



## **Industry/NRC NDE Technical Information Exchange Public Meeting**

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## Overview RES NDE

- The Office of Nuclear Regulatory Research (RES) supports the major regulatory program offices (including regions) by providing in-house technical expertise:
  - Events at operating plants, relief requests, and industry reports
  - RES further supports program offices in reviews and development of technical bases to support regulatory decisions with respect to ISI, NDE, and qualification of procedures, equipment, and personnel



## Overview RES NDE (cont'd)

- Pacific Northwest National Laboratory (PNNL) provides key support to the NDE program
  - Confirmatory laboratory tests on actual component/mock-up research
  - Direct participation on ASME Code committees
  - Expertise on emergent issues
  - Expertise on development and revisions to industry Performance Demonstration Initiative (PDI) approved methods
- The Office of Nuclear Reactor Regulation (NRR) NDE-related user need requests to RES are all categorized high priority



## Support to Operational Events

- To assist NRR in a timely manner to respond to NDE-related operating events, RES/PNNL provides support on an as-needed basis
- Since 2010, RES has supported NRR in the following evaluations of NDE-related events at plants:
  - Arkansas Unit 2 (ML13113A218)
  - Calvert Cliffs Unit 1
  - Calvert Cliffs Unit 2
  - Diablo Canyon Unit 2
  - Duane Arnold Unit 1
  - North Anna Unit 1
  - St. Lucie Unit 1 Retired Pressurizer
  - Vogtle 3 Containment Lower Ring Cracking (request from region)
  - Doel 3 reactor pressure vessel forgings
  - Nine Mile Point Unit 1 – unique request to use alternate repair and UT examination methods for BWR control rod drive housing penetrations
  - Palo Verde Units 1, 2, and 3 – first request to use UT in lieu of RT for repair and replacement of ferritic Class 2 Piping



## Operational Events

- North Anna described as a “water shed” event (occurred March 2012)
- Industry formed the NDE Improvement Focus Group (NIFG)
  - NIFG focus was specific to the North Anna event
    - DMWs where site-specific mockups have been used and non-encoded examinations conducted
    - Accordingly, NDE deficiencies observed in other events not addressed
  - In addition, a broad review of NDE not undertaken by industry



## Operational Events

- The North Anna event raised fundamental concerns regarding NDE
- Issues were discovered that bring into question ability of inspectors using PDI-qualified methods to detect flaws under certain circumstances



## RES Review of Events

- RES initiated a broad review of NDE-related events in fall 2012
  - The number of reported events were increasing
  - Similarities between events were discovered
  - Lessons learned emerged
- RES began developing a White Paper summarizing the plant events and issues
- RES requested assistance from PNNL with respect to verification / laboratory confirmation of certain technical details



## RES Review of Events (cont'd)

- RES formed an NDE expert panel in spring 2013
- World-recognized experts, most from outside nuclear industry
- Charter of panel was to:
  - Review and assess the draft White Paper on Improving the Effectiveness and Reliability of NDE.
  - Assess the plant events
    - Have the correct issues been raised?
    - Are the suggestions for NDE improvements valid?
    - Should additional recommendations be considered in this context/Draft White Paper?





## **RES Review of Events (cont'd)**

- Make recommendations for improving the White Paper and its conclusions.
- With respect to enhancing the reliability and effectiveness of NDE, assess the importance of the NDE issues
- Assess the applicability of probability of detection (POD) results from the existing body of studies or exercises to expectations for POD in the field for the types of examinations discussed in the Draft White Paper.



## RES Review of Events (cont'd)

- White Paper reflects information provided by licensees in submittals to NRC, discussions with industry personnel, and assessment of NDE expert panel



# NDE Expert Panel

NAME	AFFILIATION
Ted Sullivan, Facilitator	PNNL
Mike Anderson	PNNL
Doug Hansen	Arizona Public Service
Mark Lozev	BP Products
Clarisse Poidevin	CEA, Director of NDT
Bill Prosser	NASA Fellow
Ward Rummel	D&W Enterprises
Greg Selby	EPRI, Director NDE Center



## Presentations

- A preliminary NRC assessment of the White Paper was provided in a presentation to the industry at the EPRI 2013 NDE Technology Week meetings
- Additional information was provided to the industry by the NRC in a presentation at the EPRI 2014 NDE Technology Week meetings
- INPO presented the results of an independent assessment of NDE-related plant events at the EPRI 2014 NDE Technology Week meetings
- The NRC and INPO findings substantially agree



## PNNL TLR

- The White Paper has been converted to a PNNL technical letter report (TLR)
  - The TLR will be a useful resource tool
    - Provides in one place a description of the events, causes, and NDE performed
    - Documents the assessment of the NDE expert panel
- TLR is still under development
  - Draft will be provided to NRR for review
  - Publication anticipated mid-2015



## Industry Guidance

- NIFG/EPRI issued several reports
  - Many of the recommendations issued as guidance
- Industry requested that INPO verify that plants were using new guidance
- INPO created “How to Evaluate UT Using NIFG Guidance”
  - INPO teams will not be reviewing associated utility activities
- What will industry NDE committees and utilities be doing with respect to oversight / implementation of guidance?



## TLR / Next Steps

- TLR will be issued
- Staff will continue to assess implementation of NDE and any reported issues / flaws



**Questions?**

