# Meeting
# U.S. Nuclear Regulatory Commission
# Nuclear Energy Institute
# Electric Power Research Institute
# Westinghouse Owners Group

# Risk-informed Inservice Inspection (ISI) Living Program Guidance

December 2, 2003

# Agenda

- Introduction
- RI-ISI Living Program Philosophy
- NEI Living Program Guidance to Maintain Risk-Informed ISI Programs
- Plant Examples
- Summary and Discussion

# Introduction

- Introduction and Opening Remarks
  - NEI
    - To continue open dialogue on issues related to risk-informed ISI
    - To discuss developments on living program guidance
  - NRC

# RI-ISI Living Program Philosophy

# Purpose for RI-ISI Template Submittal Process

- Reasonable Assurance Licensees Conducted the Evaluations Consistent with a Topical & NRC Safety Evaluation (SE)
- Change in Risk Within Acceptance Guidelines (i.e., R.G. 1.174)
- Template provides a fixed snapshot in time of the RI-ISI program, that is:
  - Delta Risk Numbers
  - Number of Inspections
  - Allocation of Inspections

# NRC Notification Examples

- Changing from One Methodology to Another
- Changing "scope" of Application
  - Class 1 only to Class 1 & 2
  - Class 1 & 2 only to full scope
- Plant-Specific Impact of Revised Methodology or Safety Evaluations
- Significant Industry/Plant Event
- ASME Section XI Ten Year Updates (unless not required by plant specific SE)
- Changes that Impact the Basis for NRC Approval in the Plant Specific Safety Evaluation

# NEI Living Program Guidance to Maintain Risk-Informed ISI Programs

# NEI Living Program Guidance to Maintain Risk-Informed ISI Programs

| | |
|---|---|
| Section I | Introduction |
| Section II | Background |
| Section III | Changes That can Impact a RI-ISI Program |
| Section IV | Guidelines/Recommended Practices |
| Section V | Reporting Guidelines |
| Section VI | References |
| Appendix A | Plant Specific Examples |

# Aspects of Evaluations

- Expedited (Not Expected)
  - Significant events
- Periodic (Screening)
  - Consistent with NRC SE
  - Evaluation versus update
- Ten Year (Update)
  - Cumulative impact of periodic screening
  - Consistent with existing SXI philosophy

# Potential Changes

- Timing - Evaluated by licensee each inspection period
- Changes to be Reviewed
  - Plant Examination Results
  - Piping Failures
    - Plant-Specific
    - Industry
  - PRA Update
  - Plant Design Changes
  - Change in Postulated Conditions or Assumptions

# Plant Examination Results

| Examples | Technical Disposition | Programmatic Disposition | Impact on Overall Plant Risk |
|---|---|---|---|
| • Leakage<br>• Flaw Indication<br>• Flaw/Weld Repair Replacement | • If new or different degradation mechanism –<br>➢ Determine affected segments<br>➢ Evaluate impact on failure potential, risk ranking & element selection | • Covered by existing ASME Section XI, risk-informed ISI & corrective action program | • Minimal |

# Piping Failures

| | Examples | Technical Disposition | Programmatic Disposition | Impact on Overall Plant Risk |
|---|---|---|---|---|
| Plant-Specific Failures | • Leakage<br>• Failure due to new degradation mechanism<br>• Failure occurs in systems not previously susceptible to type of failure | • If new or different degradation mechanism –<br>➢ Determine affected segments<br>➢ Evaluate impact on failure potential, risk ranking & element selection | • Covered by existing ASME Section XI, risk-informed ISI & corrective action program | • Likely to be minimal |
| Industry Failures | | | • NRC requirement or industry recommendation | |

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# PRA Update

Potential PRA Changes by Technical Element

- Initiating Event
- Accident Sequence Analysis
- Success Criteria
- Systems Analysis
- Human Reliability Analysis
- Data Analysis
- Internal Flooding, Including Indirect Effects
- Quantification
- LERF Analysis

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# PRA Update - Technical Element Example

| Technical Element | Potential Change | Example PRA Change | Technical Disposition | Impact on Overall Plant Safety |
|---|---|---|---|---|
| Initiating Event | Increase in frequency | Small LOCA (SLOCA) | Systems responding to SLOCA could be more important | May need to be evaluated |
| | Decrease in frequency | Loss of PCC train A (LPCCA) | Systems responding to LPCCA could be less important | No impact |
| | New initiating event | Partition LOCA sizes | Systems responding to LOCA could be more or less important | May need to be evaluated |
| | Delete initiating event | Eliminate steamline break outside containment | Loss of basis for consequence assignment | May need to be evaluated |

# Plant Design Changes - Physical

| Examples | Technical Disposition | Programmatic Disposition | Impact on Overall Plant Risk |
|---|---|---|---|
| • Snubber/support change | • No change | • Use existing design control process | • None |
| • New piping or equipment installation | • Evaluate impact on failure potential, consequence, risk ranking, element selection | • Use existing design control process | • Minimal |

# Plant Design Changes - Programmatic

| Examples | Technical Disposition | Programmatic Disposition | Impact on Overall Plant Risk |
|---|---|---|---|
| • Power uprating / station blackout diesel / 24 month fuel cycle | • Evaluate impact on failure potential, consequence, risk ranking, element selection | • Use existing design change control process & should already be included in PRA model update for plant conditions | • Likely to be minimal impact |
| • Water chemistry change | • Evaluate impact on failure potential, risk ranking, element selection | • Use existing design control process or licensing basis | • Likely to be minimal impact |

# Plant Design Changes - Procedural

| Examples | Technical Disposition | Programmatic Disposition | Impact on Overall Plant Risk |
|---|---|---|---|
| • Pump test change from quarterly to refueling in standby system | • Evaluate impact on failure potential, consequence, risk ranking, element selection | • Use existing design control process or licensing basis & should already be included in PRA model update | • Minimal |
| • Emergency operating procedure / abnormal operating procedure | • Evaluate impact on failure potential, consequence, risk ranking, element selection | • Use existing design change control process & should already be included in PRA model update | • Likely to be minimal impact |

# Change in Postulated Conditions or Assumptions

| Examples | Technical Disposition | Programmatic Disposition | Impact on Overall Plant Risk |
|---|---|---|---|
| • Change from salt water to fresh water<br>• Check valve leaking or not leaking | • Evaluate impact on failure potential, risk ranking and element selection | • Covered by corrective action program and existing design control process<br>• Monitor corrective action program and take action as necessary | • Minimal |

# Plant Examples

# Plant Examples

PWR

- Class 1
- Class 1 & 2
- Full-scope

BWR

- Class 1
- Full-scope

# Example Plant Results

- Plant A
  - No changes in number of inspections
- Plant B
  - No changes in number of inspections
- Plant C
  - Six VT-2 examinations were removed
  - One VT-2 examination was added

# Example Plant Results

- Plant D
  - Five examinations were added
  - Eight examinations were removed
  - Twelve VT-2 examinations were removed
- Plant E
  - Seven examinations were added
  - Eight examinations were removed
  - Twenty VT-2 examinations were removed

# Example Plant Results

- Plant F
  - No Changes in number of inspections
- Plant G
  - No Changes in number of inspections
- Plant H
  - Nineteen examinations were removed

# Summary and Discussion

# Summary and Discussion

- NEI Guideline Document Substantially Completed
  - Will provide to NRC for information (1-30-04)
  - Many aspects of a living RI-ISI program are already programmatically controlled
  - Includes insights from eight plants that have conducted actual RI-ISI updates
  - Supports the identification of important considerations in maintaining a living RI-ISI program