

MODERNIZATION TECHNOLOGY ASSESSMENT

MTA Number	MTA-WM-001
Title	
Reduce Operating Costs using Electronic Work Packages (eWPs) for Maintenance Work	
Description	
Maintenance work packages provide task background information, procedural instructions, forms, and references to field workers on site. Traditional paper-based work package assembly is a manually intensive process that requires a significant amount of material and personnel time. The transition from paper-based work packages to eWPs for maintenance work streamlines the work package process; a process which is performed thousands of times annually for a generating unit. eWPs are prepared on an electronic platform that can be accessed via mobile device. eWPs reduce operational costs by increasing workflow efficiency and worker productivity as well as reducing package material and time required for manual activities.	
Benefits	
Benefits Estimate	Level 2 – Savings are greater than \$1 million but less than \$5 million per year per site (based on sites with 1-2 operating units). Estimated savings range from \$1.1M to \$1.5M per year. Benefit estimation varies depending on eWP implementation approach, eWP utilization, and site specific realization of benefits.
Benefits Description	• Reduction in operational costs by saving time spent on work package preparation, execution, and validation activities. • Reduction in material costs associated with printing and compiling work packages. • Reduction in outage duration by saving contract labor time and decreasing crew wait time. • Increase in plant efficiency and worker productivity by integrating the work package activities with basic plant workflow processes and information systems. • Increase in work package flexibility through in-time changes and instant access to plant information. • Improvement in work quality through instant supervisor checks.
Costs and Schedule	
Cost	Level 2 – Implementation cost is between \$1 million and \$5 million. eWP implementation can be either in-house or vendor-supported. Costs range from \$1.5M to \$3.9M per site, with the higher cost associated with vendor-supported implementation. The ongoing costs range from \$70K-\$500K per year.
Schedule	One to three years. On average, implementation of eWPs takes approximately 2 years.
Scope Context	Per site. Sites evaluated have 1-2 operating units. Given benefit estimation is a function of eWP utilization, increasing implementation fleetwide could increase cost savings at marginal additional cost. Initial implementation costs include software implementation (design, process mapping, software integration and initial training), procedure updates, and mobile devices for field use. The costs of mobile devices range from \$800 to \$1,400 per device and 150-325 devices are used for implementation. Ongoing costs include the cost of the software licensing, software upgrades, system maintenance, information technology (IT) support, and ongoing training.

Risks	
Given the mobile devices will be connected to Wi-Fi or a mobile hotspot, the cybersecurity and Electromagnetic Compatibility (EMC) risks below are relevant. Cybersecurity: If the system is not properly segmented and implemented, potential cyber-security deficiencies may result in an increase in vulnerability to cybersecurity threats. Following the NRC cybersecurity requirements will mitigate this risk. EMC: If EMC implications are not considered, then Wi-Fi applications could potentially adversely affect nearby equipment, and the overall benefits of other modernization improvements that use this enabling technology could be impacted. Following the NRC EMC requirements will mitigate this risk.	
Administrative Items	
Date	7/15/2021
Functional Area Where Benefits Will Be Realized	Work Management Maintenance Records Management
Reference Implementation Guidance	Implementation, Deployment, and Continuing Improvement of Electronic Work Packages: Update to 3002005363 (EPRI 3002018163)
Industry SME	EPRI – Nick Camilli Contact: NuclearPlantMod@epri.com
Previous Implementation	This improvement has been implemented at several nuclear plants. Please contact the EPRI SME for additional information.
Implementation Enablers	Fully connected Wi-Fi or mobile hotspot access for data transfer. Note that the mobile devices can be used anywhere in the plant and do not have to be continually connected to Wi-Fi or a mobile hotspot.
SWEEP Score	• Cost – Level 2 – Implementation cost greater than \$1 million but less than \$5 million. Costs range from \$1.5M to \$3.9M. Ongoing costs range from \$70K-\$500K per year. • Savings – Level 2 – Savings are greater than \$1 million but less than \$5 million per year. Estimated savings range from \$1.1M to \$1.5M per year. • Payback – Level 2 – Payback period is greater than one year but less than five years. Payback period will range depending on eWP implementation approach, eWP utilization, and site specific realization of benefits. • Technical Readiness – Level 3 – This technology has already been implemented at a nuclear site. • 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	eWP, work management, work package, human performance tools, HU tools
Business Case Analysis Cross-Reference	Plant Modernization Business Case: Electronic Work Packages (eWPs) for Maintenance Work: Cost-Benefit Analysis of Implementing eWPs to Reduce Operating Costs (EPRI 3002019483)

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