



EXTENDED POWER UPRATE REVIEW STANDARD

NRR Briefing for

Advisory Committee on Reactor Safeguards

September 11, 2003



MEETING AGENDA

- **Opening Remarks**
- **Background**
- **Public Comments**
- **ACRS Comments**
- **Guidance for Independent Calculations**
- **Risk Evaluation**
- **Transient Testing**
- **Closing Remarks**

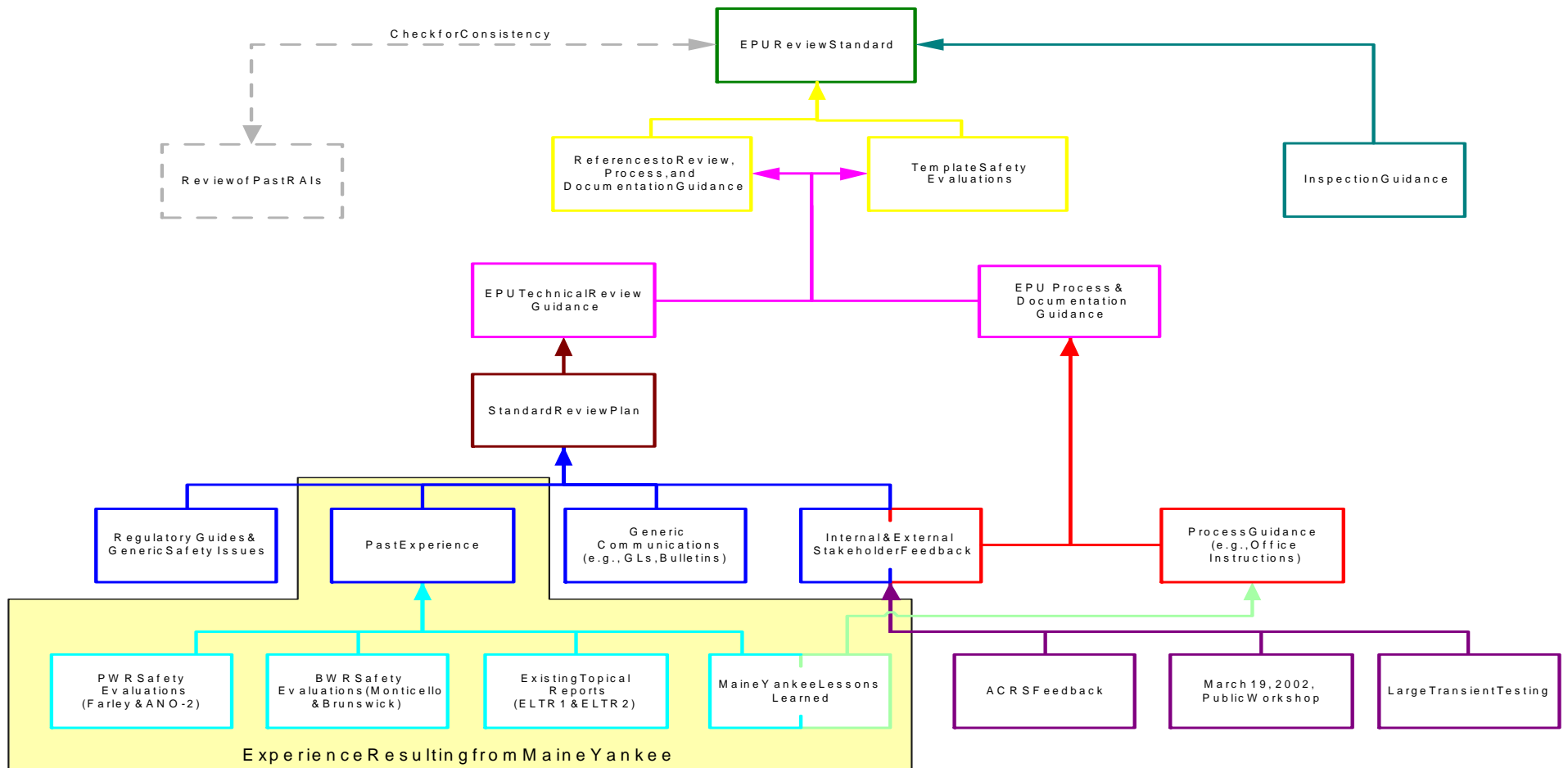


PURPOSE OF A REVIEW STANDARD

- **Provide:**
 - Comprehensive Guidance
 - Technical Review Criteria and Procedural Guidance
 - Updated Guidance
 - Mechanism for Retention of Institutional Knowledge
- **Increase Effectiveness and Efficiency of Reviews by:**
 - Implementing NRR's Vision for Centralized Work Planning
 - Improving Focus, Consistency, Completeness, and Thoroughness of Reviews
- **Improve Documentation of Reviews**



DEVELOPMENT OF RS-001





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REVIEW STANDARD FOR EXTENDED POWER UPDATES



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Areas of Review

Acceptance Review Checklist

Responsible NRR Review Branches

Guidance Documents

Guidance for Independent Analyses

**SECTION 2
TECHNICAL REVIEW GUIDANCE**

**SECTION 3
DOCUMENTATION OF REVIEW**

**SECTION 4
INSPECTION GUIDANCE**



CONTENTS OF RS-001

Standardize Format and Content

Provide Regulatory Evaluation and Conclusion for Each Area of Review

Technical Evaluation Provided After Review

Consistent with NRR Guidance

SECTION 3 DOCUMENTATION OF REVIEW

**SECTION 2
INSPECTION GUIDANCE**



CONTENTS OF RS-001

Inspection Procedure for Power Upgrades

*Documentation Highlights Recommended
Areas for Inspection*

**SECTION 4
INSPECTION GUIDANCE**



PUBLIC COMMENTS

- **Draft RS-001 Issued December 31, 2002**
- **Public Comment Period Closed on March 31, 2003**
- **Received Three Comment Letters**
 - STARS (March 28, 2003)
 - NEI (March 31, 2003)
 - Framatome ANP (May 2, 2003)



PUBLIC COMMENTS

Summary

- **Backfit/Plant-Specific Licensing Bases**
- **Burden of Completing Matrices**
- **Need for Independent Calculations**
- **Use of Precedent**
- **Impact on NRC Approved Topical Reports**
- **Control of Future Changes to RS-001**
- **Pilot Initial Use**



PUBLIC COMMENTS

Summary - Continued

- **NRC Management Oversight**
- **Acceptance Review (“Sufficient Detail”)**
- **Evaluate Resulting Review Cost/RAI Savings**
- **Need for Review of Non-Licensed Plant Staff Training**
- **Stand-Alone References Section**
- **Establishing Standard Application Format**
- **NRC Fee-Billing Practices**



ACRS COMMENTS

- **ACRS Letters on Past EPU Reviews**
 - Duane Arnold (October 17, 2001)
 - Dresden and Quad Cities (December 12, 2001)
 - Clinton (March 14, 2002)
 - ANO-2 (March 14, 2002)
 - GE CPPU Topical Report (April 17, 2002)
 - Brunswick (May 10, 2002)



ACRS COMMENTS

Summary

- **Important Areas**
 - Reduction in Time Available for Operator Actions
 - Irradiation-Assisted Stress Corrosion Cracking of Internals
 - Flow-Accelerated Corrosion
 - Fatigue of Feedwater Piping
 - Containment Response
 - Local Power Oscillations
 - ATWS and ATWS Recovery



ACRS COMMENTS

Summary – Continued

- **Documentation**
- **Communication with Inspection Staff**
- **Standard Review Plan**
- **Transition Reload Safety Analyses**
- **Need for More Detailed Thermal/Hydraulic Models**
- **Guidance for Independent Calculations**
- **Risk Evaluation**
- **Transient Testing**



ACRS COMMENTS

- **NRR Staff Presented the Review Standard to the ACRS Subcommittee on Thermal-Hydraulic Phenomena on August 19, 2003.**
- **Subcommittee Members Provided Several Comments and Suggestions During the Presentation**



ACRS COMMENTS

Summary

- **Dryer Failure at Quad Cities**
- **Effects of Increased Flow on Effectiveness of Noblechem Application**
- **Combined Effects of Increased Flow (FIV) & Increased Flux (Fluence) on IASCC**
- **Need to be Aware of New Information in Materials Area and Update Guidance as Necessary**
- **Effects of EPU on Consequences of Severe Accidents**



ACRS COMMENTS

Summary - Continued

- **What Limits Power Uprates and How Does LBLOCA Redefinition Affect these Limiting Factors**
- **“Synergistic Effects” → “Safety Margins and Impact of Plant Changes on Margins”**
- **Guidance for Independent Calculations**
- **Risk Evaluation**
- **Transient Testing**



ACRS COMMENTS

Guidance for Independent Calculations

- Confidence in Models/Methods
- Confidence in Results
- Familiarity with Models/Methods
- Prior Use of Models/Methods
- Experience with Prior Use of Models/Methods
- Experience with Impact of Proposed Changes
- Available Margin Versus Level of Uncertainty
- Review Efficiency Gains



ACRS COMMENTS

Risk Evaluation

- **Use of Human Reliability Models Not Approved by the NRC**
- **Ability of PRAs to Model Margin Reduction**
- **Level of Review of Risk Information/PRA Quality**
- **RG 1.174 Interpretation Issues**



ACRS COMMENTS

Transient Testing

- **Guidance Calls for Performance of Transient Testing**
 - Considers Original Power Ascension Tests
 - Focuses on EPU Related Modifications
- **Guidance Acknowledges that Licensees May Propose Alternative Approaches**
 - Provides Supplemental Guidance for Evaluation of Alternative Approaches
- **Guidance Places Responsibility on Licensees to Justify Proposed Alternative Approaches**