

NDE Program Update




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Review of Select 2014 Key NDE Projects

- The NDE Program is currently funding approximately 60 projects that cover a wide range of NDE methods, technologies, and issues
- The following key projects have been selected for review:
 - Capability study for inspections of complex CASS components
 - Investigation of encoded NDE technologies without robotics
 - Applying virtual flaw technology as an NDE training component
 - Verification of complex search unit parameters
 - Definition of ultrasonic phased array essential variables
 - Basis for eliminating limited examination coverage relief requests
 - Computer based training (CBT) for weld overlay NDE

Update of Industry Review and Actions for Recent NDE OE





North Anna

- ▶ NDE Improvement Focus Group (NIFG) formed to address improvements to DMW examinations after North Anna OE
- ▶ NIFG Products Issued in 2013:
 - ▶ Nondestructive Evaluation Improvement Focus Group Extent of Condition Actions in Response to North Anna Dissimilar Metal Weld Operating Experience: Revision 1 - 3002000041
 - ▶ Nondestructive Evaluation: Guideline for Conducting Ultrasonic Examinations of Dissimilar Metal Welds, Revision 1 - 3002000091
 - ▶ Performance Demonstration Initiative (PDI) Guidance for Improved Reliability in Ultrasonic Examinations: Guideline for Hands-on Practice PDI-GL-001 Revision B, Site Specific Mockup requirements for Dissimilar Metal Welds Revision C - 3002000204
 - ▶ 2013 Team Scanning Assessment Conducted on Behalf of the NDE Integration Committee's NDE Improvement Focus Group - 3002002048




Diablo Canyon and Harris Nuclear Plant

- ▶ Focus Group (FG) formed to evaluate Diablo Canyon and Harris Nuclear Plant RCE reports to determine actions to be taken to address the type of examinations that had the issues
 - ▶ Diablo Canyon – Weld overlay examinations
 - ▶ Harris Nuclear Plant – RVUH penetration examinations
- ▶ In addition the FG was tasked with evaluating the OE for cross cutting issues applicable to other NDE applications



Diablo Canyon

- ▶ The NDE IC issued NDE Alert 2014-02 – Feb 10, 2014
 - ▶ To inform utilities and vendors of an inspection issue identified during a recent examination of structural weld overlays (SWOLs),
 - ▶ to convey industry actions,
 - ▶ to provide NDE Integration Committee (IC) recommendations




Industry Actions

- ▶ PDI-UT-8 has been revised to provide enhancements for the areas identified in the RCE report.
- ▶ New weld overlay demonstration samples have been examined with both the non-encoded conventional and phased array procedures to assure that no additional procedure changes are required to address these configurations.
- ▶ NDE IC has approved a multi-year project to develop a training module that can be used to train and prepare examiners prior to qualification and examinations at the plant. This training will address the OE and contain specific guidance and recommendations highlighted by the utility root cause.
- ▶ PDI Program has fabricated practice mockups representative of non-standard weld overlays. The NDE IC focus group recommends the use of these mockups prior to performing ultrasonic examinations of non-standard weld overlays on site to allow the examiner to become familiar with the intricacies of performing examinations of these configurations.



Industry Actions (continued)

- ▶ The NDE IC has approved a project to modify the non-standard weld overlay practice mockups to implant fabrication flaws similar to those missed at DCCP for the purpose of providing indications representative of known field conditions to assist in preparing the examiners for the examinations.
- ▶ The NDE IC has approved projects to perform additional research in 2014 to evaluate approaches to improve the surface contact for the zero degree examinations of small diameter (< 8" diameter) weld overlays.
- ▶ The FG has evaluated the DCPP root cause evaluation to determine if this event was the direct cause of inadequate procedure, equipment, personnel qualifications or the qualification process that requires an extent of condition evaluation at other sites. The FG concluded that this event is related to implementation of the procedure guidance and does not require an industry extent of condition evaluation.




NDE IC Recommendations for the Industry

- ▶ Perform a detailed review of the DCPP root cause and corrective actions taken, specifically the enhancements made to the examination procedures to address non-standard overlays, which includes scan speed guidance and sensitivity adjustments.
- ▶ When applying non-encoded conventional UT examinations of weld overlays, implement the latest revision of the qualified examination procedure.
- ▶ Prior to performing examinations of non-standard overlays, utilize the practice mockups to prepare examiners.



Harris Nuclear Plant

- ▶ The NDE IP FG is evaluating the Harris OE and determining the appropriate industry actions
 - ▶ The NDE IP FG is working with the MRP Inspection TAC to address this issue
- ▶ The Root, Primary Contributing Cause and Corrective Actions are being addressed in a MRP report that provides guidance for preparing and performing RVUH examinations
 - ▶ The report is considering NEI 03-08 guidance and is targeted for issuance in the third quarter of 2014



Process for identifying Cross Cutting NDE Issues

- ▶ As new industry NDE OE is identified, the issues related to the OE is evaluated to determine applicable industry actions specific to that type of examination
- ▶ In addition, the OE is evaluated for generic implications for other NDE examinations that are performed
- ▶ The new OE is evaluated with other recent OE looking for trends that may lead to degraded NDE reliability that require industry actions




NDE Cross Cutting Issues

- ▶ Preliminary assessment of the recent OE has contributed the cross cutting issues to human performance issues related to poor implementation of the NDE examination requirements
 - ▶ Related to complex examinations
- ▶ In addition to the items being addressed specifically for DMW, WOL, and RVUH examinations; the NDE IC has been actively pursuing ways to enhance NDE reliability
 - ▶ Several examples of the areas of improvement are listed on the next slide



Examples of NDE Reliability Improvements Being Pursued

- ▶ Examiner qualification, proficiency, and training (virtual mockups and training materials)
- ▶ Improvements to encoded NDE capabilities
- ▶ Remote VT improvements
- ▶ Remote VT image analysis
- ▶ Modeling and simulation for UT examination
- ▶ Quantification and enhancement to PA UT beam skewing and steering
- ▶ Verification of complex search unit parameters
- ▶ Virtual UT NDE for human performance enhancements
- ▶ Section XI Code training for NDE and ISI personnel
- ▶ Definition of PA UT essential variables
- ▶ Guideline for compliance of ISI requirements
- ▶ Technical basis for the examination of tapered surfaces
- ▶ CBT for weld overlay examination
- ▶ Detecting WOL defects in non parallel surfaces
- ▶ Use of contoured 0 degree search units for WOL components with complex OD geometries



NDE Reliability Improvements

- ▶ NDE vendors are a key part of effective NDE reliability
 - ▶ Communication with the vendors of the NDE IC activities to improve NDE reliability is essential
 - ▶ NDE vendor engagement with the EPRI NDE IC has been improved
 - ▶ This includes interaction of the NDE APC Chair and EPRI NDE Director with the vendors
 - ▶ Vendor involvement with the Technical Advisory Committee (TAC) meetings



Questions

