Nuclear Industry Use of AI

NEI Perspective

NRC AI Workshop
September 24, 2025

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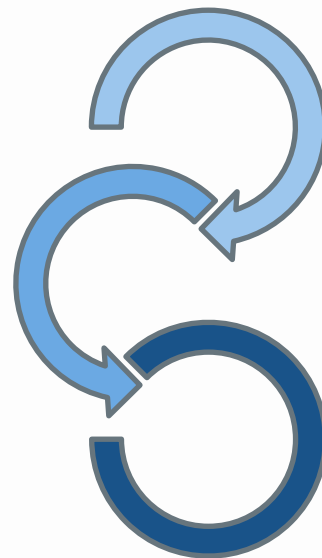
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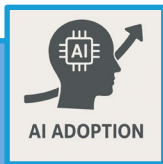ENERGY
INSTITUTE

Topics
CURRENT NEI ACTIVITIES

1. **Facilitating Engagement with NRC on AI issues**

2. **NILLM – Nuclear Industry Large Language Model**

3. **NEI Regulatory Requirements Checking Tool**
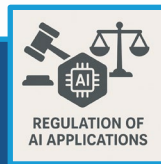   **Piloting an AI-enabled tool for NEI members**

Enabling efficient access to and application of industry knowledge and data

1. Facilitating Engagement with NRC on AI issues

Adoption

- Rapid and accelerating adoption
- Strong interest and hundreds of use cases across all plant departments
- Many uses cases focus on
  - Efficient access to the right information to improve products and support informed decision making
  - Automation of administrative or routine processes
- Human-in-the-loop (HITL) is used for validation and decision making when utilizing AI
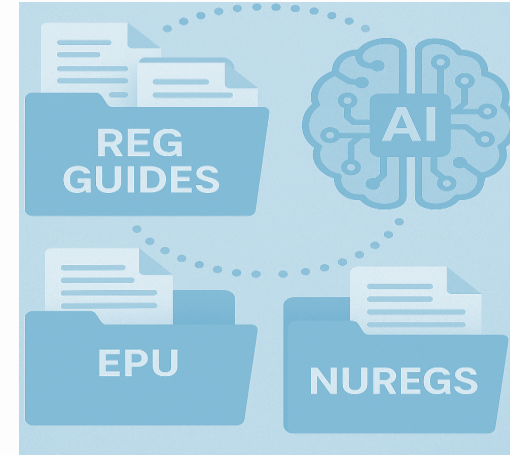
Regulation

- Large value to be gained from uses that do not require NRC approval
- Nearer-term regulatory submittals likely to involve
  - Image recognition and processing
  - Machine learning and pattern recognition
- Regulatory applications involving Generative AI (Gen AI) are likely a bit further out
- A graded and flexible regulatory framework is critical
  - Many "kinds" of AI
  - Large spectrum of how AI is used in any application
  - Encourage innovation that benefits safety and efficiency

1. Facilitating Engagement with NRC on AI issues
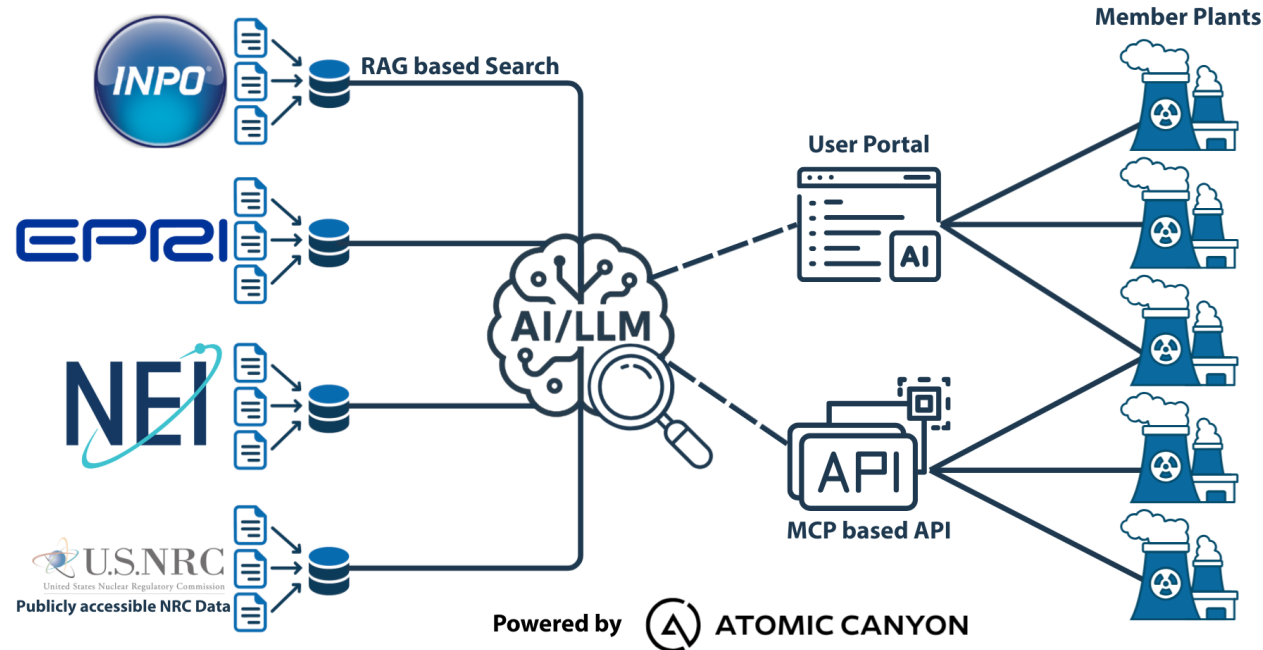## *AI-READY NRC DATASETS*

- Partnering with NRC staff to deliver high-value, AI-ready NRC datasets
  - Promotes efficiency and transparency
  - Supports all stakeholders
- Feedback to ensure
  - Sustainable process
  - Right metadata and formats
  - Priorities for future datasets
- Initial datasets include
  - Regulatory Guides
  - NUREGs
  - PURs
  - LR/SLRs
  - IMCs/IPs
  - SECYs, etc. etc.

NRC's collaboration and support on this effort is extremely valuable

2. NILLM – Nuclear Industry Large Language Model
A Collaborative Industry Project

Initial use case testing begins Q4 2025
Project Sponsor – Ramon Martinez, INPO (*martinezr@inpo.org*)

Initial Use Cases & Scope

📚 Knowledge Transfer (led by NEI)

- Supports knowledge management and transfer by enabling overview and detailed understanding of key topics in the nuclear industry

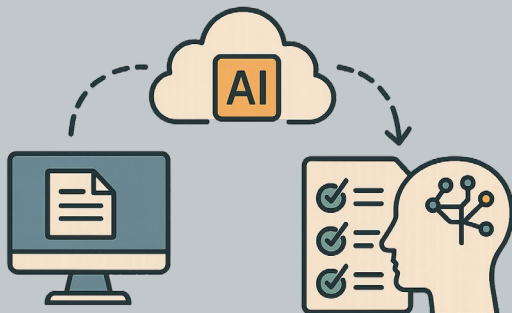### 🔍 Operational Experience Search (led by INPO)

- Smart search across IRIS, INPO, EPRI, and NEI documents
- Supports plant reliability and safety initiatives

🔧 Troubleshooting (led by EPRI)

- AI-assisted plans for degraded components or system conditions

3. NEI Member Pilot
AI-ENABLED REGULATORY REQUIREMENTS TOOL

Alignment
Focus
Insight

- AI-enabled "Document Compliance Check"
  - Automated identification and curation of regulatory requirements for a given application
  - Assess how well a document addresses each requirement
  - Supports high-quality and consistency in regulatory submittals
  - Useful for self-assessment of regulatory compliance
- Near-term, 6-month pilot, proof-of-concept project
- What will we learn from the pilot?
  - Increase comfort with AI-enabled regulatory and licensing applications
  - Understand appetite and adoption of targeted AI-workflows versus open-ended chatbots and prompt engineering
  - Assess value to end-users
  - Hosting and usage costs

NEI is partnering with Jensen Hughes to make this tool available to NEI members
Demonstration of the tool later on today's agenda

Closing Thoughts

Many current uses of AI in the nuclear industry are outside NRC requirements:

- Efficient access to information
- Automating administrative tasks

NEI supports development of AI regulatory framework that is:

- Flexible
- Graded

NEI and the nuclear industry are committed to:

- Practical use of AI for the benefit of safety and efficiency
- AI that is ethical, responsible, explainable, verifiable