% capacity pumps.
- **Heat Exchanger - 3481-HX1**
 - » removes residual heat from the demineralized water before returning it to the zone assemblies.
- **Ion Exchange Columns - 3481- IX1 & IX2**
 - » Each column contains 0.22 m³ of resin.
 - » one vessel in service - the other on ‘Stdbby’

Spent Fuel Bay System

Purpose of Chemistry Control

- **Maintains the water in state of high purity at all times.**
 - corrosion and fouling of metal surfaces is minimized.
 - radionuclides in water are minimized.
 - achieved by maintaining high purity water which reduces the net suspended solids to a minimum
 - high clarity of water is necessary to assist visual inspection of used fuel

Materials of Construction

- **Stainless Steel - Type 304L**
 - Heat Exchangers, pumps, compressors, ion exchanger columns, storage bay tank floor liner
 - Used fuel remote handling tools
 - Used fuel storage trays
- **Fiber-glass epoxy**
 - storage bay tank wall liner

Spent Fuel Bay System

Chemistry Control

- Use of Demineralized water maintained at a pH in the range of 5.5 to 8.5
- Conductivity < 0.2 mS/m (< 2 umho/cm)
- Chloride < 0.2 mg/Kg
- Fission products - non detectible
- Use of ion-exchange resins in the purification system to remove ionic, suspended, and radioactive impurities