

Gas Voids

Background

Westinghouse U.S. licensee is required by the U.S. Nuclear Regulatory Commission (NRC) generic letter GL-2008-01 to evaluate its emergency core cooling system (ECCS); decay heat removal (DHR) system; and containment spray (CS) system design, operation and test procedures to minimize and monitor gas intrusion in order to maintain system operability and compliance with 10CFR50, Appendices A and B.

Gas intrusion in system piping can be caused by several factors, including the following:

- Introduction via maintenance or operational activities when portions of the system are filled without proper venting
- Accumulation of separated gas solutions at local high points when gas-saturated water passes from high-pressure piping into lower-pressure piping, or as a result of system pressure fluctuations
- Equipment deficiencies frequently found in safety systems, such as leaking valves or charging pump suction stabilizers
- Some design deficiencies may contribute to gas intrusion during accident conditions

As part of its commitment to the continued development of nuclear power as an environmentally viable and economically sound source of electricity, Westinghouse has developed programs that provide generic industry guidance and site-specific support to address all gas intrusion issues.

Description

The NRC requested that each licensee evaluate its ECCS, DHR and CS system licensing basis, design basis, testing and corrective actions to maintain gas accumulations at amounts lower than those that would challenge the operability of these systems and that appropriate action is taken when required.

Westinghouse capabilities covering the entire range of NRC requirements listed in GL-2008-01 include the following:

Licensing Basis

- Review technical specifications
- Identify required changes
- Review modifications
- Summarize and schedule the implementation of changes
- Provide an independent review of a utility's responses and make recommendations, as appropriate
- Document and summarize changes resulting from walkdowns, testing and analytical programs

Design Basis

- Perform walkdowns during plant refueling outages
- Manage vent valve procurement, qualification and installation
- Install gas accumulation monitoring and trending systems
- Perform gas transport testing and modeling
- Develop pump design and operability criteria



Testing

- Work with the utility to define standard practices
- Perform plant-specific procedure reviews
- Demonstrate effectiveness of surveillance procedures

Corrective Actions

- Work with licensee to develop schedule and
- implement corrective actions
- Prepare training presentations
- Train plant personnel

Benefits

Technical Expertise

- Licensing and regulatory support
- Design, walkdown (including laser scanning), procedure review, valve procurement and installation, and continuous monitoring support
- Gas transport and modeling
- Suction-side and discharge-side acceptance criteria

Project Management

- Single point-of-contact

Proven Industry Supplier

- Breadth and depth of engineering experience and resources

Experience

- Extensive Pressurized Water Reactor Owners Group

- (PWROG) support and Industry Gas Accumulation Team support
- Full-scope programs at
 - Southern Nuclear Operating Company (SNC)
 - Vogtle Units 1 & 2, Farley Units 1 & 2, and Hatch Units 1 & 2 (BWR)
 - Arizona Public Service Co. (APS) - Palo Verde Units 1, 2 & 3
 - Omaha Public Power District (OPPD) - Fort Calhoun
 - Asociación Nuclear Ascó - Vandellós (ANAV) -
- Vandellós Unit 2, Ascó Units 1 & 2
 - (Centrales Nucleares Almaraz - Trillo) CNAT -
- Almaraz Units 1 & 2
- Supported:
 - Waterford Unit 3
 - Comanche Peak
 - Calloway
 - Wolf Creek
 - Byron Units 1 & 2
 - Braidwood Units 1 & 2
 - Surry Units 1 & 2
 - Beaver Valley Units 1 & 2

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