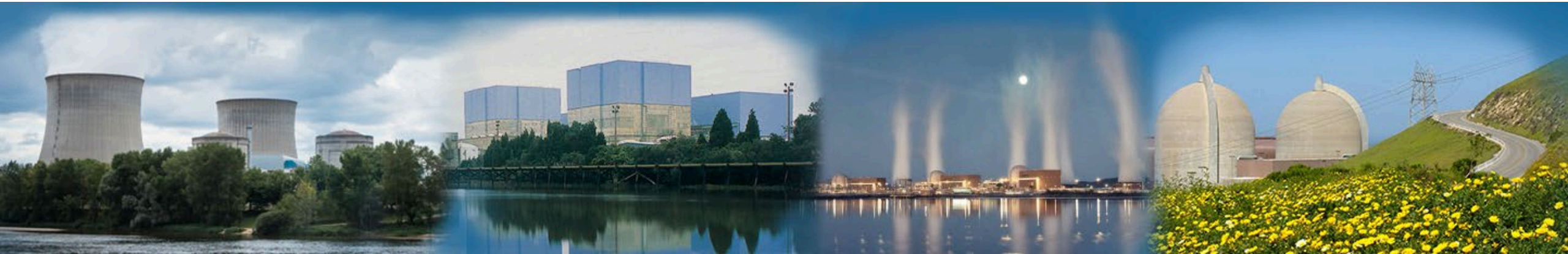
Integrated Operations for Nuclear - ION

LWRS LIGHT WATER REACTOR SUSTAINABILITY

Plant Modernization Stakeholder Engagement Meeting

December 3, 2024

Jason Remer
Lead Researcher and Industry Liaison



LWRS LIGHT WATER REACTOR SUSTAINABILITY

Integrated Operations for Nuclear

Transformation of the nuclear operating model through business-driven innovation.

Enabling new ways of working for economical, sustainable plant life.

A modern and innovative place for people to work.

ION Sustainability Objectives and Goals

Significantly reduce risk of modernization by:

- **Developing technology modernization solutions** that address aging and obsolescence
- **Delivering a sustainable business model** that ensures continued safe, reliable operation at a cost competitive level

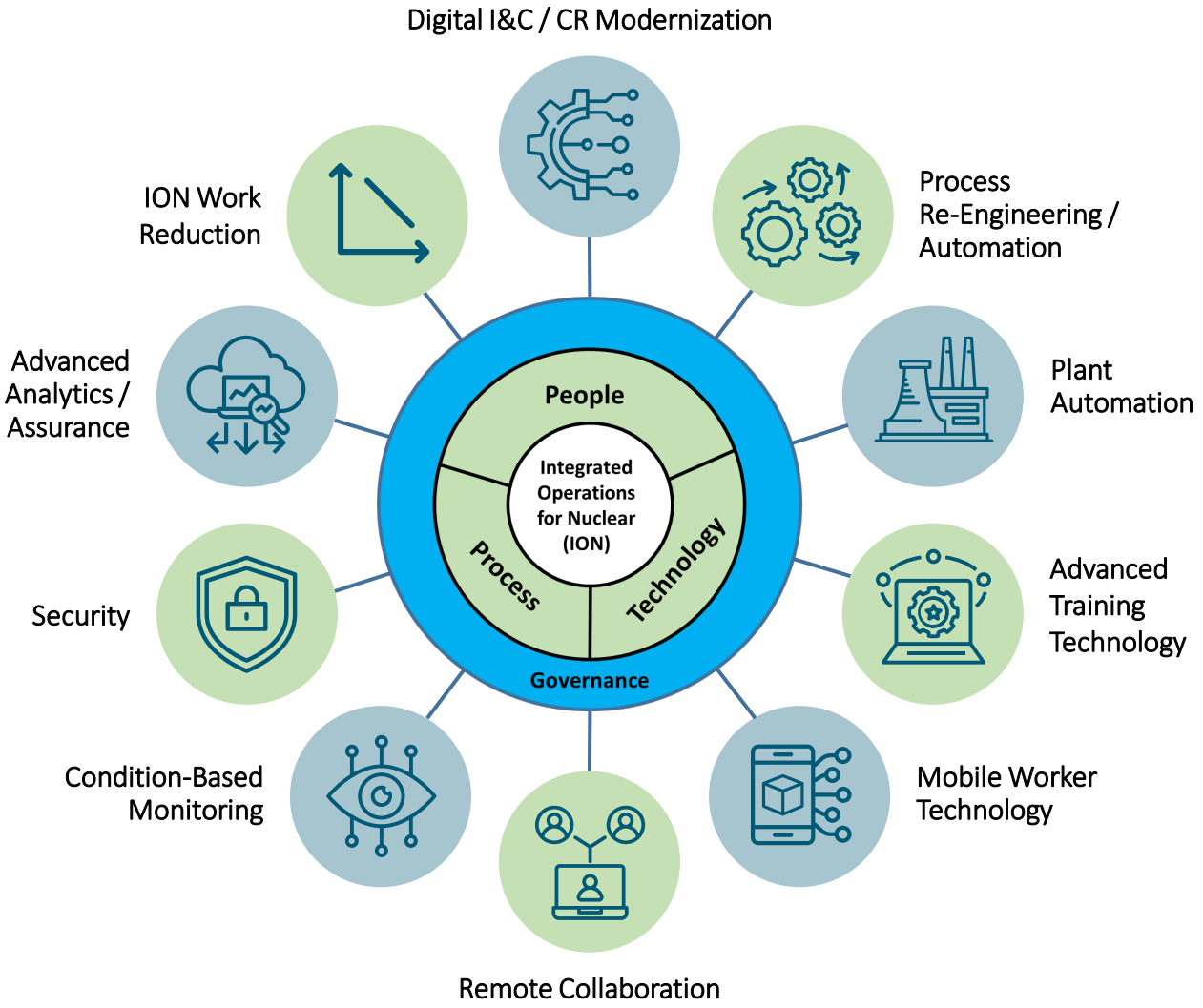
Long Term Management of Plant Systems	Nuclear Cost Competitiveness	Worker Attraction and Retention
License Extension 60, 80 or 100 years	Cost pressures from other generation sources	Worker interest in modern technology

What ION Does

Integrated operations for nuclear (ION) proposes a **rethink and overhaul of plant operations** with the help of these work domains

Work domains guide execution of the ION strategy and help to organize the many changes needed to the plant's technology, processes, and workforce organization

ION-GEN 1 Critical Work Domains



How Will you Deploy your Limited Resources?

Integrated Operations for Nuclear (ION)

- People
- Process
- Technology
- Governance

Roadmap for Long Term Sustainability

Plant Performance Issues
Sustainability
Component Obsolescence
O&M Cost Growth
Attraction and Retention

Disconnected Innovations
Technology only solutions
One-of-a-kind systems
Quick Fixes

Benefits of ION

9 of 37
Work reduction opportunities represented by these squares

99.7%
chance of positive NPV from these WROs

Advanced Training Technology
- 16-24 FTEs Saved
- $23-34M Initial Cost
- 87% Chance of Positive NPV

Remote Assistance & Troubleshooting
- 29-33 FTEs Saved
- $13-17M Initial Cost
- 100% Chance of Positive NPV

Condition-Based Monitoring
- 20-39 FTEs Saved
- $8-12M Initial Cost
- 95% Chance of Positive NPV

Automated Planning and Scheduling
- 7-16 FTEs Saved
- $9-17M Initial Cost
- 75% Chance of Positive NPV

Physical Security
- 10-30 FTEs Saved
- $16-51M Initial Cost
- 52% Chance of Positive NPV

Campaign Maintenance
- 17-23 FTEs Saved
- $12-17M Initial Cost
- 52% Chance of Positive NPV

Drones and Robotics
- 9-18 FTEs Saved
- $4-8M Initial Cost
- 100% Chance of Positive NPV

AI Condition Report Analysis
- 2-6 FTEs Saved
- $1-12M Initial Cost
- 50% Chance of Positive NPV

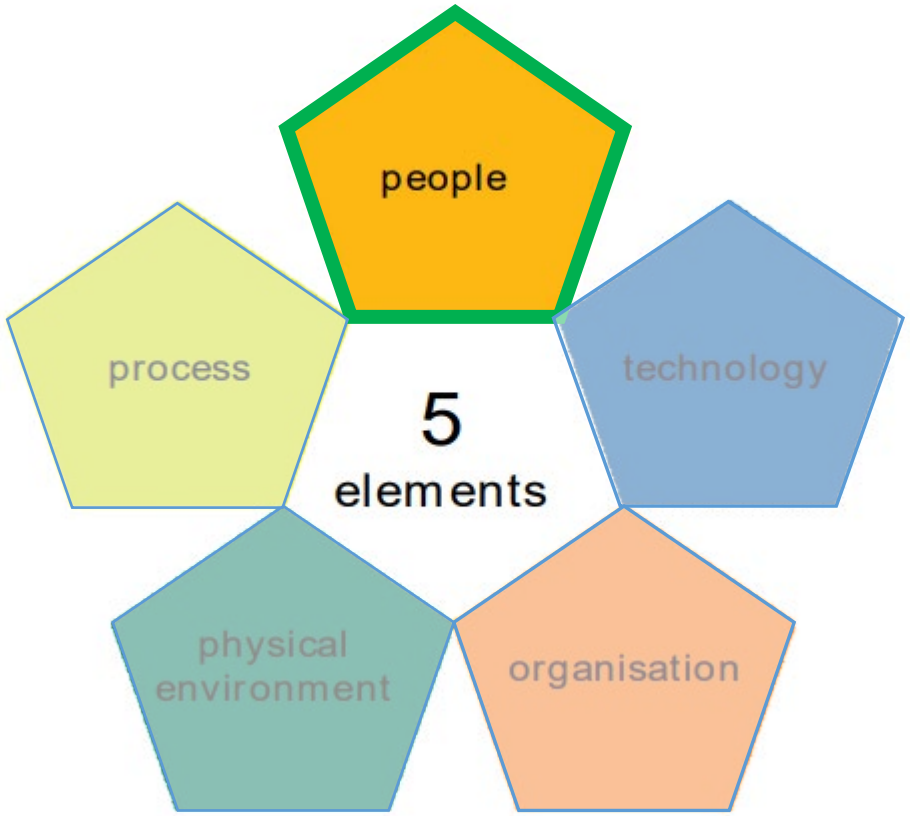
Digital I&C Upgrades
- 46-52 FTEs Saved
- $196-273M Initial Cost
- 66% Chance of Positive NPV

The Importance of People

- We tend to focus on **Technology** as the solution or the finish line, but technology is only part of the journey

  "People, Team & Behavioral change, is the ultimate key to success." – Focus on Communication and collaboration in real time to improve decision making – Technology is just the enabler.

- The ability to communicate and collaborate using quality data and analytics enables innovation within an organization



British Petroleum's "Petal Model" representing the **5 Key Elements of Success** (2006)

Innovation as a Capability

Work Satisfaction → Foster Creativity → Capable of Innovation

Creativity is the wellspring of ideas, the ability to think divergently and see connections between seemingly unrelated concepts.
Innovation, on the other hand, is the practical application of these creative ideas to bring about tangible change and improvement."

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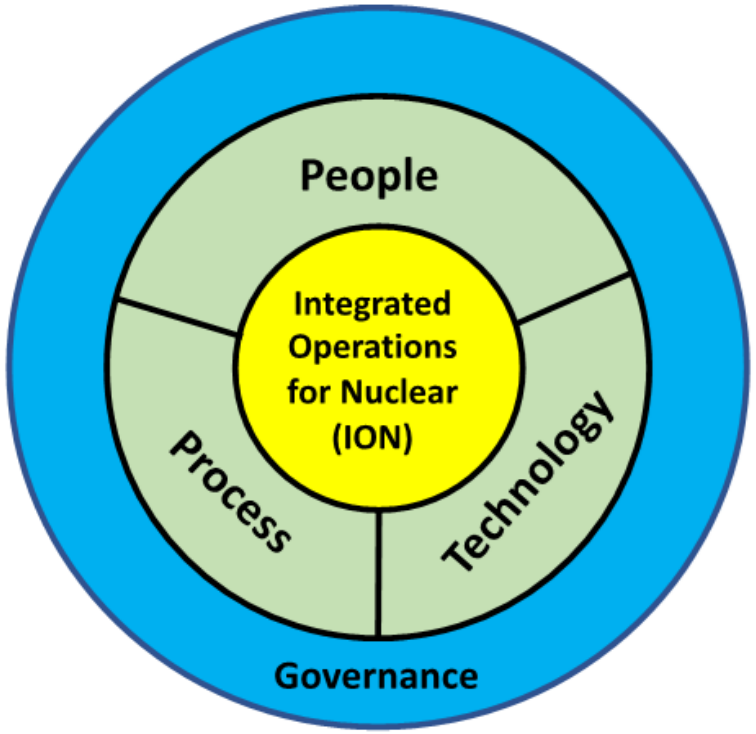
Innovative Operations in Nuclear



Change and Adapt

"It is not the most intellectual of the species that survives; it is not the strongest that survives; but the species that survives is the one that is able best to adapt and adjust to the changing environment in which it finds itself."

– Leon Megginson, Professor of Marketing and Management

Research Reports

INL has produced **public facing research reports** detailing the methodology and framework construction approach being developed in cooperation with industry partners

These reports will be used by the **domestic nuclear industry** to systematically determine if a business model change in accordance with ION principles is appropriate or warranted at the site or corporation.

To view all research reports:
https://lwrs.inl.gov/SitePages/Plant%20Modernization.aspx

More to Come…

Time (EST)	Topic	Speaker – Organization
01:30 - 01:35	Introduction	Jason Remer, INL
01:35 - 02:00	Strategic Modernization at South Texas Project	Clayton Bonnot, South Texas Project
02:00 - 02:25	The Impact of Strategic Modernization on Attracting and Retaining a Skilled Nuclear Workforce	Asgeir Drøivoldsmo, Halden Research Laboratory
02:25 - 02:50	Demonstration of a Work Reduction Opportunity for Advanced Computer Based Training	Sean Lawrie, Lumera
02:50 - 03:15	Modernizing Training for the Next Generation of Nuclear Workers	Chuck Lease, Electric Power Research
03:15 - 03:45	General Q&A and Session Wrap Up	Zachary Spielman, INL Jason Remer, INL
03:45	Session Adjourned	

LIGHT WATER
REACTOR
SUSTAINABILITY

Sustaining National Nuclear Assets

http://lwrs.inl.gov