

## IPRenewal NPEmails

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**From:** Green, Kimberly  
**Sent:** Tuesday, April 21, 2015 3:57 PM  
**To:** Louie, Richard (rlouie@entergy.com)  
**Subject:** NRC's Draft ACRS Slides  
**Attachments:** IP ACRS SubCommittee 4-23 Briefing 04-22-15.pdf

Rich,

Attached is our current draft ACRS presentation.

Kim

**Hearing Identifier:** IndianPointUnits2and3NonPublic\_EX  
**Email Number:** 5085

**Mail Envelope Properties** (Kimberly.Green@nrc.gov20150421155600)

**Subject:** NRC's Draft ACRS Slides  
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**From:** Green, Kimberly

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**Recipients:**  
"Louie, Richard (rlouie@entergy.com)" <rlouie@entergy.com>  
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MESSAGE	82	4/21/2015 3:56:00 PM
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**Advisory Committee on Reactor Safeguards  
License Renewal Subcommittee  
Indian Point Nuclear Generating Units 2 and 3  
Status Briefing  
April 23, 2015**

Division of License Renewal  
Office of Nuclear Reactor Regulation

# Presentation Outline

- History of LRA and Staff Review
- Timely Renewal Activities for Indian Point 2 (IP2)
- SER Supplement 2
- Staff's Ongoing Review

# License Renewal Application

- License Renewal Application (LRA) submitted April 23, 2007
  - Supplemented May 3 and June 21, 2007
  - 16 amendments to LRA
- Operating License Expiration Dates
  - IP2: September 28, 2013
  - IP3: December 12, 2015

# Safety Evaluation Report

- NUREG-1930 published November 2009
  - Staff's initial evaluation and findings
  - ACRS letter
- NUREG-1930, Supplement 1 published October 2011
  - Changes to LRA since August 2009
  - Operating experience since GALL Report, Revision 1
- NUREG-1930, Supplement 2 issued November 2014
  - Changes to LRA since August 2011
  - Reactor Vessel Internals inspection plan and program

# Timely Renewal

- Administrative Procedure Act
- 10 CFR 2.109, Effect of timely renewal application
  - At least 5 years before expiration of existing license
  - Sufficient application
- Existing license will not be deemed to have expired until the application has been finally determined
- Continue to meet all of the regulations and license conditions of the existing license

## **Timely Renewal (cont.)**

- Licensee's Voluntary Actions
  - Implement IP2 commitments
  - Update IP2 UFSAR
- NRC's Activities
  - Acknowledgement letter
  - Conducted Temporary Instruction (TI) 2516 inspections



# License Renewal Inspections

Mel Gray, Branch Chief, Engineering  
Branch 1, Division of Reactor Safety

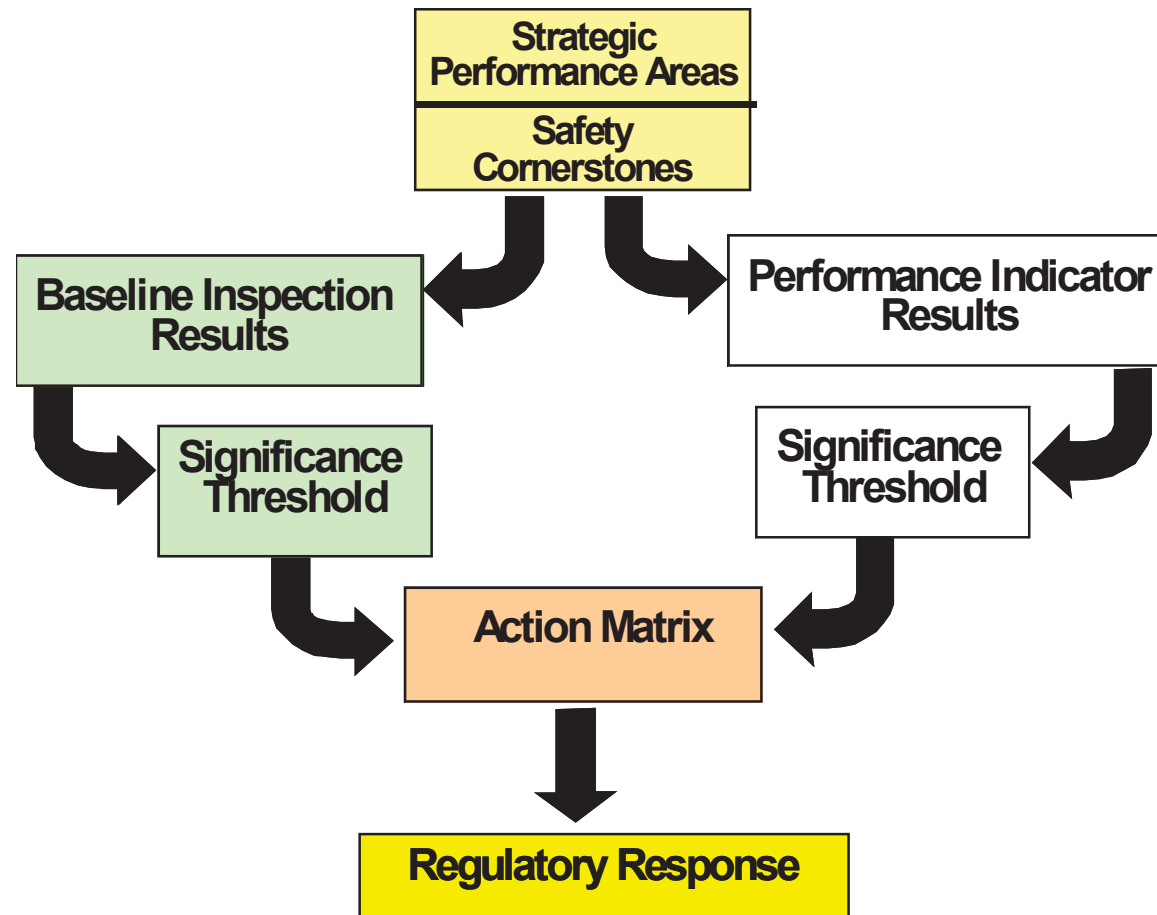
Michael Modes, Senior Inspector

## Region I

# License Renewal Inspection Results

- TI 2516/001, “Review of License Renewal Activities”
  - Specific to applicants in “timely renewal”
  - Satisfies completion of IP 71003 inspection requirements
- Conducted 3 license renewal inspections
  - March 2012: 4 commitments implemented; 2 commitments needed further assessment
  - May 2013: 30 commitments implemented; 11 commitments needed further assessment
  - September 2013: 10 commitments implemented
- No findings identified
- Fall 2015: IP3 Commitment Inspection scheduled

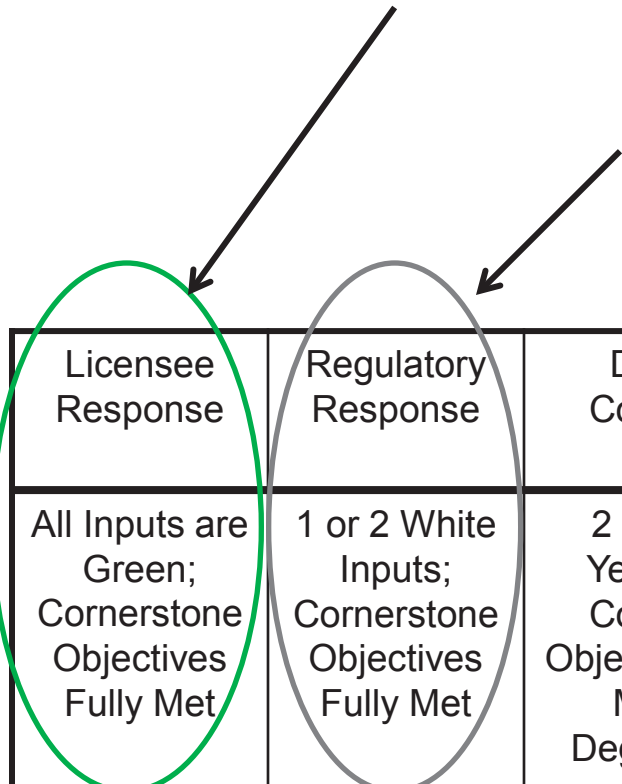
# Reactor Oversight Process (IMC 0305)



# Indian Point Historical Performance

IP2 & IP3 2009-2014

IP3 July 2009 - June 2010 (White PI)



Licensee Response	Regulatory Response	Degraded Cornerstone	Multiple Repetitive Degraded Cornerstone	Unacceptable Performance
All Inputs are Green; Cornerstone Objectives Fully Met	1 or 2 White Inputs; Cornerstone Objectives Fully Met	2 White or 1 Yellow Input; Cornerstone Objectives Met w/ Moderate Degradation in Safety Performance	Multiple Yellow Inputs or 1 Red Input; Cornerstone Objectives Met w/ Significant Degradation in Safety Performance	Overall Unacceptable Performance; Plants not permitted to Operate w/in this Column; Unacceptable Margin to Safety

# Baseline Inspection Results

- Inspection Results for CY2014
  - Indian Point Unit 2 and 3 performance placed the units in the Licensee Response Column of the Action matrix for all of CY2014
  - Approximately 8300 inspection hours
  - All performance indicators in the Green band
  - 13 findings of very low safety significance (Green)

## **SER Supplement 2**

- Supplement 2 to the SER issued November 6, 2014
  - Reactor Vessel Internals Inspection Plan and Program
  - Annual Updates in 2011, 2012, and 2013
  - Buried Piping and Tanks Inspection Program
  - Other AMPs
- No changes to time-limited aging analyses
- Conclusion is unchanged
- List of Commitments in Appendix A
  - IP2: completed with exception of three
  - IP3: will complete by December 12, 2015 with exception of two

# **RVI Program - Background**

- 4/30/2007 – IP2 and IP3 LRA submitted
  - Consistent with GALL Report, Rev. 1
  - LRA Commitment 30 to implement industry program
- 1/12/2009 – EPRI submitted MRP-227, Rev. 0 for NRC review
- 8/11/2009 – NRC issued SER related to license renewal of IP2 and IP3
- 7/14/2010 – Applicant submitted LRA Amendment 9 - AMP for RVI based on MRP-227, Rev. 0
- 6/22/2011 – NRC issued Rev. 0 of SE of MRP-227, Rev. 0

# **RVI Program- Background (cont.)**

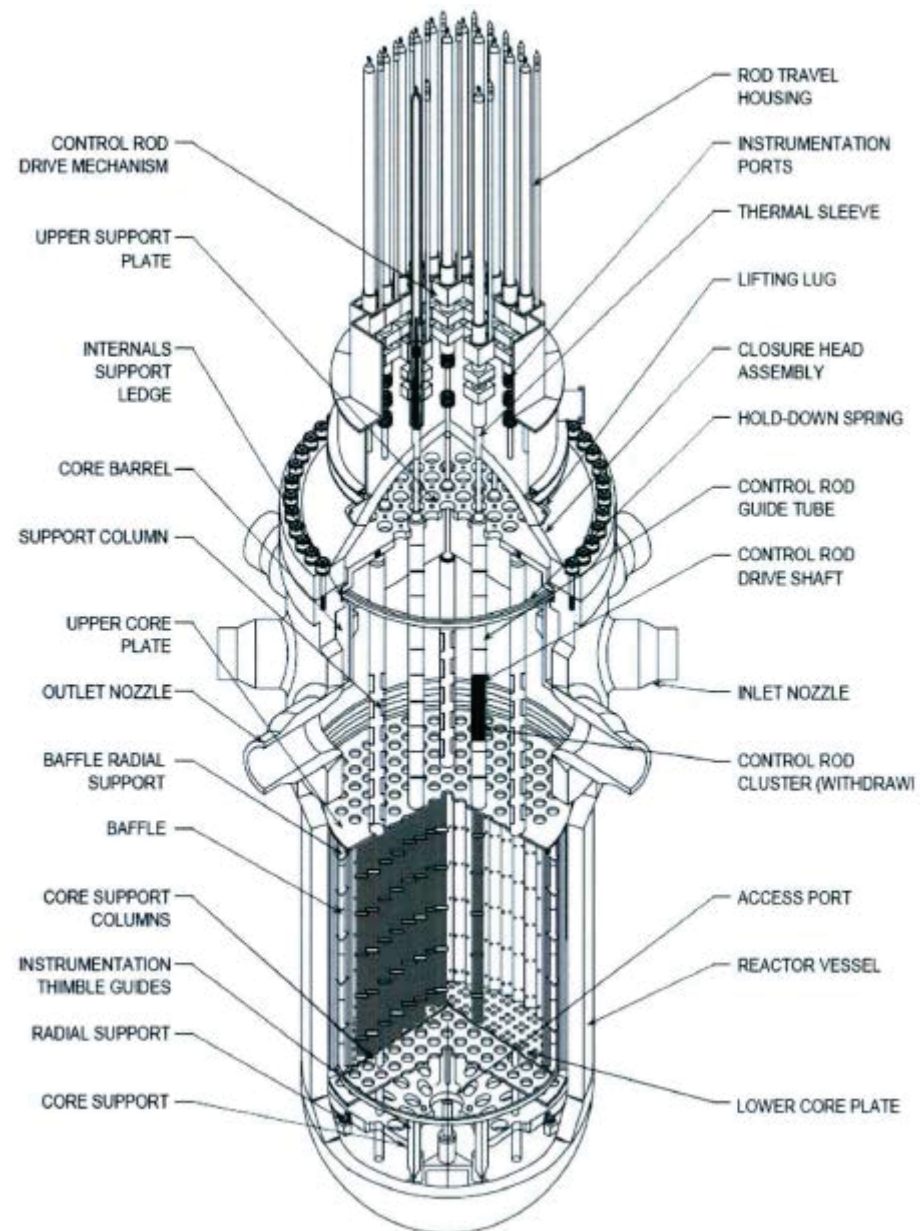
- 9/28/2011 – Applicant submitted RVI Inspection Plan based on MRP-227, Rev. 0 and SE, Rev. 0, meeting Commitment 30 date
- 12/16/2011 – NRC issued Rev. 1 of SE for MRP-227, Rev. 0
- 1/9/2012 – EPRI submitted MRP-227-A, incorporating Rev. 1 of SE
- 2/3/2012 – NRC endorsed MRP-227-A for referencing in licensing applications related to PWR RVI inspection
- 2/17/2012 – Applicant submitted update to RVI Inspection Plan consistent with MRP-227-A + updated AMP
- 11/6/2014 – RVI Inspection Plan for IP2 & IP3 first approved by NRC staff for a Westinghouse-design reactor



## **MRP-227-A Process**

- Generic components for each PWR vendor were evaluated
- Each component screened for eight aging mechanisms
- Screened-in components put through Failure Modes, Effects and Consequences Analysis (FMECA)
- Risk rankings developed based on FMECA
- FMECA results, plus some analytical work, used to develop final inspection recommendations
- All components assigned to one of four inspection categories

# Reactor Vessel Internals for Typical Westinghouse Reactor



# **MRP-227-A Component Categorization**

- Primary – Highest susceptibility category, will be inspected (lead components)
- Expansion – High to moderate susceptibility with some tolerance for degradation. Not lead component. Inspected if degradation found in lead components.
- No Additional Measures – Low susceptibility and/or no functional impact of failure. No augmented inspections recommended, but may be inspected under ASME Code, Section XI as applicable.
- Existing Program – Susceptible to aging effects, but existing programs such as ASME, Section XI Inservice Inspection deemed adequate to detect aging

## **IP2 and IP3 RVI Program Staff Review**

- Staff review concentrated on:
  - AMP Elements
  - Applicant/Licensee Action Items (A/LAIs)
- AMP elements met recommendations of LR-ISG-2011-04, therefore acceptable.
  - ISG updated GALL, Rev. 2 guidance consistent with MRP-227-A
- A/LAIs 1, 2, 3, 5, 7 and 8 applicable to Westinghouse plant such as IP2 and IP3

# **RVI Program**

## **A/LAI 1: Plant-Specific Applicability**

- **A/LAI 1**
  - Applicant must assess its plant design and operating history and demonstrate MRP-227-A is applicable
  - Ensure operating conditions assumed for generic components during development of MRP-227-A are valid for the specific plant
  - MRP-227-A basic applicability criteria:
    - Base load operation
    - Low leakage core before 30 years
    - No plant-specific modifications
  - Generic staff concerns that basic criteria were not sufficient led to MRP letter 2013-025 additional criteria:
    - Core design (relates to RVI fluence and temperature assumptions)
    - Fabrication – no cold work (relates to SCC susceptibility)

# **RVI Program**

## **A/LAI 1 – Plant-Specific Applicability (cont.)**

- **Applicant Evaluation**
  - Applicant showed IP2 and IP3 meet basic and additional criteria
- **Staff Finding**
  - MRP-227-A is applicable to IP2 and IP3
  - Applicant adequately addressed A/LAI 1

# **RVI Program**

## **A/LAI 2 – RVI Components within Scope of License Renewal**

- **A/LAI 2**
  - Recommends applicants ensure that all RVI components within scope of LR are covered by generic components in MRP-191. If not, modify plant-specific program to address the components not covered.
- **Applicant Evaluation**
  - Determined all components
    - Have an equivalent generic component, or
    - Have an equivalent generic component, but different material
  - Plant-specific screening and FMECA for components with different materials – no differences in aging management
- **Staff Finding**
  - Applicant adequately evaluated differences in material, thus applicant adequately addressed A/LAI 2.

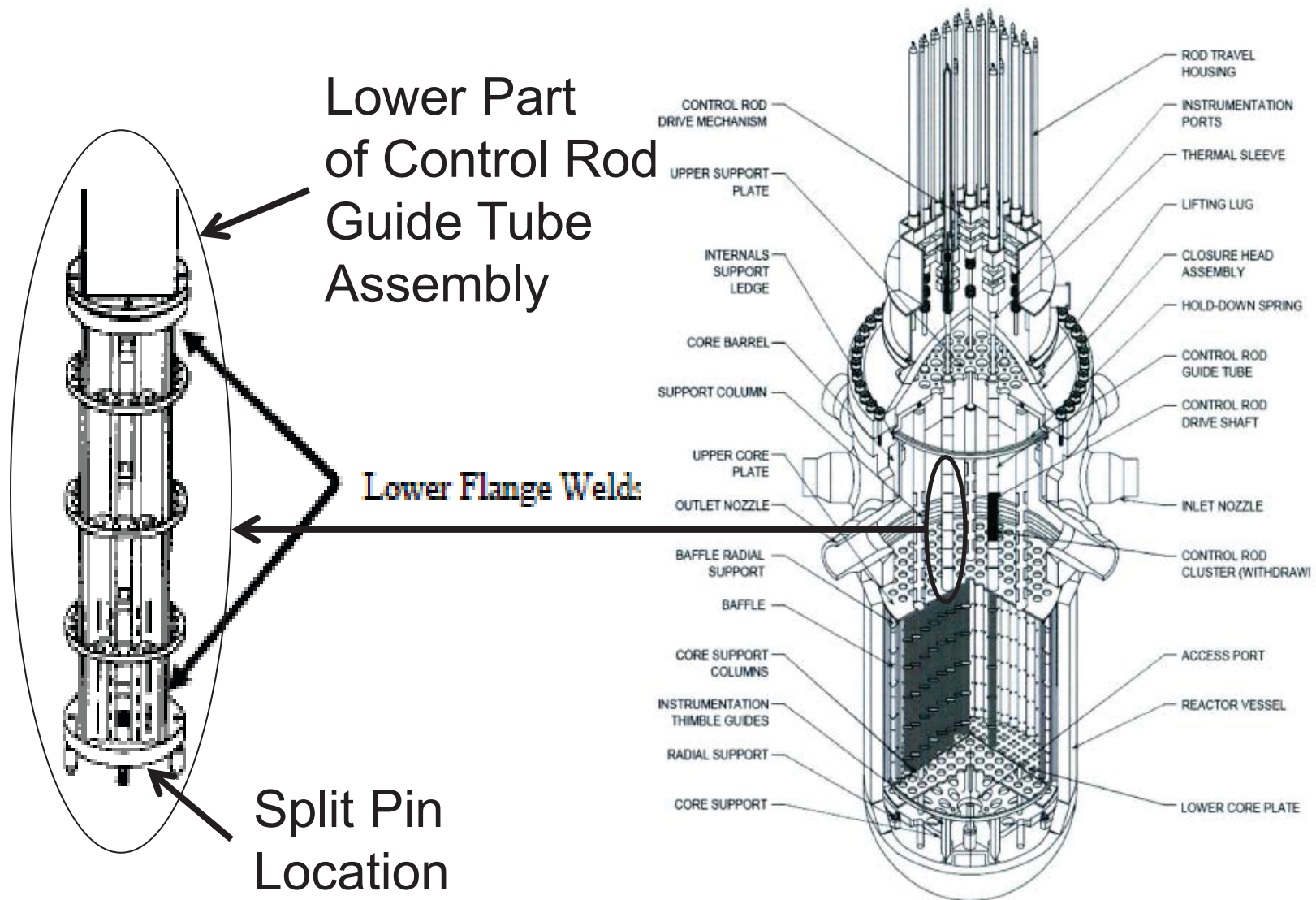
# **RVI Program**

## **A/LAI 3: Plant-Specific Programs**

- **A/LAI 3**
  - Recommends a justification of the adequacy of plant-specific program, or modify program to manage aging for the PEO
- **Applicant Evaluation**
  - Split pins are only component with plant-specific program for IP2 & IP3
  - IP3 split pins previously replaced with SCC-resistant material (cold-worked Type 316 stainless steel)
  - Commitment 50 to replace IP2 split pins during 2016 RFO
  - Applicant justified replacement date with a statistical analysis of remaining life
- **Staff Finding**
  - Applicant adequately addressed A/LAI 3 based on replacement of split pins with SCC-resistant material (IP3), or commitment to do so (IP2)



# Split Pin Location

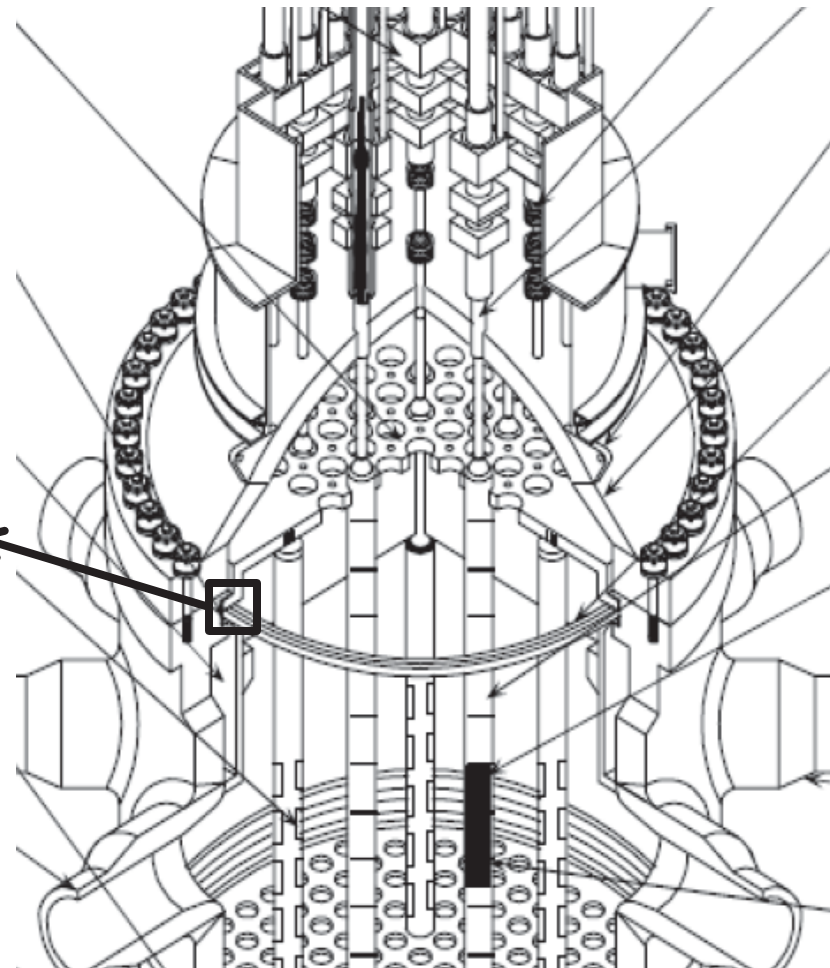
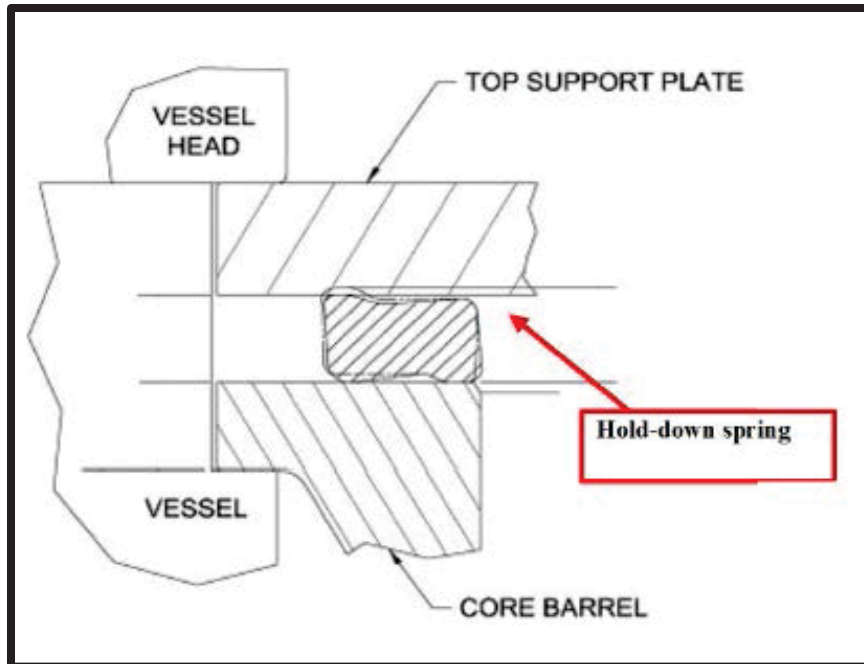


# **RVI Program**

## **A/LAI 5: Application of Physical Measurements**

- **A/LAI 5**
  - Recommends licensees identify plant-specific acceptance criteria to be used when performing physical measurements
- **Applicant Evaluation**
  - Applicable to IP hold-down springs
  - Applicant explained how measurements evaluated
    - Linear interpolation between initial and 60-year minimum height to determine acceptable height at first measurement
    - If spring height unacceptable, a follow-up measurement will be performed, or spring replaced
- **Staff Finding**
  - Applicant clarified how acceptable spring height is determined
  - Staff also performed audit of detailed spring height calculation
  - Applicant adequately addressed A/LAI 5

# Hold-Down Spring



# **RVI Program**

## **A/LAI 7: Plant-specific Evaluation of Cast Austenitic Stainless Steel**

- **A/LAI 7**
  - Licensees must demonstrate functionality of CASS components through end of life considering loss of fracture toughness due to thermal embrittlement (TE ) and irradiation embrittlement (IE)
- **Applicant Evaluation**
  - Applicable to lower support column caps at IP
  - Initially made Commitment 47 to provide detailed analysis prior to PEO
  - In response to staff RAIs, the applicant:
    - Performed screening for column caps – TE screened out
    - Showed pre-existing flaws in column caps unlikely
    - Showed service-induced cracking of column caps unlikely
    - Provided link to an alternate lead component for IASCC and IE (core barrel lower girth weld)

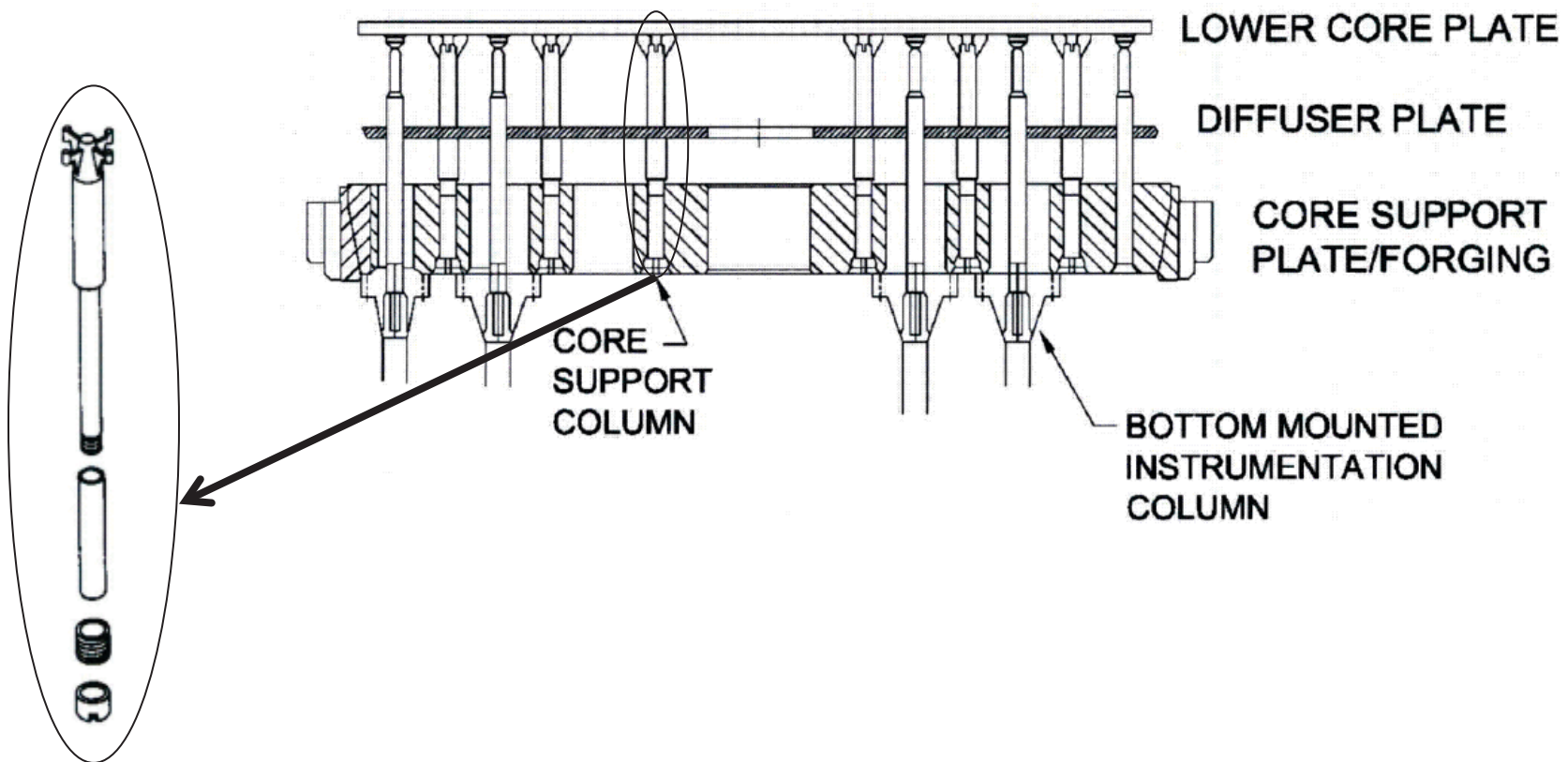
# **RVI Program**

## **A/LAI 7: Plant-specific Evaluation of Cast Austenitic Stainless Steel**

- **Staff Finding**

- Applicant provided sufficient information to provide reasonable assurance of functionality of the column caps through PEO because:
  - Screened out TE, therefore only IE applicable, column caps thus equivalent to wrought stainless steel
  - Showed pre-service and in-service flaws very unlikely
  - Provided a link to a primary component that is a good predictor for IASCC and IE
- Applicant adequately addressed A/LAI 7
- Staff agreed with deletion of Commitment 47

# Westinghouse Lower Support Column Bodies





# **RVI Program**

## **A/LAI 8: Submittal of Information for Staff Review and Approval**

- **A/LAI 8**
  - Recommends submission of an RVI AMP and Inspection Plan + for current LR applicants, submit FSAR supplement, TS markup and TLAA's related to RVI
  - For fatigue TLAA's, A/LAI recommends these account for reactor water environmental effects
- **Applicant Evaluation**
  - Applicant provided AMP and Inspection Plan
  - Applicant committed to update RVI fatigue TLAA's to account for environmental effects as recommended by A/LAI 8
- **Staff Finding**
  - Applicant adequately addressed A/LAI 8 because it provided the recommended information and made commitment to revise fatigue TLAA's

# **RVI Program Conclusion**

- RVI AMP – Applicant has demonstrated
  - Effects of aging will be adequately managed per § 54.21(a)(3)
  - FSAR supplement adequate per § 54.21(d)
- RVI Inspection Plan implements elements of RVI AMP in an acceptable manner
  - Program is consistent with the generic RVI inspection and evaluation guidelines of MRP-227-A
  - Adequately addressed all of the applicable A/LAIs
  - RVI Inspection Plan addresses the conditions of the final SE for MRP-227, Revision 0



## **SER Conclusion**

- “On the basis of its review of the LRA, the staff determines that the requirements of 10 CFR 54.29(a) have been met.”
- Additional information provided by Entergy Nuclear Operations, Inc., does not alter the staff’s conclusions stated in the SER

# Staff's Ongoing Review

- Annual Update in December 2014
  - Changes to plant since December 2013 that materially affect LRA
- RAI response to LR-ISG-2012-02, “Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation”
- RAI response to LR-ISG-2013-01, “Aging Management of Loss of Coating or Lining Integrity for Internal Coatings/Linings on In-Scope Piping, Piping Components, Heat Exchangers, and Tanks”