



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, DC 20555 - 0001

April 26, 2016

Lawrence G. McDade, Chair  
Administrative Judge  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Mail Stop: T-3 F23  
Washington, D.C. 20555

Dr. Michael F. Kennedy  
Administrative Judge  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
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Washington, D.C. 20555

Dr. Richard E. Wardwell  
Administrative Judge  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Mail Stop: T-3 F23  
Washington, D.C. 20555

In the Matter of  
ENTERGY NUCLEAR OPERATIONS, INC.  
(Indian Point Nuclear Generating Unit Nos. 2 and 3)  
Docket Nos. 50-247-LR/286-LR

Dear Administrative Judges:

The NRC Staff ("Staff") wishes to inform the Atomic Safety and Licensing Board ("Board") and parties that the telephone numbers for Staff Counsel have changed. Effective immediately, Staff Counsel in this proceeding may be reached as follows:

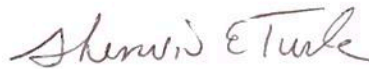
Ghosh, Anita	(301) 287-9175
Harris, Brian	(301) 287-9120
Lindell, Joseph	(301) 287-9114
Mizuno, Beth	(301) 287-9201
Roth, David	(301) 287-9121
Turk, Sherwin	(301) 287-9194

In addition, the Staff wishes to inform the Board and parties that on April 19, 2016, the Staff provided a PowerPoint briefing to the Chairman, Commissioner Ostendorff, Commissioner Svinicki, and Commissioner Baran's staff, regarding the licensee's inspection of baffle-former assembly bolts in the Indian Point Unit 2 reactor pressure vessel. In its briefings, the staff provided an overview of the design of a pressurized water reactor baffle-former assembly and the associated bolts; the regulatory requirements associated with inspection of the baffle-former assembly and bolts; the inspection results at Indian Point Unit 2, including the current status; the implications for Indian Point Unit 3; and the Staff's related ongoing activities.

Atomic Safety and Licensing Board  
April 26, 2016  
Page 2

Copies of the Staff's meeting summary and briefing slides are enclosed herewith.

Respectfully,

A handwritten signature in dark ink, appearing to read "Sherwin E. Turk". The signature is fluid and cursive, with the first name "Sherwin" being more prominent than the last name "Turk".

Sherwin E. Turk  
Counsel for NRC Staff

Encl.: As stated

cc w/Encl.: EIE Service List

April 22, 2016

MEMORANDUM TO: Houman Rasouli  
Deputy Assistant for Operations  
Office of the Executive Director for Operations

FROM: Jeremy S. Bowen */RA/*  
Executive Technical Assistant  
Office of the Executive Director for Operations

SUBJECT: SUMMARY OF APRIL 19, 2016, BRIEFINGS FOR THE  
COMMISSIONERS ON INDIAN POINT BAFFLE BOLTS

On April 19, 2016, the Nuclear Regulatory Commission (NRC) staff provided information briefings for the Commissioners on Baffle Bolts at the Indian Point Nuclear Generating Station (Indian Point). One briefing was held for Chairman Burns and Commissioner Ostendorff; and a separate briefing was held for Commissioner Svinicki. Commissioner Baran was not briefed, but had staff in attendance during the first briefing.

The staff provided (1) an overview of the design of a pressurized water reactor (PWR) baffle-former assembly and the associated bolts; (2) the regulatory requirements associated with inspection of the assembly and bolts; (3) the results of the inspections at Indian Point, Unit 2, including the current status; (4) the implications for Indian Point, Unit 3; and (5) the NRC engagement in the ongoing activities. Information presented on the design was limited to the function of the assembly and the bolts, the associated material properties, and the potential failure mechanisms and related consequences. The process and bases of the regulatory required inspections was provided as it relates to all PWRs. Discussions on the inspection results at Indian Point was limited to factual information about the numbers of bolts that failed, the current plans to replace or further evaluate the affected bolts, and the anticipated schedules for the associated activities. The staff concluded by discussing how the operating experience at Indian Point correlates with industry; and by covering the NRC's ongoing and planned activities.

cc: OGC

CONTACT: Jeremy Bowen, OEDO  
(301) 415-3471

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OFFICE	OEDO/ETA	OEDO/DAO
NAME	JBowen	HRasouli
DATE	04/21/16	04/ 22 /16

OFFICIAL RECORD COPY



Memo to Houman Rasouli from Jeremy S. Bowen dated April 22, 2016

SUBJECT: SUMMARY OF APRIL 19, 2016, BRIEFINGS FOR THE COMMISSIONERS ON  
INDIAN POINT BAFFLE BOLTS

DISTRIBUTION:

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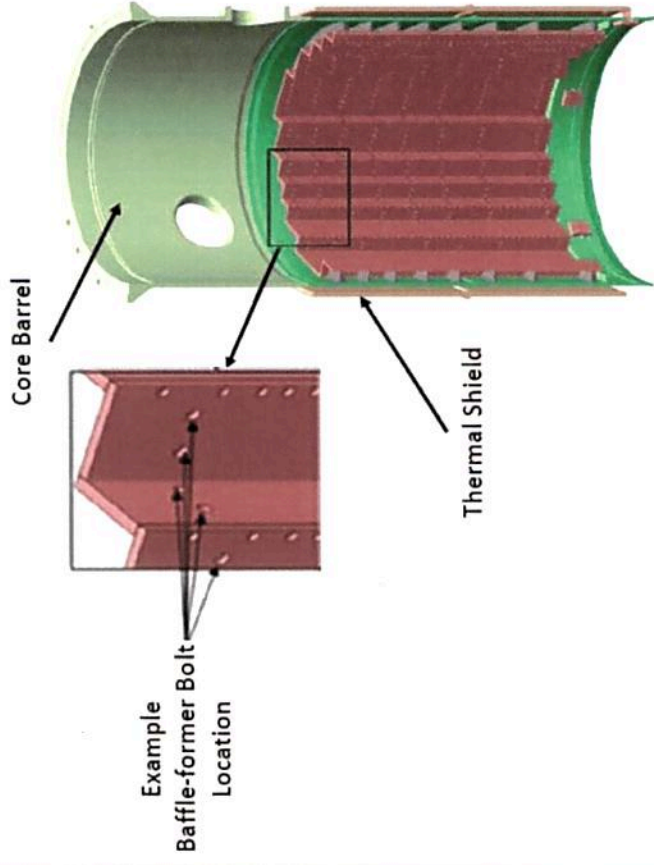
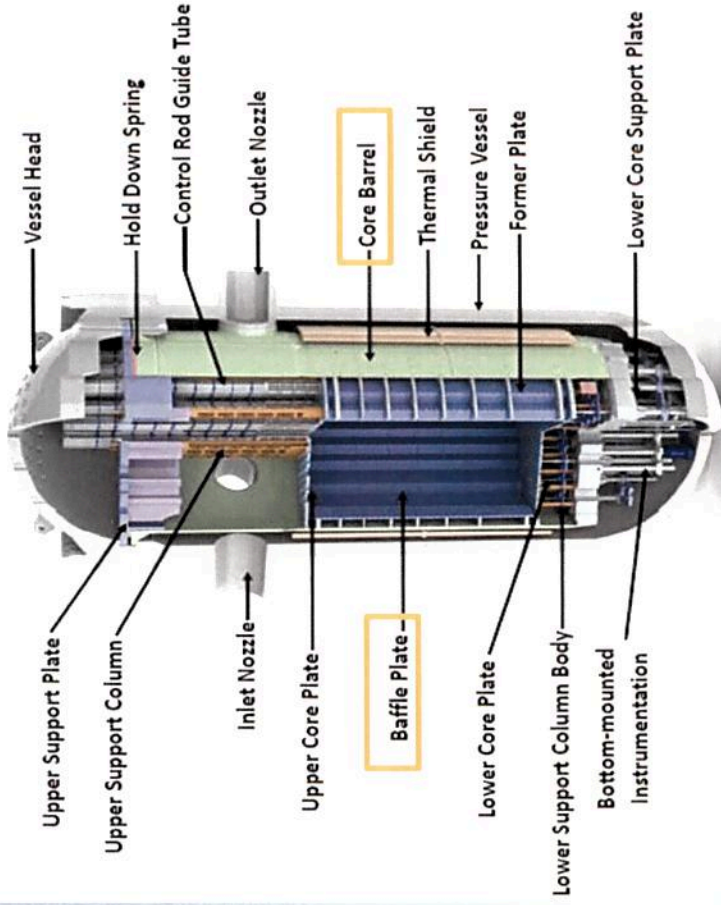
# **Briefing on Indian Point Baffle Bolt Inspections**

**April 19, 2016**



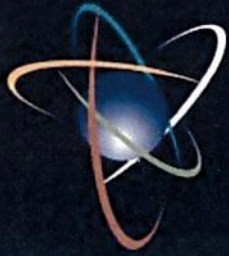


# Baffle-former assembly



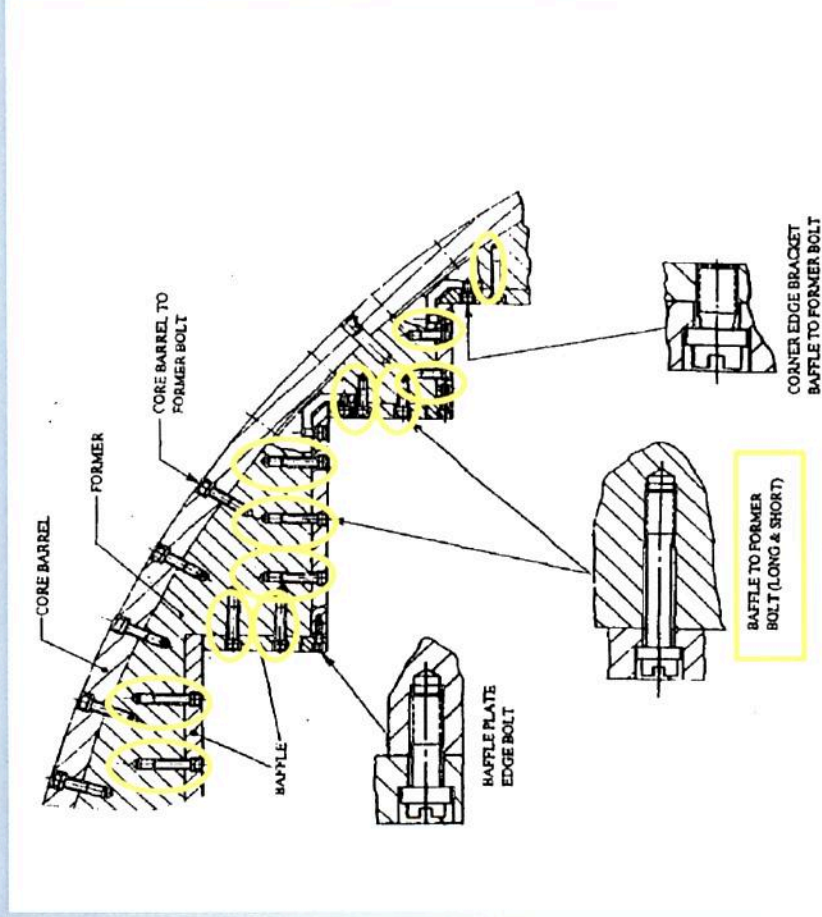
Function of baffle-former assembly is to direct coolant flow through the core. It also provides lateral support to the core during a seismic event or loss-of-coolant accident (LOCA).



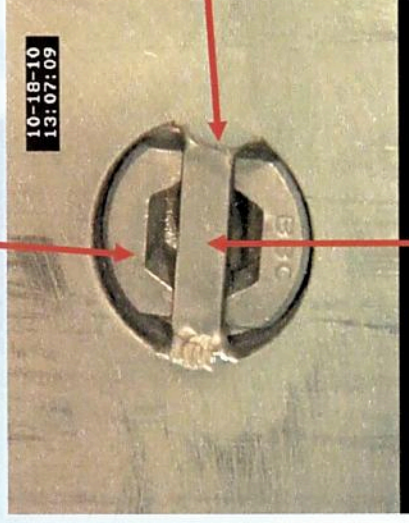


# Baffle-former bolts

- Stainless steel bolts are 5/8" dia. x ~2" long and attach the baffle plates to the former plates to form the baffle assembly



Baffle-former  
bolt head



Tack weld

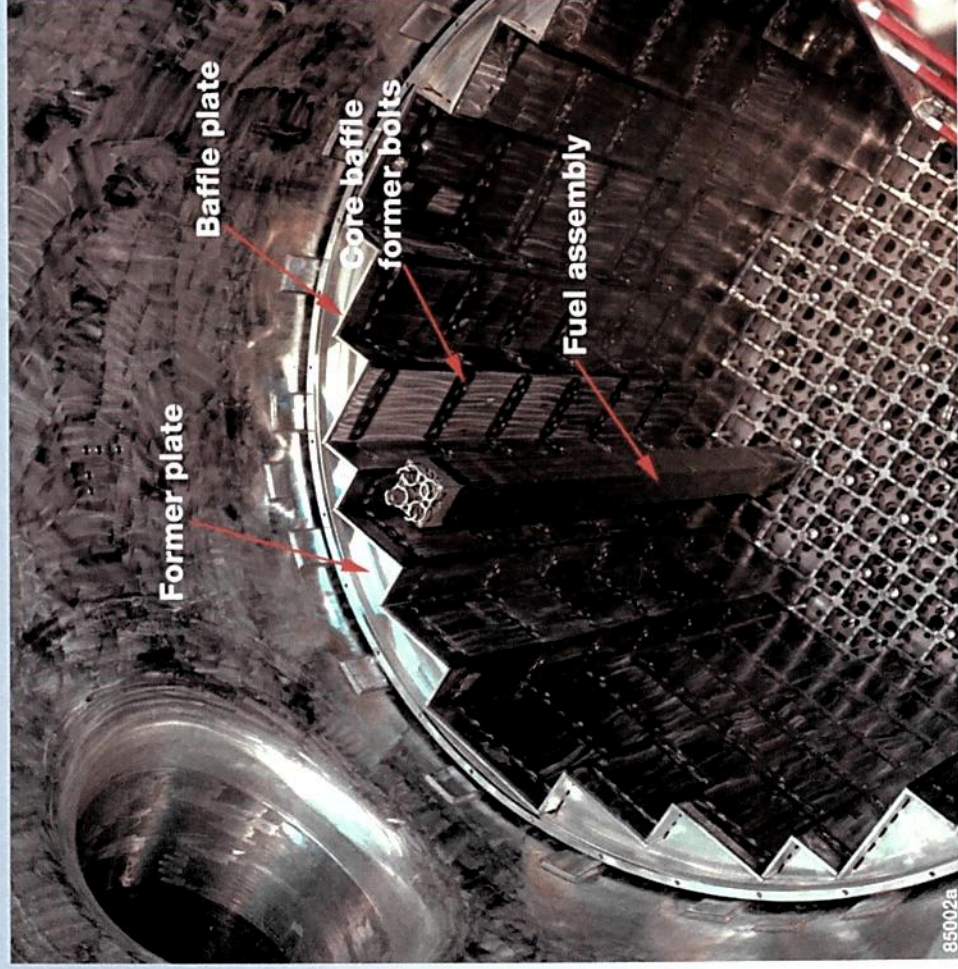
Locking tab





# Potential consequences

- No impact from a few bolt failures
- Large numbers of failed bolts could cause:
  - Flow leakage through gaps between adjacent plates
    - Fuel degradation (baffle jetting erosion)
    - Increased core bypass flow (less fuel cooling)
  - Baffle plates impacting fuel assemblies during LOCA event, potentially leading to grid deformation







## **Baffle-Former Bolt Inspections – Regulatory Basis – First 40 years**

- **10 CFR 50.55a “Codes and Standards”**
  - Incorporates by Reference ASME Code, Section XI
  - Section XI mandates general visual condition examination of reactor vessel internals (RVI) every 10 years
- **All PWRs have been performing every 10 years during the first 40 years of operation**

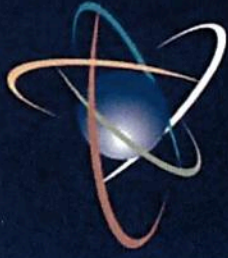




## **Baffle-Former Bolt Inspections Regulatory Basis – Period of Extended Operation**

- Guidance for PWR RVI aging management program is based on NRC-approved topical report MRP-227-A
- To manage aging of RVI, IP2 committed to enhanced inspections following MRP-227-A, consistent with NRC guidance





# **MRP-227-A Inspection Requirements for Baffle-Former Bolts**

- **Ultrasonic (UT) Examination**
- **Initial (baseline) inspection between 25-35 effective full power years**
- **100% of bolts**
- **Inspect every 10 years thereafter**
- **All PWRs with baffle-former bolts must perform these inspections (most PWR designs)**





# 2016 Indian Point Results

## Entergy Unit 2 Activities

- Conducted visual examination of 1232 baffle-edge bolts
- Conducted ultrasonic and visual examination of 832 baffle-former bolts
- Results:
  - All baffle edge-bolts were acceptable
  - 227 total baffle-former bolt identified as failed
    - 182 ultrasonic testing failures
    - 31 visually identified as protruding
    - 14 inaccessible, conservatively assumed failed
- Bolts to be sent out for analysis by Westinghouse and LPI, an independent engineering firm





# 2016 Indian Point Activities

## Indian Point Unit 2 (IP2)

- Removing degraded bolts using mechanical extraction and Electrical Discharge Machining (EDM) tools
- Developing plans to replace baffle-former bolts
- Developing safety evaluation of as-found condition
- Developing analysis to support baffle-former assembly return to service (if not all bolts are replaced)

## Indian Point Unit 3 (IP3)

- Developing evaluation of baffle-former assembly considering information from IP2
- Evaluating schedule for future baffle bolt examinations, currently planned in 2019

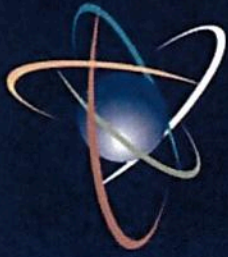




# ***NRC Inspections to Ensure Safety Of Indian Point Unit 2***

- Evaluated Entergy's Inservice Inspection to verify their examination methods/acceptance criteria were appropriate
- Baseline Inspections being planned and implemented to:
  - Verify Entergy completes bolt replacement and analyses that ensure the baffle-former assembly will perform intended safety functions
  - Review Entergy's evaluation of the as-found conditions to independently assess the safety significance and whether there were prior performance issues

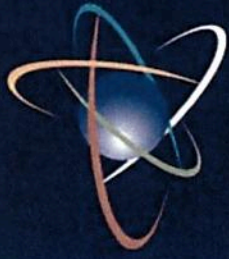




# NRC Inspections to Ensure Safety Of Indian Point Unit 3

- **NRC staff's current assessment is that IP3 is safe to operate**
  - Smaller number of failed bolts expected because:
    - IP3's baffle-former bolts are exposed to less radiation than those in IP2
    - Less operating time than IP2
    - No current indication of fuel leaks which would indicate significant problems with baffle-former bolts
  - Analysis for other Westinghouse plants have demonstrated significant margin regarding the total number of required bolts
  - Will reassess IP3 functionality based on results of IP2 analysis currently in progress
- **Resident Inspectors onsite to independently assess if conditions change**
- **NRC will review Entergy's evaluation of IP3 and their plans for future baffle-former assembly exams**





# **Operating Experience – Inspection Results**

- Only one plant found broken baffle-former bolts via Section XI visual inspections
- Over 12,000 baffle-former bolts ultrasonically inspected to date
- Only 3.6% defective (potentially cracked)
- Excluding IP2 results, 2% defective
- Several plants of similar age or older to IP2 have inspected
- These older plants have found no more than 10% defective bolts

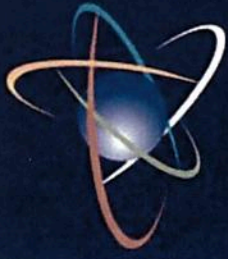




# ***Industry Response***

- **Entergy will perform root cause analysis**
- **Results will be shared with the industry through the EPRI Materials Reliability Program (MRP)**
- **EPRI considers MRP-227-A a living program**
- **Changes can be made in response to operating experience**





# **NRC Response**

- **Region I and NRR monitoring IP2 analysis, repair and root cause, and IP3 implications**
- **Decide if regulatory action needed based on:**
  - **Operating experience with baffle-former bolt inspections**
  - **IP2 root cause analysis results**
  - **Operability of IP2 under all design basis conditions with as-found defective bolts**
- **Potential actions could include acceleration of baseline inspection schedule, shorten reinspection interval, or no change**
- **Could implement through modification to guidance, or generic communication if warranted by safety impact**

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
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	)	
(Indian Point Nuclear Generating	)	
Units 2 and 3)	)	

CERTIFICATE OF SERVICE

Pursuant to 10 C.F.R § 2.305 (as revised), I hereby certify that copies of the foregoing letter from Sherwin E. Turk to the Atomic Safety and Licensing Board, dated April 26, 2016, have been served upon the Electronic Information Exchange (the NRC's E-Filing System), in the above- captioned proceeding, this 26<sup>th</sup> day of April, 2016.



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