

MODERNIZATION TECHNOLOGY ASSESSMENT

MTA Number	MTA-TR-001		
Title			
Implementation of the EPRI Virtual Nondestructive Evaluation (VNDE) Simulator			
Description			
The Virtual Nondestructive Evaluation (VNDE) simulator replaces physical mockups, integrating software and hardware to simulate a manual ultrasonic examination by playing back digitized ultrasonic test data from a physical mockup. The VNDE may be used for hands-on practice (HOP) to meet the American Society of Mechanical Engineers (ASME) requirements for ultrasonic certification and practice, or generally to supplement training, laboratory, and proficiency experience normally provided using physical mockups. The VNDE simulators look and feel similar to physical, metallic mockups, but are a fraction of the cost and weight, making the simulator a more cost-effective and portable solution. There is a vast UT data library of HOP mockups that can be utilized. The VNDE may be used to replace HOP and portions of nondestructive examination (NDE) certification training. There is also a future opportunity (not included in the scope of this MTA) for the VNDE simulator to replace required experience hours for UT certification.			
Benefits			
Benefits Estimate	Level 1 - Savings are less than \$1 million per year, per fleet. Estimated savings are approximately \$25,000 - \$50,000 per year. Savings will vary based on the quantity of HOP mockups and the use of specialty HOP mockups.		
Benefits Description	• Elimination of ongoing and future HOP mockup leases/purchases. • Reduction in HOP travel costs (both labor and expenses) for the code required ultrasonic examiner proficiency and practice. • NDE Workforce costs can be reduced as well by way of distance learning using the UT Simulator. • Potential avoided costs due to NDE inspection rework. • Provides for standards alignment, enhanced learning and retention, shared Operating Experience, and access to a variety of samples.		
Costs and Schedule			
Cost	Level 3 – Implementation cost is less than \$1 million. Estimated implementation costs are approximately \$100,000 per fleet (\$15,000 per month if leasing), and ongoing costs are approximately \$10,000 annually.		
Schedule	Less than six months. Direct labor to implement the simulator (e.g., procedure revisions, system familiarity) is approximately 40 hours.		
Scope Context	Per fleet. NDE personnel training is typically performed at a corporate level. The VNDE simulator with HOP supplement kits (e.g., to support ASME Section XI, Appendix VIII, Supplements 2, 3, and 10) may be purchased or leased on a monthly basis. Ongoing costs are conservatively assumed for general system maintenance. This modernization concept may be higher value to vendors who have a large customer base for these services.		
Risks			
• The majority of the value of the VNDE simulator comes from utilities with high recoverable travel costs. There is a risk that the VNDE simulator may be underutilized, resulting in a net negative business case.			
Administrative Items			

This MTA can be accessed from <http://www.epri.com/nuclearplantmod>. For more on MTA's please see EPRI product 3002020578

Date	12/14/2021
Functional Area Where Benefits Will Be Realized	Training Engineering Maintenance
Reference Implementation Guidance	Nondestructive Evaluation: Virtual Mockups-Electronic Implantation of Flaw Responses into Previously Recorded Data (EPRI 3002013152) Virtual Non-Destructive Evaluation (VNDE) v2.1 (EPRI 3002015977)
Industry SME	EPRI – Bob Bouck Contact: NuclearPlantMod@epri.com
Previous Implementation	Please contact EPRI for more information.
Implementation Enablers	Not applicable
SWEEP Score	• Cost - Level 3 - Implementation cost is less than \$1 million. Estimated implementation costs are approximately \$100,000 per fleet (\$15,000 per month if leasing), and ongoing costs are approximately \$10,000 annually. • Savings - Level 1 - Savings are less than \$1 million per year, per fleet. Estimated savings are approximately \$25,000 - \$50,000 per year. Savings will vary based on the quantity of HOP mockups and the use of specialty HOP mockups. • Payback - Level 1 - Payback period greater than five years. Estimated payback period is three to six years for a fleet. • Technical Readiness - Level 3 – The technology is commercially available and is ready for wide operational deployment. • Licensing Readiness - Level 3 - No changes are required for implementation. • Implementation Proficiency - Level 3 – The technology can be implemented by all sites, regardless of digital experience.
Applicability	All reactor types All geographic regions
Keywords	Ultrasonic testing; NDE
Business Case Analysis Cross-Reference	Plant Modernization Business Case: Cost-Benefit Analysis for Implementation of the EPRI Virtual NDE (VNDE) Ultrasonic Simulator (EPRI 3002020581)

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NOTE

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