March 2025

NUCLEAR OPERATING PLANT INITIATIVES NEWSLETTER

(Nuclear Plant Modernization, Long-Term Operations (LTO), Data-Driven Decision Making (3DM)) and Digital Transformation

Welcome to the March 2025 Nuclear Operating Plant Initiatives (Nuclear Plant Modernization, Long-Term Operations (LTO), Data-Driven Decision Making (3DM)) and Digital Transformation Newsletter! This quarterly newsletter will keep you, our stakeholder, up to date with:

- **Recent news** from Nuclear Operating Plant Initiatives (Plant Modernization, Long-Term Operations (LTO), Data-Driven Decision Making (3DM)), and Digital Transformation Research Initiative (DXRI)
- **Key insights** from our research
- And upcoming **meetings, links, and contacts**

We hope you have found this newsletter to be informative and helpful on keeping you up to date with EPRI's Plant Modernization Program, 3DM and DXRI over the past year. We are excited to expand our newsletter to include LTO.

RECENT NEWS

EPRI's AI and Digital Transformation for Electric Power Summit (AI/DX Summit) brought together more than 250 attendees and over 100 companies to Palo Alto January 7–9. The bi-annual event, co-hosted with Stanford University's Bits and Watts initiative, included several panels with experts from EPRI, Google, NVIDIA, IBM, and other leading organizations that provided insight on implementing AI across organizations.

Exploring both sides of the AI coin—AI for energy and energy for AI—the summit focused on how rapid the energy industry must be in adopting AI. Key topics such as AI-driven innovations, large language models, and grid-enhancing technologies (GETs) were also discussed. Access the meeting materials and images here.

EPRI recently awarded a Technology Transfer Award to members who successfully transferred EPRI research related to the i-LAMP program into applied results. EPRI collaborated with global members to collect data and develop this industrywide approach to aging management of neutron absorber materials in spent fuel pools. This aging management program is required for LTO and for license renewal. By collecting and combining data and inspection results from operating nuclear plants around the world, the i-LAMP program was able to obtain NRC approval to use this alternative to meet regulatory requirements for aging management of neutron absorbers.

Three recent projects led by Korea Hydro & Nuclear Power (KHNP), EDF Energy, and a joint effort by Tennessee Valley Authority (TVA) and

Southern Nuclear Operating Co. demonstrate the value of EPRI's neutron absorber aging management research, which provided critical data and cost savings for global nuclear power plants. These projects address the challenges of neutron absorber material degradation and highlight the innovative application of EPRI's i-LAMP program.

The energy and electric power industry is shifting towards a Low Carbon Energy Future (LCEF) by increasing reliance on low to no-carbon energy resources like small modular nuclear reactors and solar. This transition presents new asset management challenges, such as integrating diverse materials and ensuring safety in nondestructive evaluation (NDE) practices.

To address these, the Electric Power Research Institute (EPRI) has launched a strategic initiative to integrate Digital Transformation (DX) technologies into NDE, focusing on data collection, AI-assisted decision support, digital twins, and workforce engagement. An industry-facing focus group supports this initiative by providing feedback on the DX NDE roadmap, identifying high-value applications, and sharing best practices for the use of DX technologies. An upcoming hybrid meeting on March 24−26 (Home – Digital Transformation NDE Focus Group Meeting – March 2025) will be held by the focus group. DX NDE use-cases and quick wins for the industry will be discussed in this meeting.

RECENT RESEARCH

Large language models (LLMs) are versatile tools that can serve as a document's question answering bots, automation aids, ideation starters, programming support, data analyzers, and summarization helpers. 'Good Practice Guide for Setting Up Large Language Models', is a summation to date of good practices for LLM projects and applications and geared towards project managers, innovation leaders, information technology, and operational technology staff. This report provides guidance on setting up LLM powered application and details the four steps of a general iterative workflow (1. project scoping, 2. data curation, 3. model building and 4. application deployment). To illustrate the methodology, an example use case is discussed detailing specific techniques and approaches used.

KEY INSIGHTS

DX involves a comprehensive overhaul of business operations through strategic use of digital tools, leading to enhanced worker and business process efficiency. For data analytics and AI to deliver its full potential, it will require high-quality data, robust digital infrastructure, and seamless integration into business processes—all of which are core components of DX. Without these foundations, AI implementations can struggle with data silos, integration issues, and underperformance. Embracing DX is not just beneficial but a prerequisite for leveraging AI effectively, ensuring that AI models can provide actionable insights, drive automation, and ultimately, deliver significant value to the organization.

In 2025, the DXRI will perform research to determine the risks of moving forward with DX and AI without the proper foundations in place. This research aims to highlight potential pitfalls and provide guidance on mitigating risks associated with inadequate digital transformation, ensuring that organizations can fully harness the power of AI and other digital tools.

UPCOMING MEETINGS, LINKS, AND CONTACTS

Meetings

Digital Transformation for Non-Destructive Examination (NDE) Focus Group (March 24–25, 2025): We look forward to your attendance at the first DX for NDE Focus Group meeting at the EPRI Charlotte Office in North Carolina. This meeting will be held in collaboration with DXRI. This meeting is open for registration for all EPRI members.

Digital Transformation Research Initiative In-Person Meeting (March 26–27, 2025): We look forward to your attendance at the second annual DXRI meeting at the EPRI Charlotte Office in North Carolina. This meeting will be held in collaboration with the DX for NDE Focus Group. The morning session on March 26th will be a hybrid meeting open to all EPRI members. The morning session on March 27th will be virtual and closed to DXRI funders.

Links

- Nuclear Plant Modernization Toolbox
- Operating Plant Initiatives Program Webpage
- Digital Transformation Research Initiative (DXRI) Microsite
- Plant Modernization Benchmarking & Assessment Supplemental Project Notice
- Digital Transformation Research Initiative (DXRI) Supplemental Project Notice

Contacts

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