

July 26, 2017

MEMORANDUM TO: Anthony T. Gody, Jr., Director  
Division of Reactor Safety, Region II

FROM: James A. Isom, Senior Reactor Operations Engineer /RA/  
Reactor Inspections Branch  
Division of Inspection and Regional Support  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE REACTOR OVERSIGHT PROCESS WORKING  
GROUP MEETING ON DESIGN VERIFICATION INSPECTIONS

On June 6, 2017, the U.S. Nuclear Regulatory Commission (NRC) staff conducted the first of several planned public meetings to discuss potential changes to the NRC Reactor Oversight Processes (ROP) design verification inspections. The NRC is implementing this collaborative effort to consider options focused on improving both the effectiveness and efficiency of our independent inspection programs. The purpose of the meeting was to discuss the NRC effort and initiate the collaborative process between NRC and external stakeholders.

Enclosure 1 contains the meeting attendance list.

Enclosure 2 contains the presentations and handouts discussed during the meeting.

Enclosure 3 contains additional information provided at a later date by other public stakeholders

Mr. Bill Dean, Director, Office of Nuclear Regulatory Reactor (NRR), provided the opening remarks. Mr. Dean stated that the current suite of ROP inspections were developed based on the available NRC lessons-learned at the time that the ROP was constructed in CY 2000. Since then, the Agency has inspected licensee's ability to understand and maintain the design basis of their facilities many times using the current suite of engineering inspections. Recent changes made to inspection procedures, IP 7111.21M, "Design Bases Assurance - Team" inspection and also to IP 7111.21N, "Design Bases Assurance – Program" were, in part, in recognition of the fact that since CY 2000 the Agency had performed sufficient verification of licensee's adherence to their original design basis. Additionally, although

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301-415-1109

## A. Gody

feedback on the changes made to IP 71111.21M and 71111.21N were mixed, Mr. Dean stated that the Commission has encouraged NRC staff to periodically review licensee's implementation of licensee engineering inspection program. IP 7111.21N currently accomplishes this aspect of Commission expectation through examination of licensee's implementation of the Environmental Qualification (EQ) requirement (10 CFR 50.49).

However, there is recognition by the agency that there is a desire to improve the focus of our baseline inspections by looking at current licensee performance and the unique challenges posed as plants age and enter a period of extended operation (i.e., an operation beyond their initial 40 year operating license). For example, it may be appropriate to focus on plant changes associated with equipment obsolescence and component replacements that may pose new challenges to licensee's engineering staff.

Mr. Tony Gody, Director, Division of Reactor Safety (DRS) – Region II, led the discussion of the NRC staff review of their engineering inspections. Mr. Gody provided information on the staffing of the NRC Design Bases Assurance (DBA) working group which consists of experienced NRC first line supervisors with many years of inspection experience. He also provided a high level discussion on the range of options that were preliminarily developed by the DBA working group that ranged from an 8 percent increase in effort to 28 percent decrease in effort from current inspections. Mr. Gody also indicated that these preliminary options are currently being vetted internally within the NRC inspection organizations and that several options explore the use of licensee self-assessments in some manner. Mr. Gody provided an in-depth discussion of the NRC draft charter for the DBA working group and described tasks described in the charter. He stated that the DBA charter would be made publically available once NRC senior management approved the charter. Key aspects of the draft charter included ensuring that NRC inspections remain effective and perhaps more efficient, that the NRC is interested in all stakeholder views and that any proposals would be made available to anyone interested in reviewing and commenting on, that no options were off the table as of today, that multiple public meetings will be scheduled, and that a Commission paper will ultimately describe the working group recommendations.

Following NRC managers opening remarks, industry provided a number of comments to the NRC presentation as follows:

- A series of meetings between the NRC and the industry would be helpful to facilitate dialogue to understand the changes being made by both parties. Some of these meetings may require one or more days of discussion.
- What is the NRC's measure of effectiveness of their engineering inspections?
- What does the NRC timeline look like for implementation of the changes to the engineering inspections?

The nuclear industry representatives made their presentation (see attached file) which consisted of three major themes: 1) Case for Change, 2) Approach to Considering Efficiencies and 3) Industry Proposal.

NRC managers' and staff's feedback to the industry's presentation included comments that the industry proposal appear to be heavily focused on event response; their proposal would impact the Region's ability to maintain inspection expertise and ability to respond to plant events; and the misconception by the industry that the identification of

## A. Gody

low-significant (Green) findings from engineering inspections would not have become more risk significant if they were not identified by the NRC.

Other comments from other public stakeholders included:

- Does the NRC plan to perform lessons-learned from the EQ inspections currently in progress, which could be applied to future changes to the engineering inspections?
- Probability Risk Assessment (PRA) review process could be used as a template for industry's development of the self-assessment program.
- Design inspections provide a valuable learning tool for the nuclear industry and are important that the future engineering elements retain this feature because many experienced engineers are leaving the nuclear industry through retirement.
- NRC past focus on system review is more advantageous than the current approach because the system approach to performing design review helps improve licensee's engineering staff knowledge of their system design.
- Future NRC engineering inspections should ensure these three elements are retained:
  - Is the plant safe?
  - Improve the quality of design
  - Provide new training opportunities for new engineers if critical for NRC and licensee staff

A. Gody

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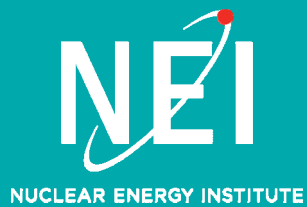
OFFICE	<b>NRR/DIRS/IRIB</b>	
NAME	<b>Jim Isom</b>	
DATE	<b>07/26/2017</b>	

**\*concurring via email**

**OFFICIAL RECORD COPY**

REACTOR OVERSIGHT PROCESS WORKING GROUP MEETING ON DESIGN  
VERIFICATION INSPECTIONS ATTENDANCE LIST  
JUNE 6, 2017

William Dean	NRC	Christopher Nolan	Duke Energy
Anthony Gody	NRC	Dan Doran	Exelon
Christopher Miller	NRC	David Gudger	Exelon
Michael King	NRC	James Slider	NEI
Jonathan Bartley	NRC	Greg Halnon	FirstEnergy
James Isom	NRC	Greg Cameron	NEI
C. J. Fong	NRC	Peter Wilson	TVA
		Richard Rasmussen	Conger & Elsea
		Jana Bergman	Curtiss-Wright
		Darani Reddick	Exelon
		Joe Shea	TVA
		Robert Berryman	NuEnergy
		Michael Shlyamberg	NuEnergy



# REACTOR OVERSIGHT PROCESS ENGINEERING INSPECTIONS REVIEW

June 6, 2017

1

# TODAY'S AGENDA

- Case for Change: Sustained, Improved Performance
- Industry Approach to Considering Efficiencies
- Industry Proposals
- Next Steps and Open Issues
  - Industry
  - NRC
- Items to Consider

# INDUSTRY TEAM

## Regulatory Affairs

- Ron Gaston, Entergy
- Dave Gudger, Exelon
- Ryan Treadway, Duke Energy
- Pete Wilson, TVA

## Engineering

- Vince Bacanskas, Entergy
- Dan Doran, Exelon
- Brian Dorathy, STARS Alliance
- Mark Grantham, Duke Energy
- Wayne Lewis, Exelon

## Executive Sponsors

- Greg Halnon, First Energy
- Chris Nolan, Duke Energy
- Joe Shea, TVA





# CASE FOR CHANGE: SUSTAINED, IMPROVED INDUSTRY PERFORMANCE



# SAFETY PERFORMANCE

- Abnormal Occurrences (NUREG-0090)
  - One in the last decade
- Scram and Significant Event Rates
  - Greatly reduced since the 1990's
- Industry and Regulatory Improvements have reduced Core Damage Frequency (CDF) to very low levels

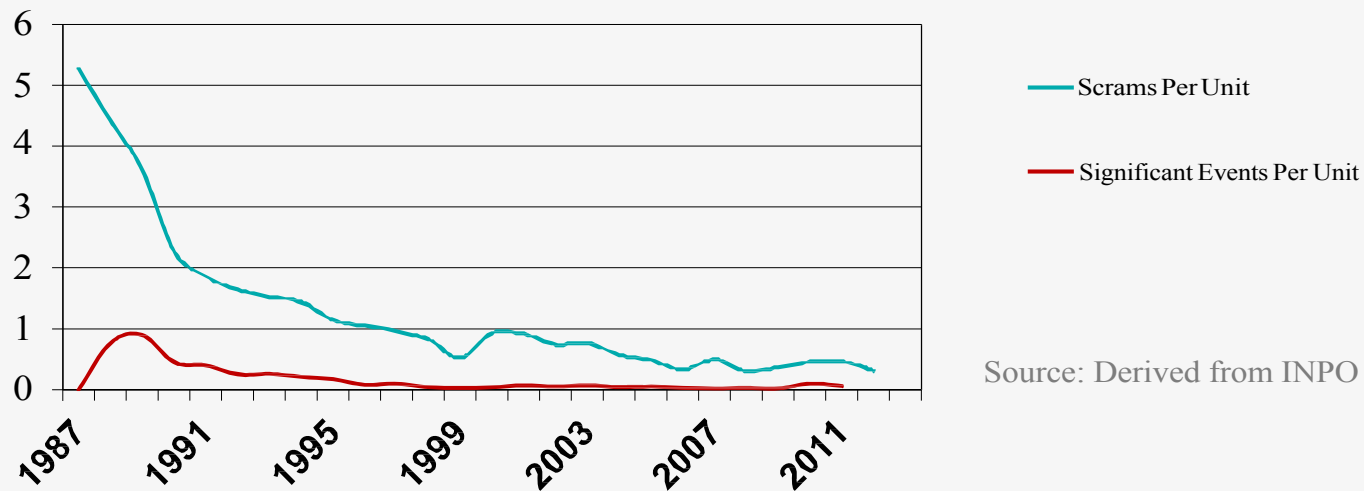
Demonstrated improvements in plant safety support a  
rebaselining of ROP inspections

5



# SAFETY PERFORMANCE

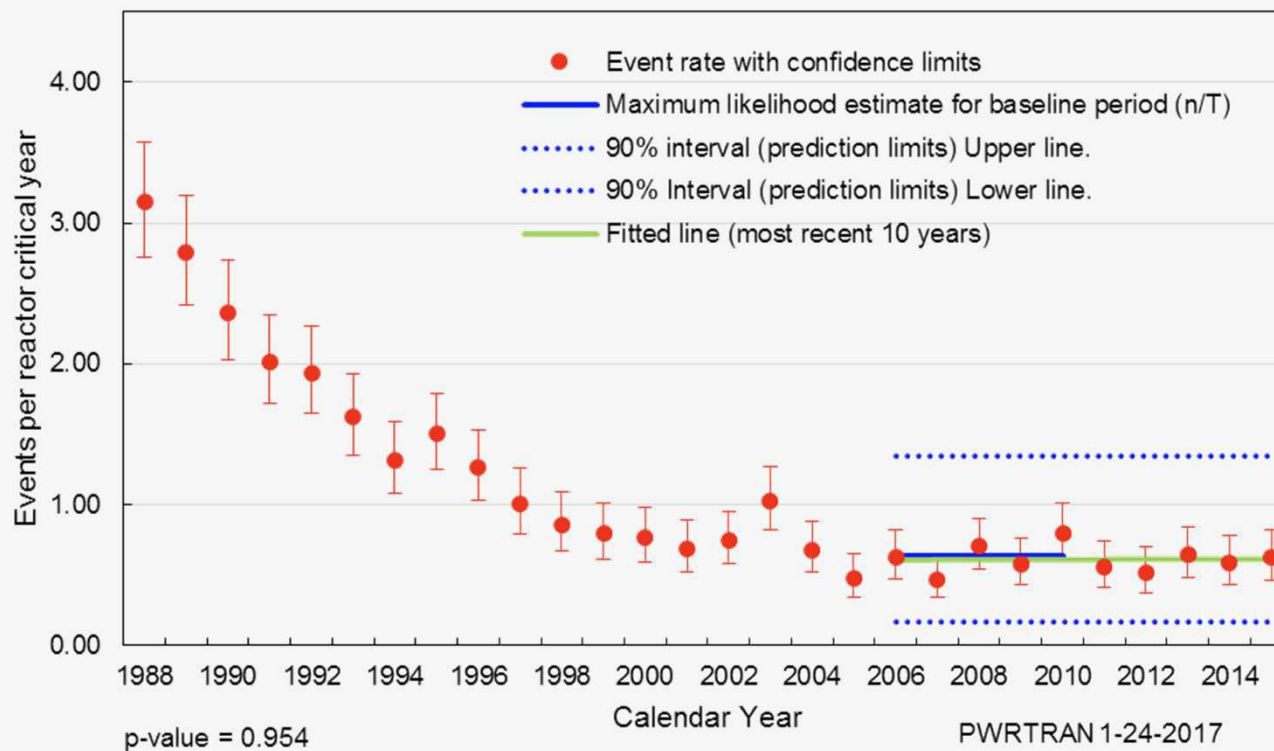
## SCRAMS AND SIGNIFICANT EVENTS



Safety indicators show a sustained improvement over the past two decades.

# SAFETY PERFORMANCE

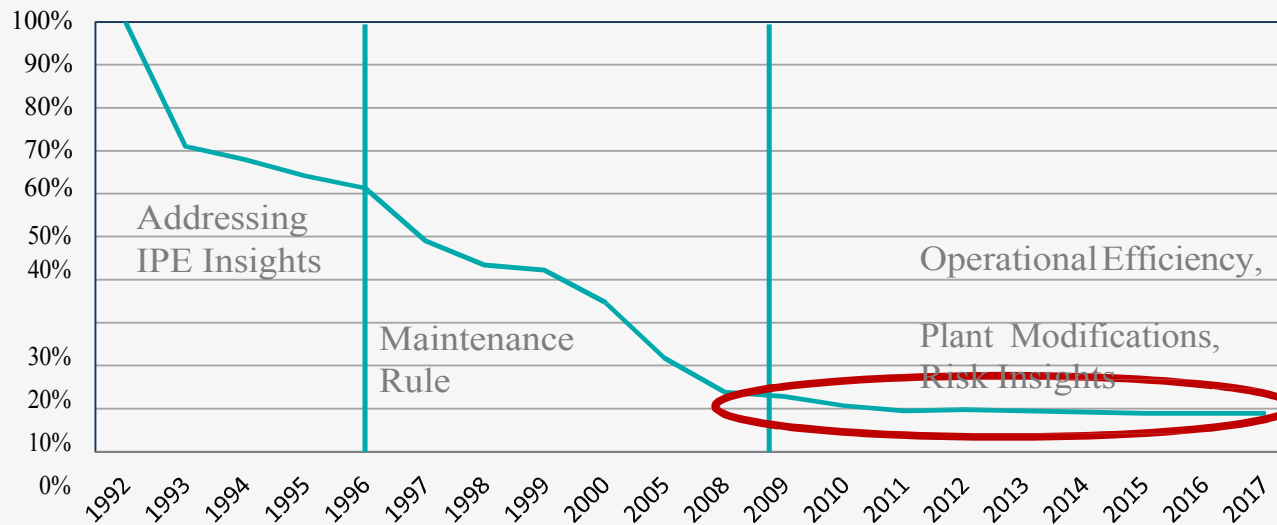
## INITIATING EVENT RATES



Source: INL/EXT-16-39534,  
Initiating Event Rates at U.S.  
Nuclear Power Plants, Nancy  
Johnson and John A. Schroeder,  
May 2016.

# SAFETY PERFORMANCE

## INTERNAL EVENTS CDF TREND



Source: May 11, 2017 Commission Briefing on Sustainable Use of Risk-Informed Regulation to Improve Plant Safety

The trend of CDF has improved dramatically due to industry improvements coupled with regulatory requirements.



# INDUSTRY EVENTS AND FOLLOW-UP

- Component Design Basis Inspections largely identifying issues of very low safety significance
  - 773 findings from inception through May 2014
  - Only three greater than green (all occurred before 2010)
- In January 2015, NRC referenced 7 red findings for value of engineering inspections
  - 100% were self-revealing violations (one was self-identified)
- Safety record of the industry has continuously improved
- Great value in detailed inspection and analysis of event causes
- Better use of industry and NRC resources

**CONCLUSION:** Industry performance supports stronger NRC emphasis on event/self-identified issue follow-up

Focus on contemporary engineering performance

Events that demonstrate original design concerns may merit additional inspection

The learnings from detailed follow-up are valuable



# INDUSTRY APPROACH TO CONSIDERING EFFICIENCIES





# OBJECTIVES FOR INDUSTRY

- Right-size number of inspection hours in engineering areas
- Reduce impact to plant staff during inspections
- Eliminate unnecessary challenges to historical licensing basis
- Eliminate duplication of activities by different inspections at different times

# OBJECTIVES FOR NRC

- Maintain Principles of Good Regulation
- Ensure public health and safety are maintained or enhanced
- Maintain transparency of public information
- Reduce burden on specialized regional resources
- Reduce reliance on contract resources

# AREAS OF EXPLORATION

- Sample size and selection
- Overlap and duplication of focus areas
- NRC observation of and credit for licensee self-assessments
- Re-baseline ROP inspection hours
- Focused, responsive inspections
- Design-related cross cutting areas

# INDUSTRY PROPOSAL



# INDUSTRY PROPOSAL CONCEPTS

Enhance self-identification through credit for Licensee self- assessments using NRC endorsed process



# ENHANCED SELF-IDENTIFICATION

- Licensee performs engineering self assessment using NRC- endorsed process and template
  - Performed on a triennial basis
  - Sample size and scope largely chosen by NRC from input of previous inspection results and resident inspector insights
- Licensee provides self assessment results to NRC
- NRC inspector observes self assessment and documents inspection report
- Available only to plants in Column 1 or 2 of the ROP action matrix

17



# ENHANCED SELF-IDENTIFICATION

- Triennial self assessment replaces most engineering team inspections
  - Design Basis Assurance Inspection
  - Fire Protection
  - Ultimate Heat Sink
- Assessment samples cover a broad range of engineering issues
  - Various samples from risk-significant systems, structures and components
  - One sample from GL 89-13 program
  - One sample from post-fire safe shutdown

# INDUSTRY PROPOSAL CONCEPTS

- Enhance self-identification through credit for Licensee self- assessments using NRC endorsed process
- Broaden the event follow-up inspections to focus on specific events (lower significance to Reactive and Supplemental inspections)





# BROADER EVENT FOLLOW UP

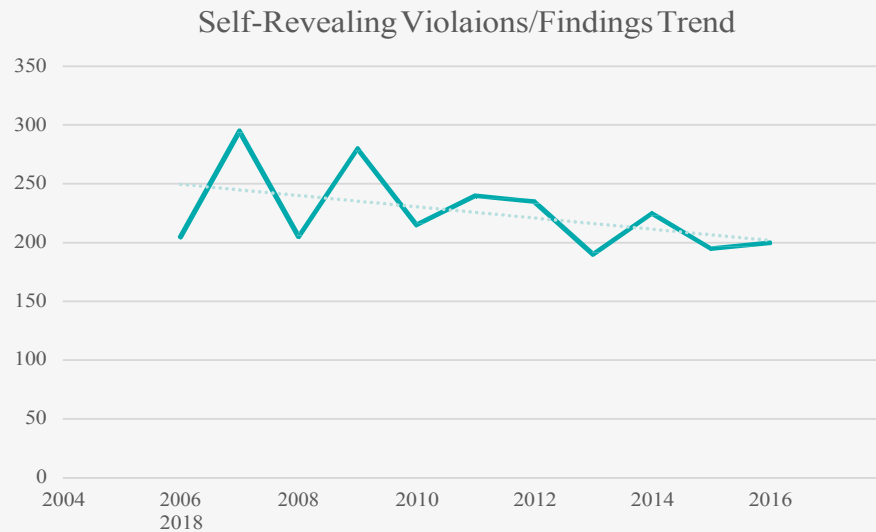
- NRC responds to plant events or self-revealing findings via “Area of Emphasis” inspection
  - Focused to event and conducted by regional or resident inspector
- Trigger points defined to ensure events not considered nominal are interrogated
- Inspection hours planned and communicated (fixed scope)
- Reactive is already defined in MD8.3 – no change
- Supplemental already defined through Action Matrix and 9500X procedures – no change

20



# SAFETY PERFORMANCE

## SELF-REVEALING FINDINGS

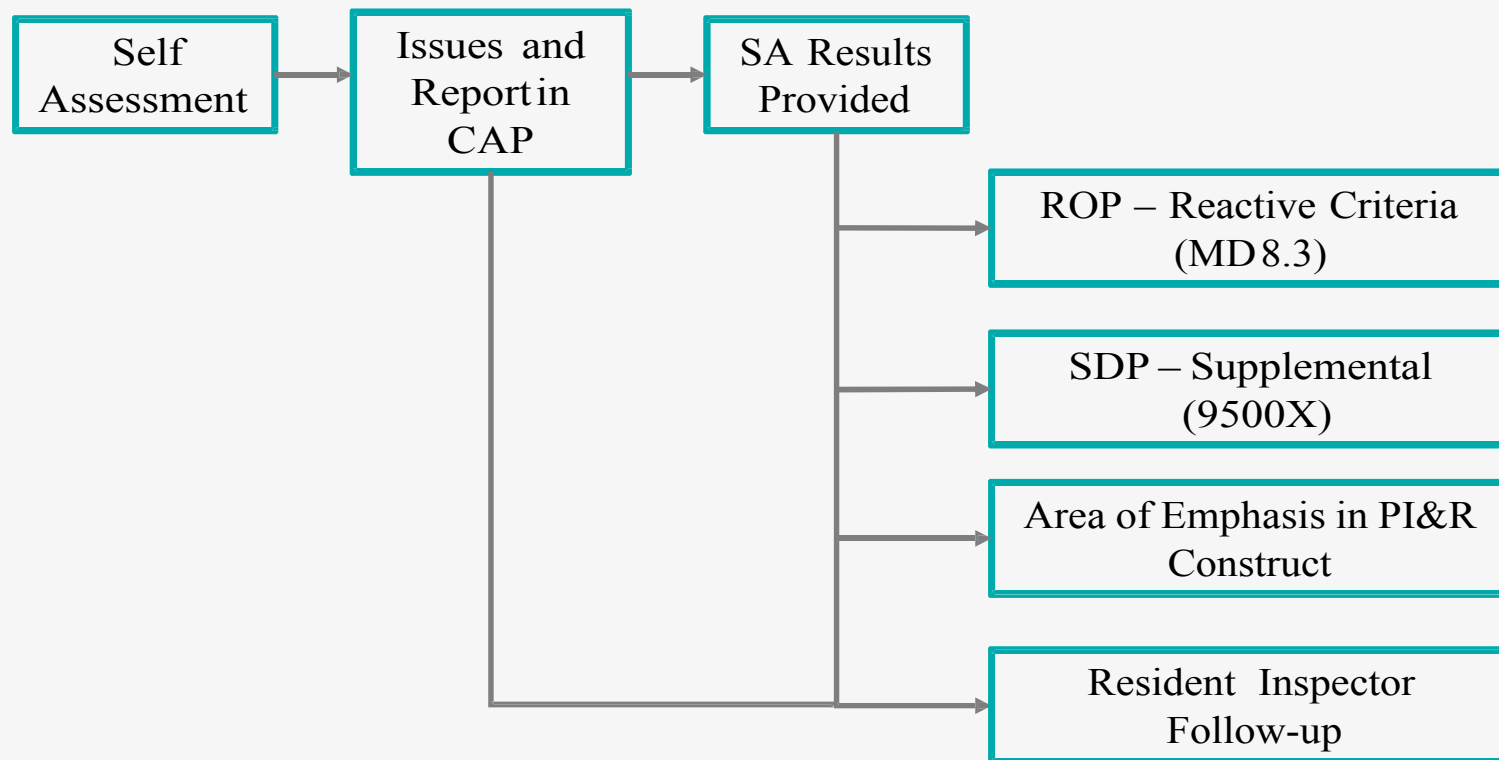


Source: Sciencetech public database

Declining trend in self-revealing events over the life of the ROP indicates improved plant performance.



# BROADER EVENT FOLLOW UP



# INDUSTRY PROPOSAL CONCEPTS

Enhance self-identification through credit for Licensee self- assessments using NRC endorsed process

Broaden the event follow-up inspections to focus on specific events (lower significance to Reactive and Supplemental inspections)

Verify changes to Current Licensing Basis (CLB) are completed according to program requirements



# VERIFICATION OF CHANGES TO CLB

- Consolidates existing 50.59 inspection and modification review
- Triennial 50.59 procedure changed to one week annually, expanded to include review of license basis changes
  - Eliminates overlap and duplication
  - Allows for end-to-end review of a modification package, 50.59 screening/evaluation, and management of license basis impacts
  - Performed by a regional inspector for one week per year
  - Insights gained during review inform self assessment sample section
- Eliminates need for annual 50.59 report

# INDUSTRY PROPOSAL CONCEPTS

Enhance self-identification through credit for Licensee self- assessments using NRC endorsed process

Broaden the event follow-up inspections to focus on specific events (lower significance to Reactive and Supplemental inspections)

Verify changes to Current Licensing Basis (CLB) are completed according to program requirements

Reduce overlap and repetition.  
observation/verification

Put more emphasis on actual



# REDUCE OVERLAP AND REPETITION

- Current inspections continue to focus heavily on validating the design basis
- In many cases, sample selections are repetitive
  - The design basis of most risk significant components has been interrogated through many years of inspections (e.g. DBAI, CDBI, SSDPC, etc.)
  - Most risk-significant fire areas have been reviewed during triennial FP inspections
- A shift to assuring design basis maintenance is appropriate
  - Modification reviews
  - Operation and Maintenance consistent with design basis

# REDUCE OVERLAP AND REPETITION

- Resident and regional inspectors provide oversight of design basis maintenance
  - Residents perform walkdowns, assess operations and maintenance practices
  - Regional inspectors perform 50.59 and modification reviews and oversee licensee self assessments
  - Combined, residents and regional inspectors perform reactive inspections where necessary

27



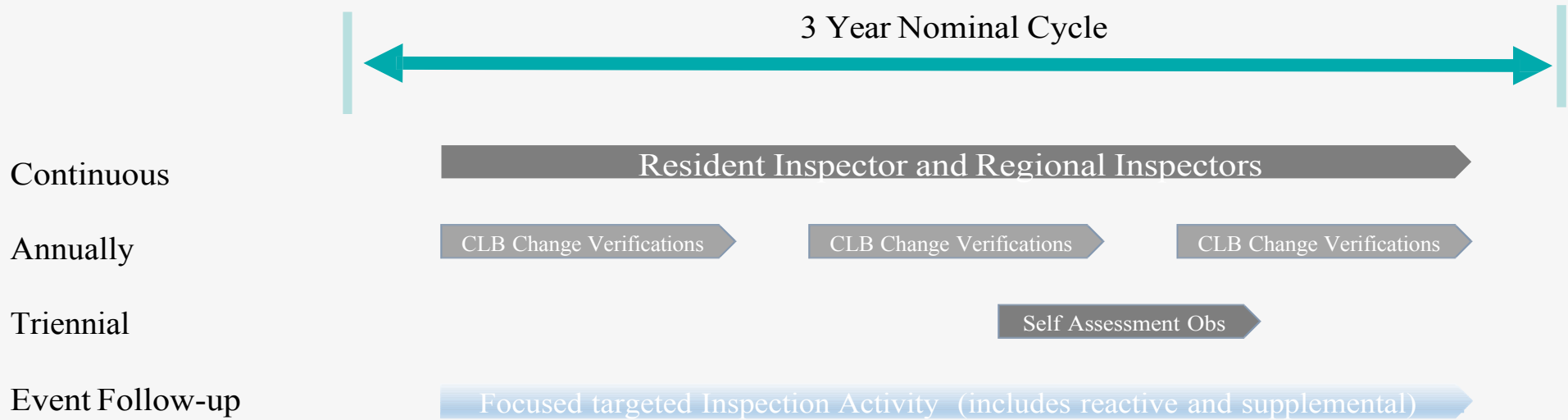


# INDUSTRY PROPOSAL CONCEPTS

- Enhance self-identification through credit for Licensee self- assessments using NRC endorsed process
- Broaden the event follow-up inspections to focus on specific events (lower significance to Reactive and Supplemental inspections)
- Verify changes to Current Licensing Basis (CLB) are completed according to program requirements
- Reduce overlap and put more emphasis on actual observation/verification



# NRC ENGINEERING TOUCH-POINTS



Proposal creates sufficient number and frequency of opportunities for NRC to assess engineering performance.

# INDUSTRY PROPOSAL SUMMARY

- Credit for licensee triennial self assessment
- Implement a focused “Area of Emphasis” follow-up concept
- Implement annual CLB change verification inspection
- Reduce overlap and duplication
  - Overall reduction in ROP baseline inspection hours

# BENEFITS FOR NRC

- Ensures continued strong oversight of plant safety
- Consistent with principles of Project AIM
  - Reduces reliance on contractor support
  - Introduces flexibility in ROP
- Allows for dedication of resources to investigating and understanding plant events
- Drives a culture of self-identification and accountability consistent with the Commission's Statement of Policy on Safety Culture

# BENEFITS FOR INDUSTRY

- Aligns inspection activities with plant performance
- Reduces impact on plant staff from large team inspections
- Drives a culture of self-identification and assessment important to healthy safety culture
- Consistent with principles of Delivering the Nuclear Promise

# OPEN ISSUES TO DISCUSS

- Timing and methods to select samples
- Enforcement at end of self-assessment
- Triggers for “Area of Emphasis” inspection
- Impacts of 50.69 plant on sample selection and size
- Balancing of resident and regional inspector workload
- Cyber Security – when can it be folded in?

# DIALOGUE AND QUESTIONS



June 15, 2017

James A. Isom

Office of Nuclear Reactor Regulation Division of  
Inspection and Regional Support Reactor Inspection  
Branch

U.S. Nuclear Regulatory Commission Washington, DC  
20555-0001

Anthony Gody. Director Division of  
Reactor Safety

U.S. Nuclear Regulatory Commission Region II Someplace in  
Georgia

SUBJECT: Reactor Oversight Process Engineering Inspection Programs

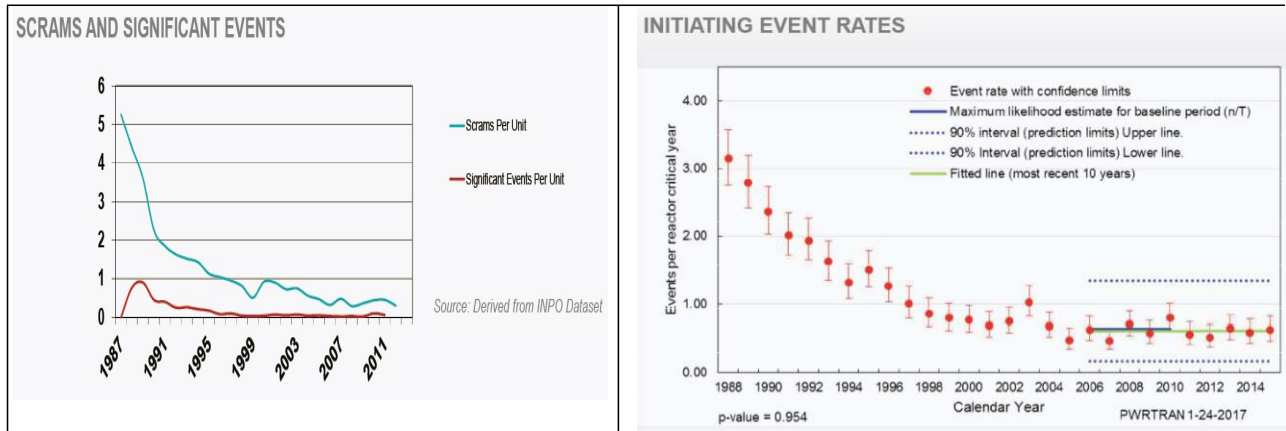
Dear Gentlemen:

I regret missing the public meeting the NRC held on June 6, 2017, to discuss potential changes to the engineering inspections conducted under the Reactor Oversight Process (ROP). I consider the ROP to be one of the best things the NRC has ever done. The NRC does a fine job of establishing the agency's expectations regarding safety performance at operating power reactors. Clear articulation of the expectations makes it easier for plant owners to meet them and for NRC's inspectors to identify shortfalls as early as possible, before they grow to epidemic proportions.

One of the many attributes that makes the ROP valuable is the recognition by the NRC that it is a work in progress. The meeting I missed is one of many mechanisms used by the NRC to consider adjustments to the ROP to make it better and more efficient.

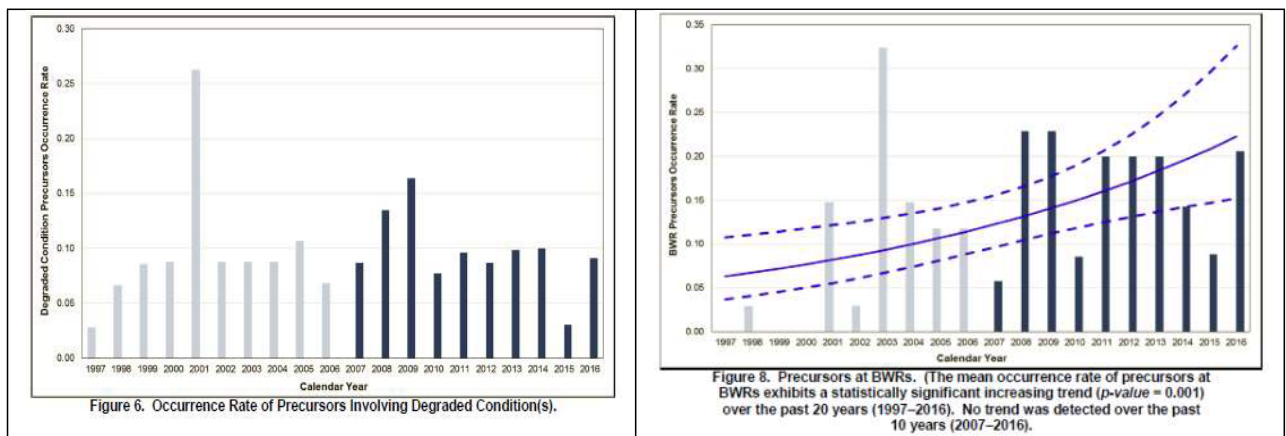
I reviewed the slides used by industry representatives during the June 6 meeting. The slides began with graphics showing improving safety trends, including these two:





Slide 9 of the industry’s slides contained this statement: “Safety record of the industry has continuously improved.”

Two days after the meeting, the NRC issued its annual report on the accident sequence precursor (ASP) program (ML17153A364 and ML17153A365.) The ASP report also contained graphics, including these two:



The graphic on the left is Figure 6 showing the number of precursors involving degraded conditions to be essentially constant over the past two decades.

The graphic on the right is Figure 8 from the ASP report. Its caption might be hard to read, but states “The mean occurrence rate of precursors at BWRs exhibits a statistically significant increasing trend (p-value = 0.001) over the past twenty years” (boldfacing added for emphasis.)

The steady occurrence of precursors involving degraded conditions and the BWR statistically significant increased trend in accident precursors seem to contradict the industry’s assertion that the safety record as continuously improved. And that p-value is virtually impossible to dispute (even if one understood what it means).

The over abundance of data and the computing methods for slicing and dicing it renders a qualitative approach to distinguish between fat and muscle an amusing but otherwise useless activity. The figures I cut and paste from the ASP report are no more, or less, insightful than those conjured up by industry.

Setting the figure fracas aside, there may very well be ways to conduct the ROP's engineering inspections more effectively and efficiently, including even via the self-assessments proposed by the industry during the June 6 meeting. The matter may not lend itself to a qualitative analysis – check that, to a meaningful qualitative analysis – but a quantitative assessment could fairly evaluate the merits of various options.

Another aspect of the ROP's value is that it was originally developed and subsequently been revised via open, collaborative processes. The participation in these processes by industry representatives, NRC inspectors, and members of the public allows a broader set of pros and cons for options to be considered, lessening the chances that unintended consequences occur.

I understand that there will be additional public meetings about potential changes to the engineering inspection portions of the ROP. I would appreciate being notified of these meetings as they are scheduled and for remote participation to be arranged whenever possible.

Sincerely,

A handwritten signature in blue ink that reads "David A. Lochbaum". The signature is fluid and cursive, with the first name "David" being the most prominent.

David Lochbaum

Director, Nuclear Safety  
Project Union of Concerned  
Scientists PO Box 15316  
Chattanooga, TN 37415