Service Water System Problems

GE BWR/4 Advanced Technology Course

Chapter 4.8

Objectives

1. Recognize the potential consequences of Service Water System failure or degradation.
2. Identify potential causes of the Service Water System failures and / or degradation.
3. Identify the primary strategies used by Licensees to ensure adequate system reliability and piping integrity.

Service Water

Cooling Water from UHS that supplies:

- RBSW / TBSW
- EDGs
- RHR HXs
- Fire Protection water
- ECCS room coolers

Common Mechanisms for SW Problems

- Environment and environmental changes
- Inadequate designs that do not evaluate all credible vulnerabilities
- Weaknesses in monitoring techniques
- Material Condition Monitoring and Maintenance Programs
- Procedure and Training Deficiencies

Blockage

Service water blockage has been caused by:

- Frazil ice and ice plugs
- Bivalve mollusks such as clams, oysters and mussels
- Silt, sand, mud, small rocks and corrosion products (including microbiologically induced corrosion)
- Algae, seaweed, lakeweed and Canadian pondweed
- Plant matter such as leaves, branches and tree wood
- Jellyfish and gill bearing fish
- Garbage

Loss of the service water system can impair reactor safety through:

- Loss of the main condenser for cooling and pressure control
- Loss of the residual heat removal pump heat exchangers
- Potential high area temperature effects on HPCI, LPCI and Core Spray
- Loss of cooling to emergency diesel generators

The worst case consequences following a prolonged complete loss of service water cooling include:

- Pressure control using safety relief valves, adding heat to the primary containment
- Loss of emergency power to emergency core cooling systems which will require further addition of heat to the primary containment from steam driven cooling systems
- Exceeding temperature limits for the primary containment

Mitigation Strategies

- Frequent observation / inspection
- Automatic monitoring
- Testing
- Good Procedures
- Follow-up on trends
- Biocides
- Sonar
- Cold Weather Preparations

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