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Gas Accumulation and Management: Remaining Issues and Their Resolution

Inspection Perspectives

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March 2015

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Agenda

- Past and current inspections associated with gas accumulation in piping systems
- Gas management and accumulation issues
- Inspection Insights

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Temporary Instruction (TI) 2515/177

- One time inspection
- Same scope as Generic Letter 2008-01:
 - Emergency core cooling systems
 - Decay heat removal
 - Containment spray
- Completed during 2012

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Inspections Since TI 2515/177

- Engineering inspections such as:
 - Component Design Basis Inspections
 - Heat Sink Performance
 - Evaluation of Changes, Test, or Experiments and Permanent Plant Modifications
- Resident inspector samples
- No longer limited to TI 2515/177 scoped systems

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TI 2515/177 Inspection Issues: The Big Picture

- Inadequate design reviews
- Void removal issues
- Gas monitoring deficiencies
- Reliance on software that has not been benchmarked for void transport
- Failure to update the Final Safety Analysis Report

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Recent Inspection Issues: Residual Heat Removal Flashing

- Identified during a recent Component Design Basis Inspection (CDBI)
- Operating experience related to this issue
 - Information Notice 2010-11
 - Previously documented on at least eight TI 2515/177 and CDBI inspection reports

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Recent Inspection Issues: Air-Entraining Vortices

- At least 5 vortex issues have been identified since completion of TI 2515/177
- Identified on systems outside the scope of GL 2008-01
- Examples of these issues involved:
 - lack of or deficient evaluations,
 - instrument uncertainties, and
 - deficient emergency operating procedures


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Recent Inspection Issues: Water Hammer/Hydraulic Transients


- At least 4 water hammer issues have been identified or self-revealed since completion of TI 2515/177
- Identified on systems outside the scope of GL 2008-01
- Examples of these issues involved:
 - failure to follow procedures,
 - inadequate design reviews, and
 - configuration control

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Recent Inspection Issues: Void Acceptance Criteria

- Reliance on void transport software that has not been benchmarked
 - Information Notice 2011-17
- Questions associated with void acceptance criteria methodology



NRC General Insights

- Importance of adequate benchmarking and review of operating experience
 - Multiple recent violations are similar to issues first identified during TI inspections at other facilities
- Generic Letter 2008-01 lessons apply to systems outside its scope

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Questions?

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