Strategic Programmatic Overview of the Fuel Facilities and Spent Fuel Storage and Transportation Business Lines

COMMISSION MEETING

APRIL 20, 2023

Opening Remarks

DANIEL H. DORMAN

EXECUTIVE DIRECTOR FOR OPERATIONS

John Lubinski

- Director, Office of Nuclear Material Safety and Safeguards (NMSS)

Carrie Safford

- Deputy Director, Division of Fuel Management, NMSS

Yawar Faraz

- Senior Project Manager, Fuel Facilities Licensing Branch, Division of Fuel Management, NMSS

Lindsey Cooke

- Fuel Facilities Inspector, Division of Fuel Facilities Inspection, Region II

Becca Richardson

- Deputy Director, Division of Physical and Cyber and Security Policy, Office of Nuclear Security and Incident Response

Strategic Overview of the Fuel Facilities Business Line

JOHN LUBINSKI, DIRECTOR

OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

People

Trust

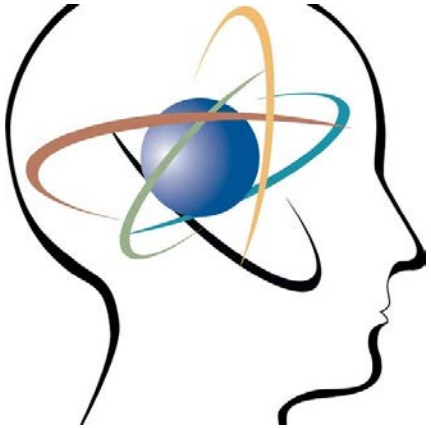
Workload

Working together to ensure the safe, secure, and environmentally responsible use of radioactive materials and nuclear facilities.

Current and Future Considerations for the Fuel Cycle Program Environment

Carrie Safford, Deputy Director

Division of Fuel Management | Office of Nuclear Material Safety and Safeguards



Current Considerations for the Fuel Cycle Program

- Strategic Workforce Planning and Recruitment
- Knowledge Management and Training

Organizational Health

Promoting an organizational culture that focuses on attracting a workforce (skilled, diverse, engaged) to carry out the NRC's mission along with a focus on knowledge management, staff training, and qualifications.

Future Considerations for the Fuel Cycle Program

- New Fuels
- Stakeholder Interactions and Outreach
- Interagency and International Coordination

Inspiring Stakeholder Confidence

Enhancing public outreach and inspiring stakeholder confidence through developing transparent communication strategies of fuel cycle decisions, along with engaging our federal and international partners.

Oversight: Today and Tomorrow

- Smarter Inspection Program
- Triennial Inspection Cycle Data
- Construction Oversight

Ensuring Oversight at Fuel Facilities

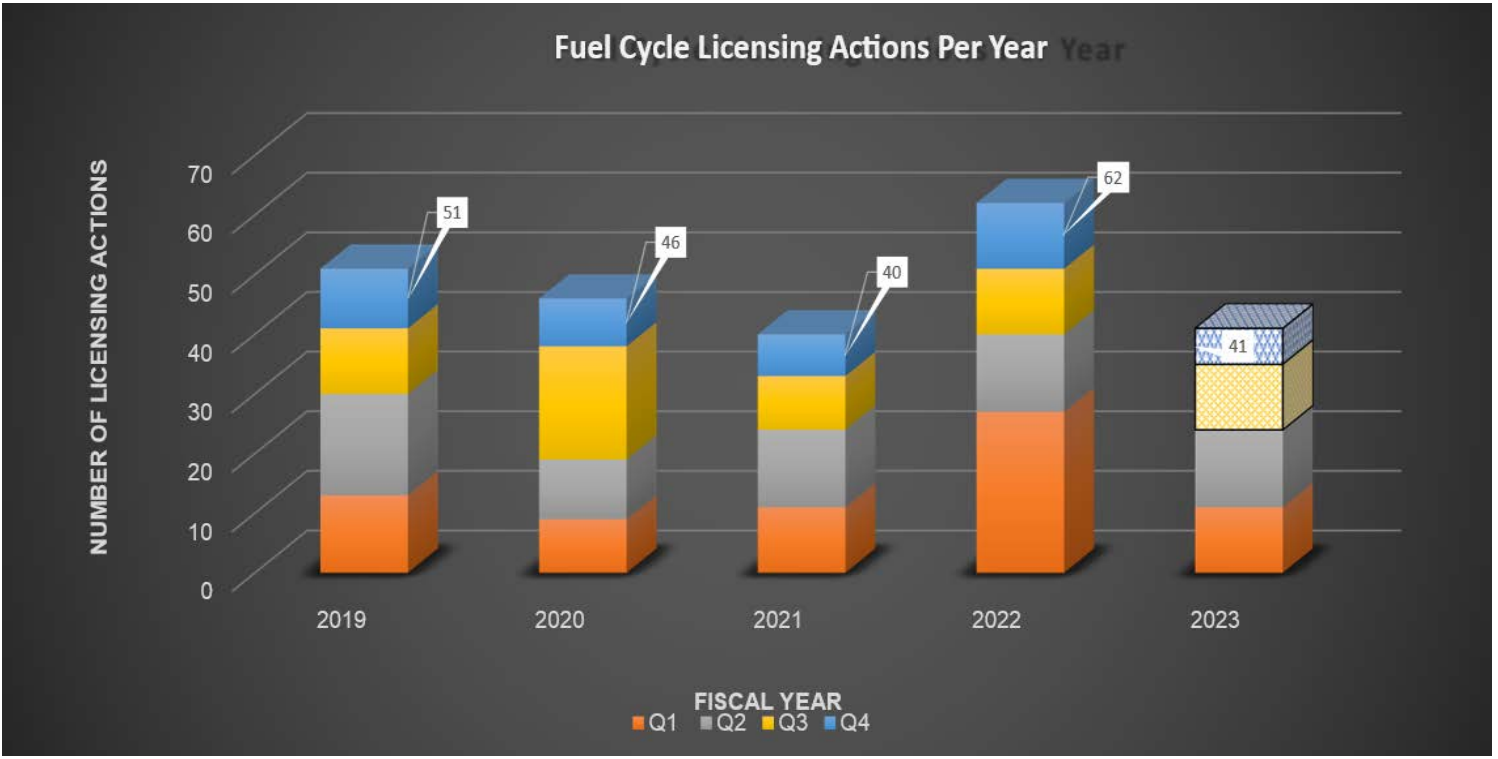
The Fuel Facilities Business Line works to ensure the safety and security of fuel facilities, as well as fuel facilities under construction by promoting risk-informed decisionmaking that results in effective and efficient management of oversight activities.

Fuel Facilities Licensing Activities

Yawar Faraz, Senior Project Manager

Fuel Facilities Licensing Branch | Division of Fuel Management | Office of Nuclear Material Safety and Safeguards

Overview of Fuel Facility Licensing Activities



Fuel Cycle Facilities

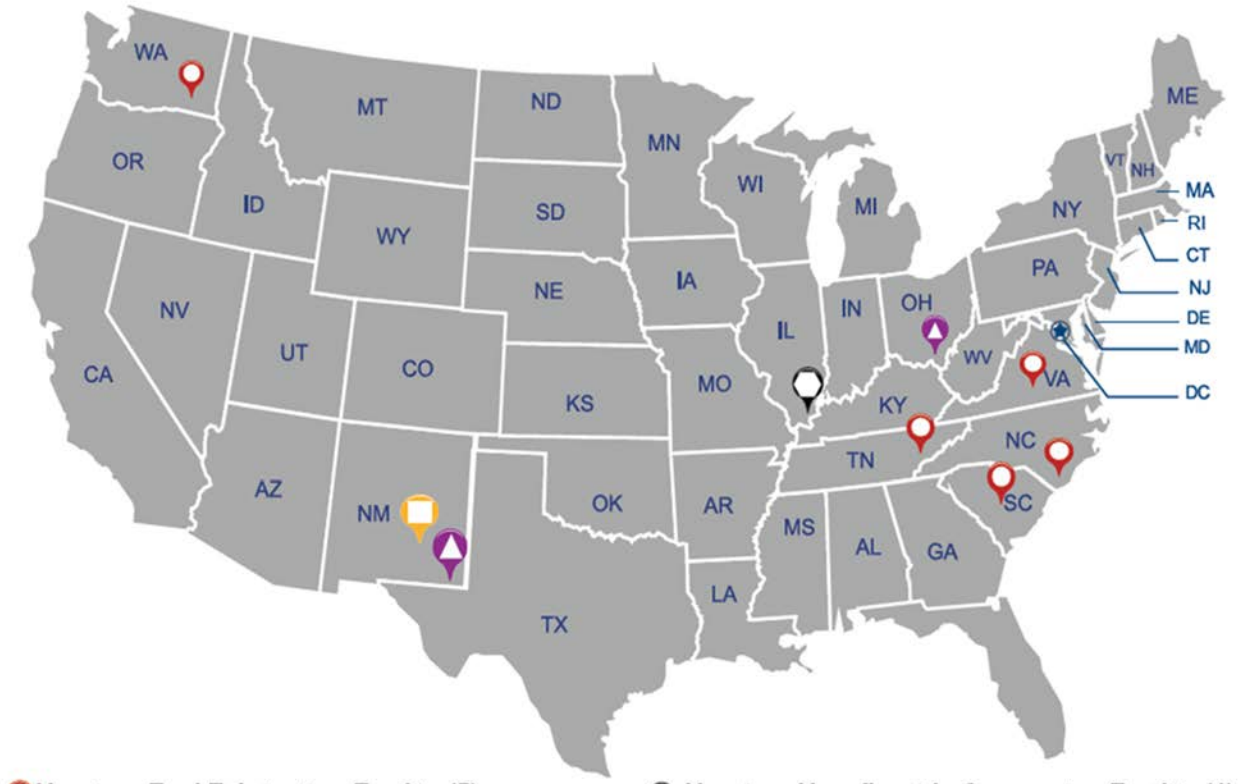
5 Fuel Fabrication Facilities (+1 application)

2 Enrichment Facilities (+1 in development)

1 Conversion Facility (+1 not built)

10 Greater Than Critical Mass (GTCM) Facilities

Significant Ongoing Activities



Note: Alaska and Hawaii are not pictured here and do not have sites. On January 5, 2021, the NRC issued a letter terminating the license for the GLE Laser Separation Enrichment Facility. For the most recent information, go to the NRC facility locator page at https://www.nrc.gov/info-finder/reactors/index.html.

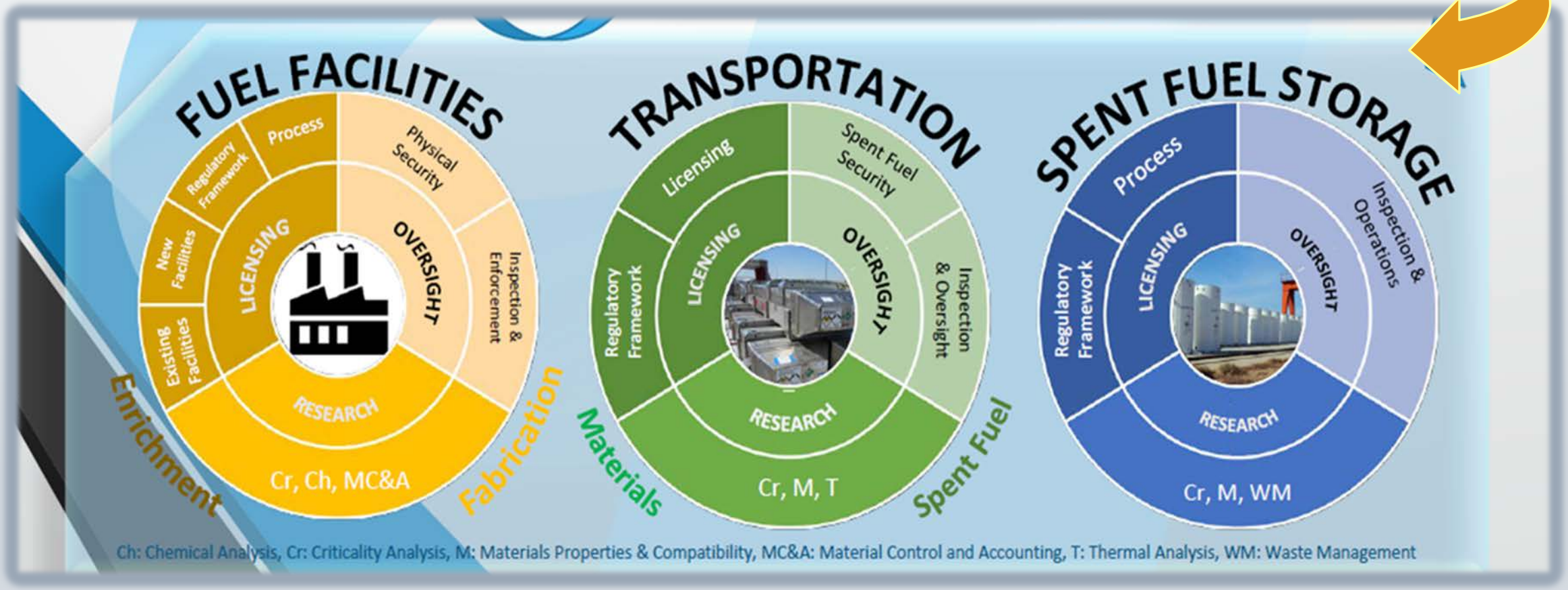
- **TRISO-X**: HALEU fuel fab
- **ACO**: HALEU production
- **NUREG-2212**: SRP for GTCM
- **GNF-A**: 8% enriched fuel
- **GNF-Natrium**: HALEU fuel
- **Framatome**: above 5% fuel
- **Sensor Concepts**: renewal
- **Westinghouse**: owner transfer
- **LES**: centrifuge assembly

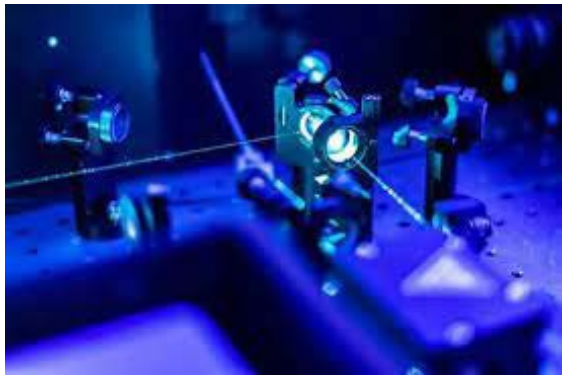
Significant Anticipated Activities

- **American Centrifuge Operating LLC:** Continued HALEU production
- **Global Nuclear Fuel - Americas:** Natrium HALEU fuel fabrication
- **Global Laser Enrichment:** Paducah laser enrichment
- **Niowave:** Mo-99 medical isotope facility
- **Framatome:** Criticality considerations for higher enrichment including HALEU

NEW FUELS ATLAS:

Readiness for new non-light water reactor FUELS





Oversight of Operating and Under-Construction Facilities

Lindsey Cooke, Fuel Facility Inspector

Division of Fuel Facilities Inspection | Region II

4,800	Hours of Direct Inspection Activities
93	Onsite Inspections Covering Focus Areas
21	Inspectors Assuring Mission Success
10	Facilities Inspected
4	Divisions Sharing Resources
2	Special Inspections
2	New Applicants Preparing for Construction
1	Licensee Preparing for Construction

Mission Focused

We focus on our mission of oversight for operating and under-construction facilities licensed in accordance with 10 CFR Part 70.

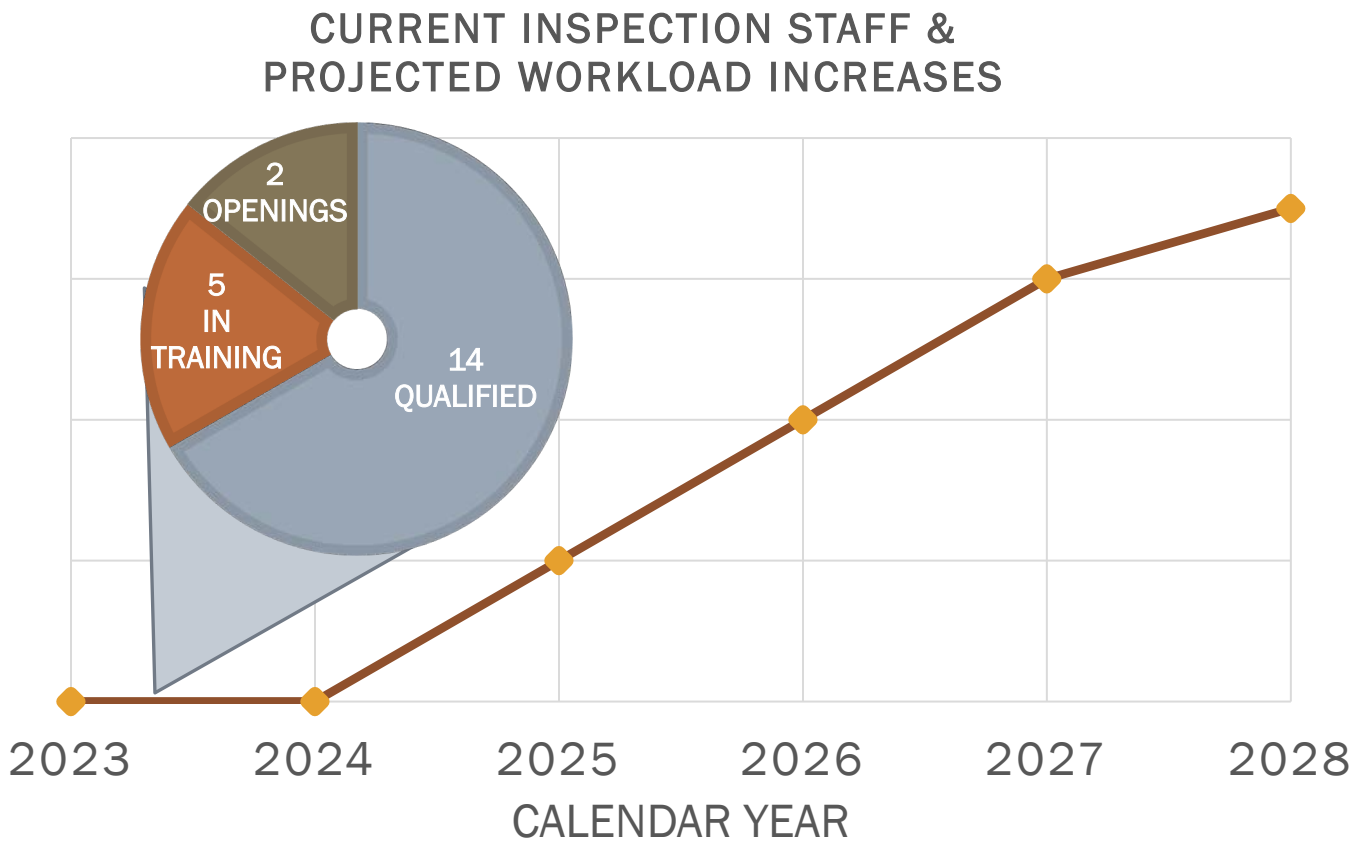
MISSION FOCUSED VALUES CENTERED PEOPLE DRIVEN

Ensuring Safety for Today and Tomorrow

INTEGRITY SERVICE OPENNESS	to and with stakeholders
COMMITMENT	to our mission and each other
COOPERATION	with our Program and Partner Offices
EXCELLENCE	in our oversight & organizational effectiveness
RESPECT	in all our interactions

Values Centered

We exhibit our values via technical excellence, cooperation, respect, inclusion, and proactive engagement with all our partners and stakeholders.



People Driven

We engage in hiring, executing agile qualification and training programs, and ensuring our workforce is prepared to drive our mission to success today and tomorrow.

MISSION FOCUSED
VALUES CENTERED
PEOPLE DRIVEN
Ensuring Safety for Today and Tomorrow

Update on Staff Activities Related to Security of Special Nuclear Material

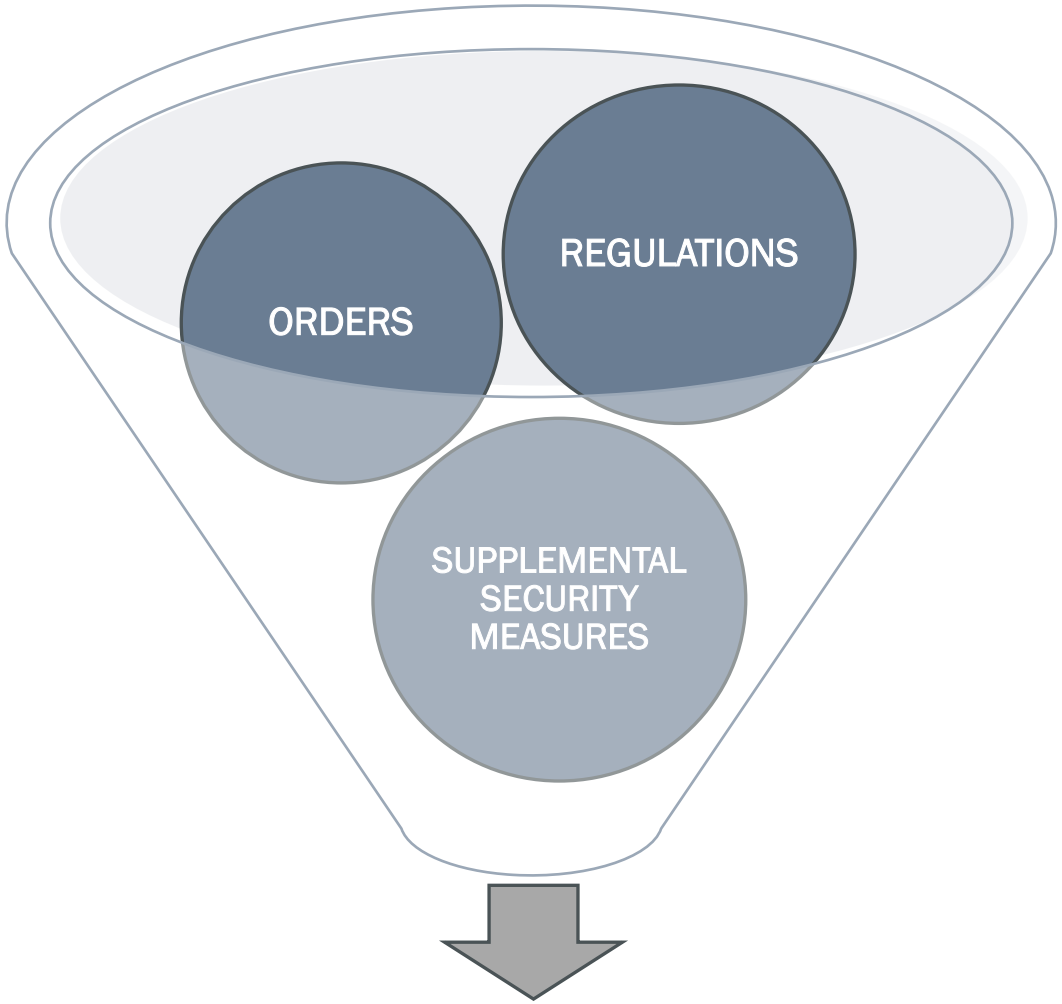
Becca Richardson, Deputy Director

Division of Physical and Cyber Security Policy | Office of Nuclear Security and Incident Response

Preparing for the Future

GRADED RISK-INFORMED APPROACH TO SECURITY

OPTIMIZING THE SECURITY REGULATORY FRAMEWORK



Preparing for the Future (continued)

Staff activities related to security of special nuclear material (SNM)

SECY PAPER IN RESPONSE TO SRM-SECY-19-0095

SRM-SECY-19-0095, “Discontinuation of Rulemaking – Enhanced Security of Special Nuclear Material” (ML21217A065)

STAKEHOLDER OUTREACH

Continuing to Support Licensing and Oversight

- NRC AUTHORIZATION OF CLASSIFIED NETWORKS AT ENRICHMENT FACILITIES
- PRE-LICENSING ENGAGEMENT
- PREEMPTION AUTHORITY

Closing Remarks

DANIEL H. DORMAN

EXECUTIVE DIRECTOR FOR OPERATIONS

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John Lubinski

- Director, Office of Nuclear Material Safety and Safeguards (NMSS)

Jacob Zimmerman

- Deputy Director, Division of Fuel Management, NMSS

Norma Garcia Santos

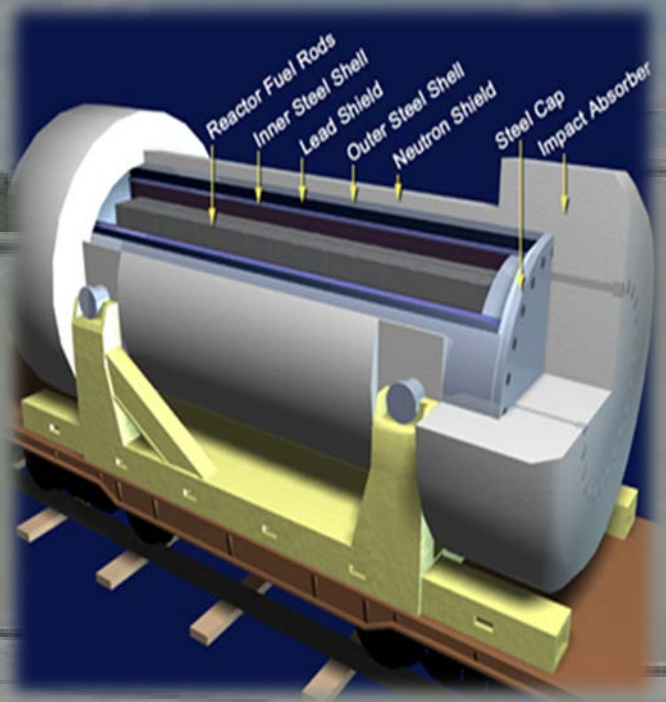
- Project Manager, Storage and Transportation Licensing Branch, Division of Fuel Management, NMSS

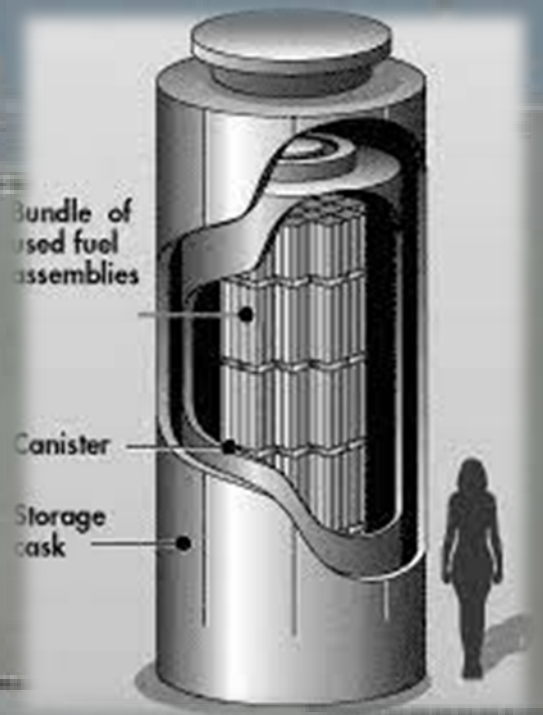
Mark Henrion

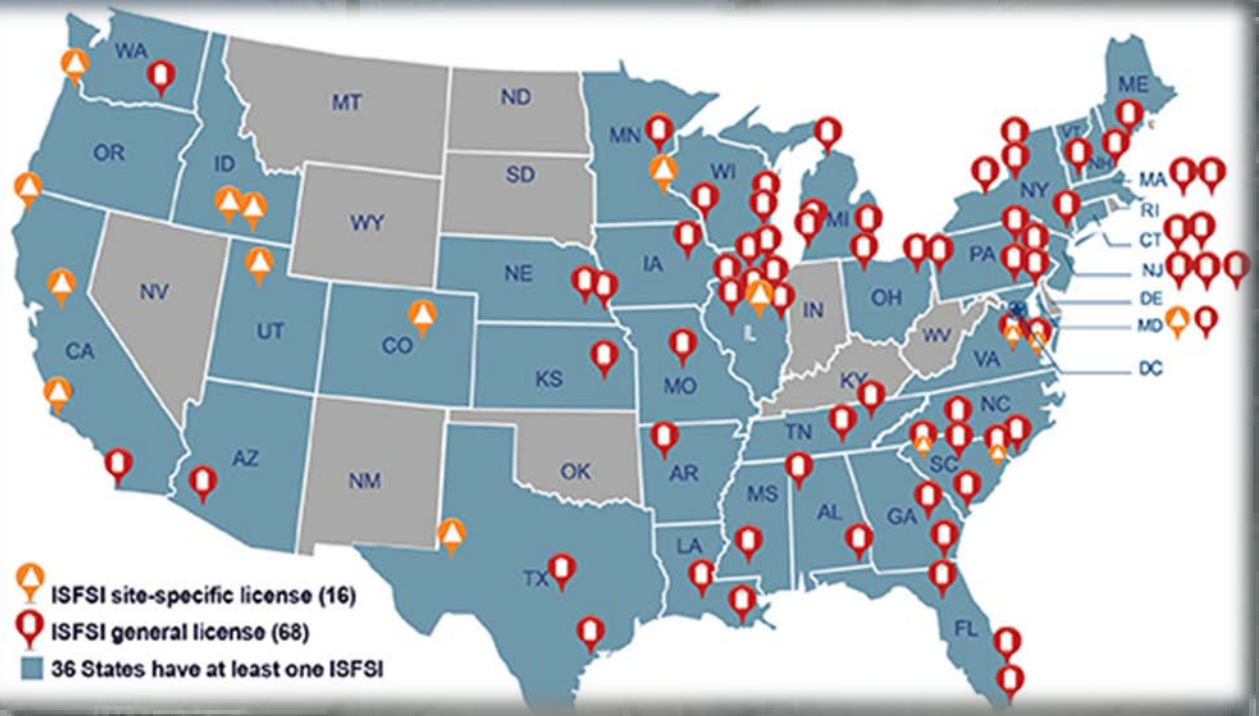
- Senior Health Physicist, Division of Radiological Safety and Security, Region I

John McKirgan

- Deputy Director, Division of Engineering, Office of Nuclear Regulatory Research





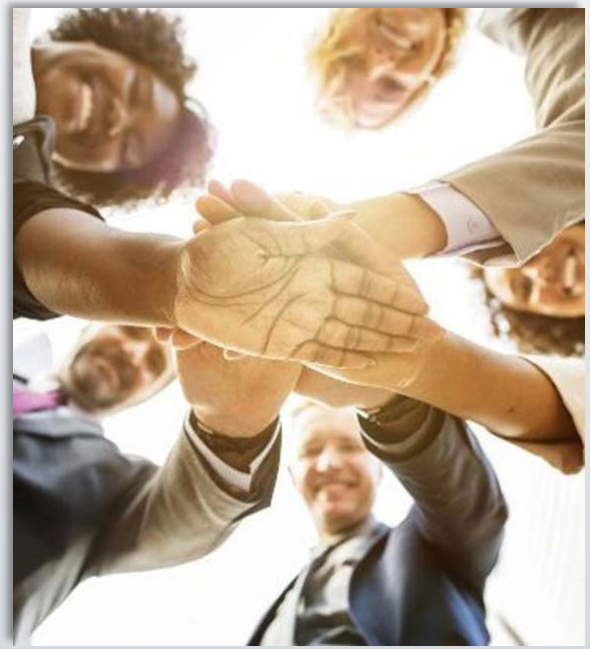


Strategic Overview of the Spent Fuel Storage and Transportation Business Line

John Lubinski, Director

Office of Nuclear Material Safety and Safeguards

People



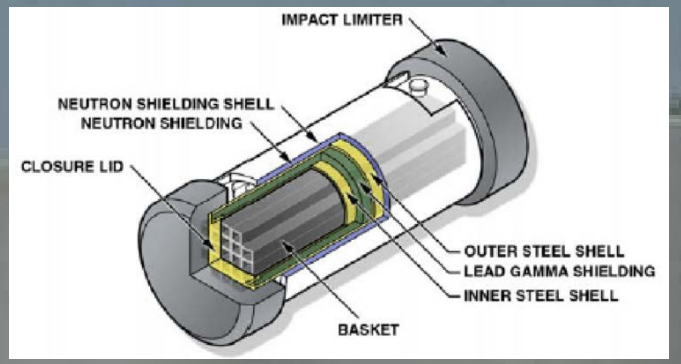
Recruiting, developing, and retaining our workforce

Trust

Enhancing public outreach and inspiring stakeholder confidence

Workload

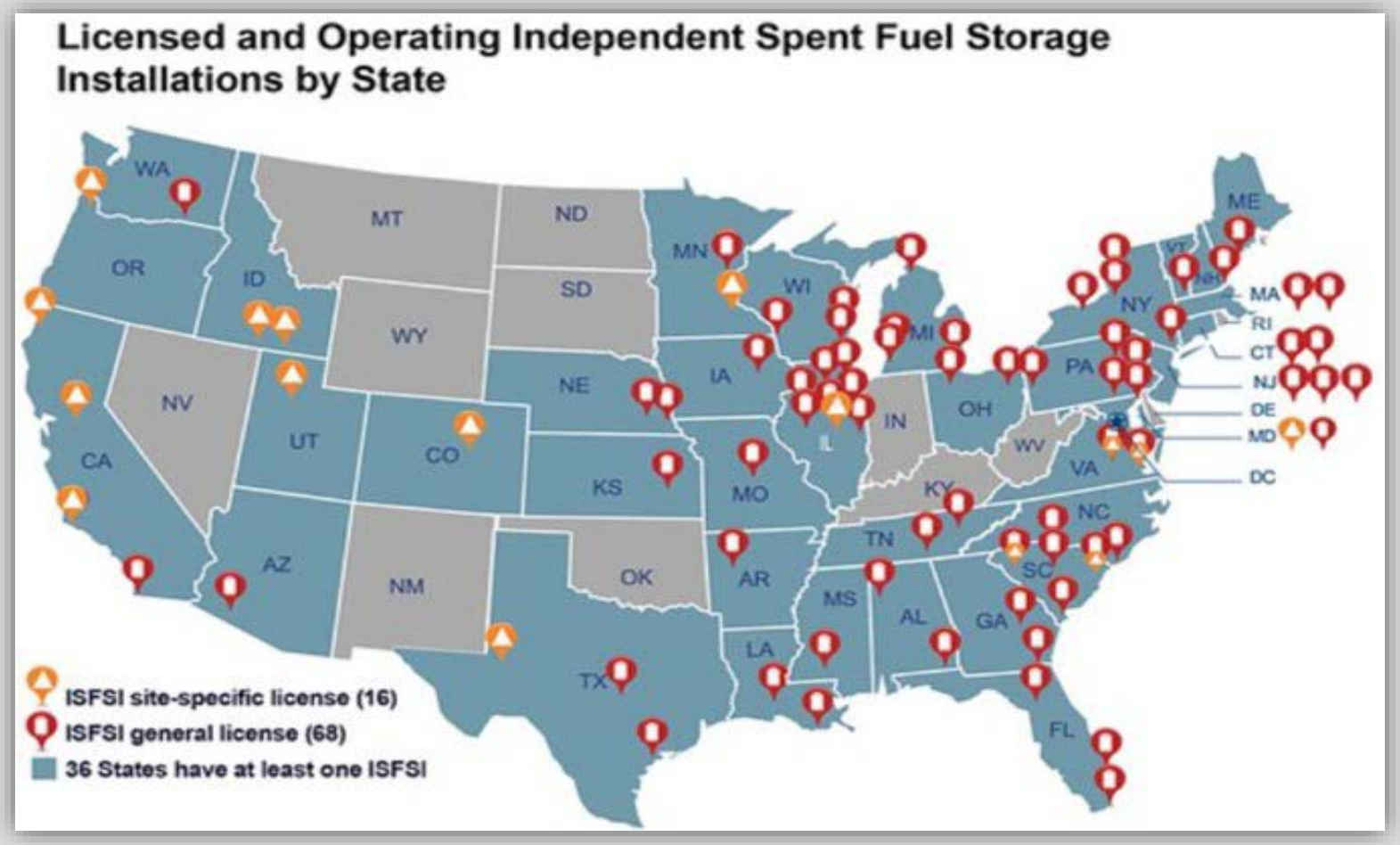
Leveraging technology to inform data-driven decision making

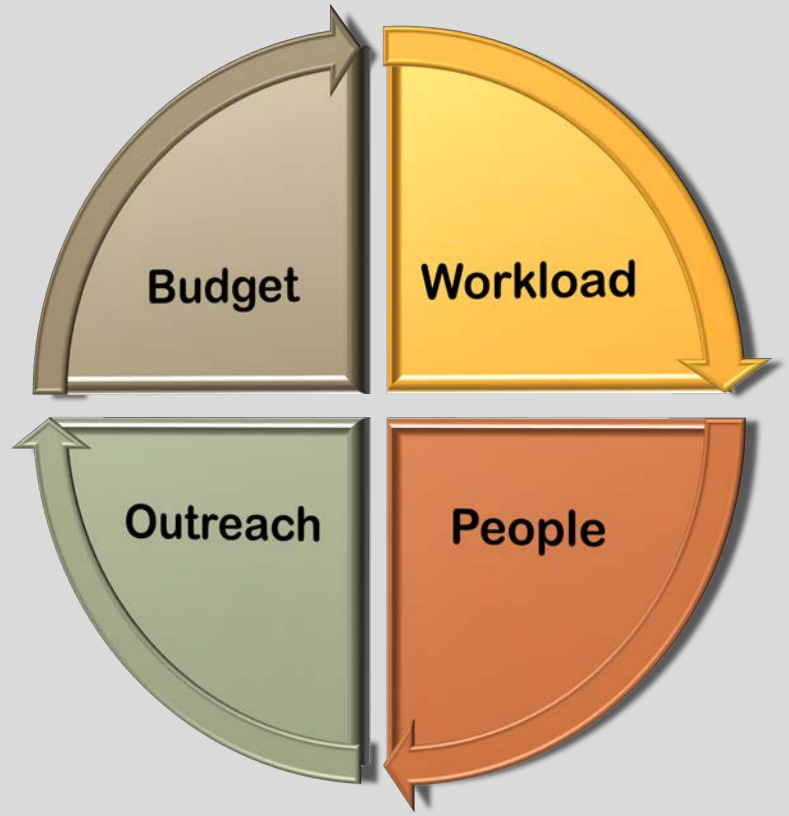


Spent Fuel Storage and Transportation Program Environment

Jacob Zimmerman, Deputy Director

Division of Fuel Management | Office of Nuclear Material Safety and Safeguards





Ensuring Safety and Security

Ensure the safe design, fabrication, and operation of casks and packages, as well as the secure loading operations of spent nuclear fuel.

Goal:
Consistent and Efficient Reviews

Risk Tool

- ✓ Facilitate acceptance reviews
- ✓ Risk-informed and knowledge-based tool
- ✓ Periodic assessments to identify improvements

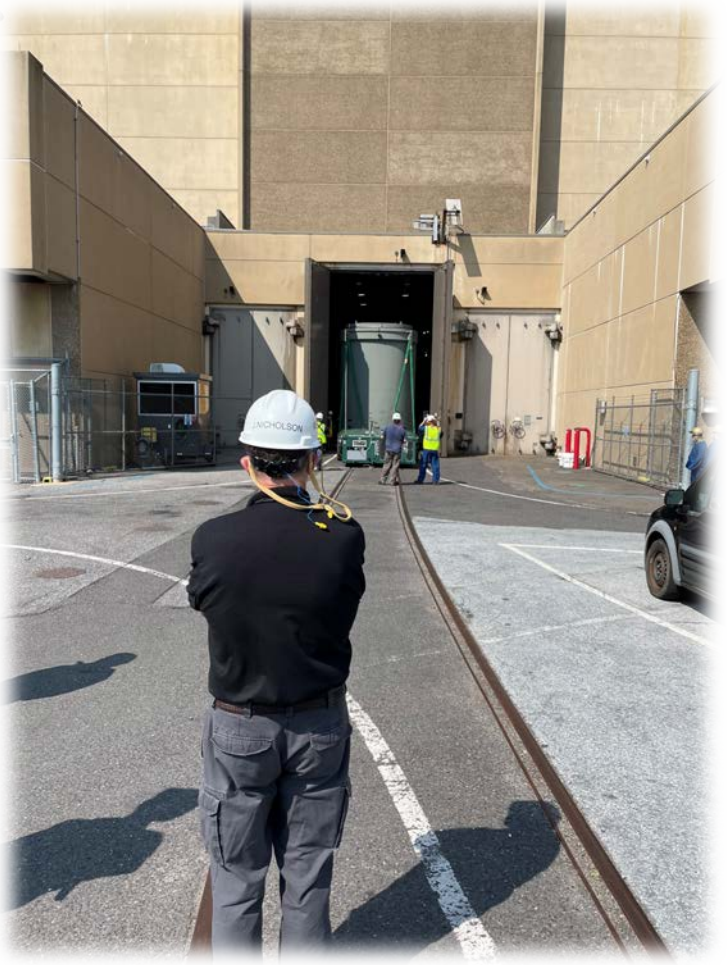
Early Engagement

- ✓ Identify cross-cutting issues
- ✓ Improve schedules
- ✓ Manage workload

Promoting Safety and Fostering Stakeholder Confidence

Apply risk insights, lessons-learned, and a variety of regulatory tools to perform reviews more consistently and efficiently.

Oversight Activities



- Calendar Year 2022, Completed:
  - ➢11 Inspections of Certificate Holders
  - ➢49 Inspections at ISFSIs
- Implementation and Evaluation of the Inspection Program
- Operating Experience Assessment
- Aging Management Inspections

Meeting NRC's Mission and Ensuring Compliance

Implement the inspection program to ensure that we meet our safety and security mission related to spent fuel storage and transportation of radioactive materials.

Spent Fuel Storage and Transportation Licensing Activities

Norma Garcia Santos, Project Manager

Storage and Transportation Licensing Branch |

Division of Fuel Management | Office of Nuclear Material Safety and Safeguards

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Protecting People and the Environment

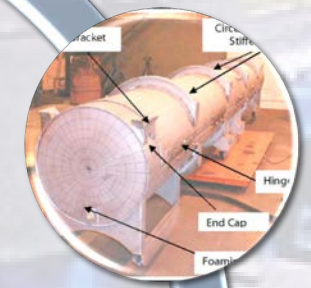
Accomplishments and Significant Licensing Reviews

Examples of Actions Completed

GE-Hitachi Morris subsequent renewal

TRAVELLER package amendment

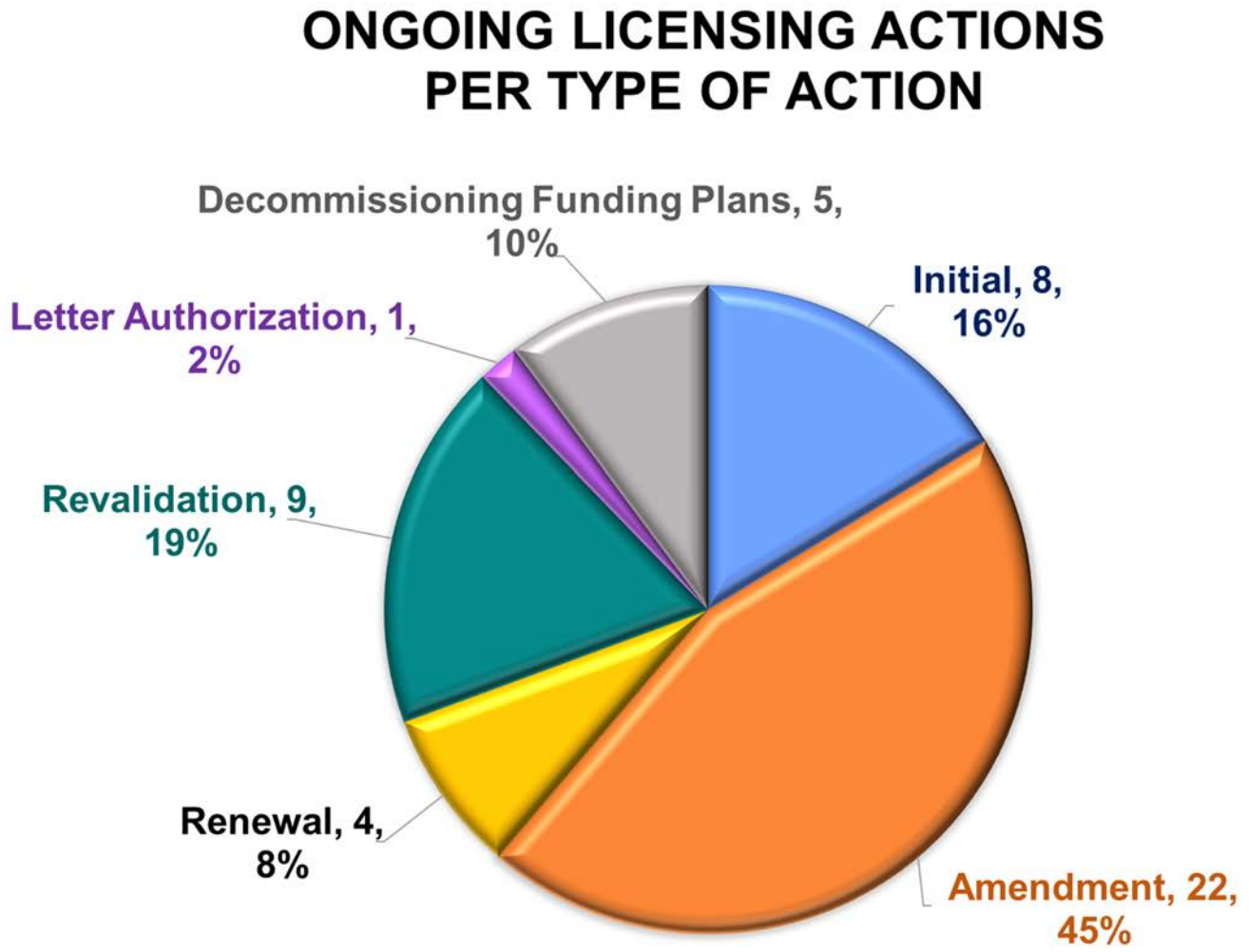
Processing a large number of licensing actions



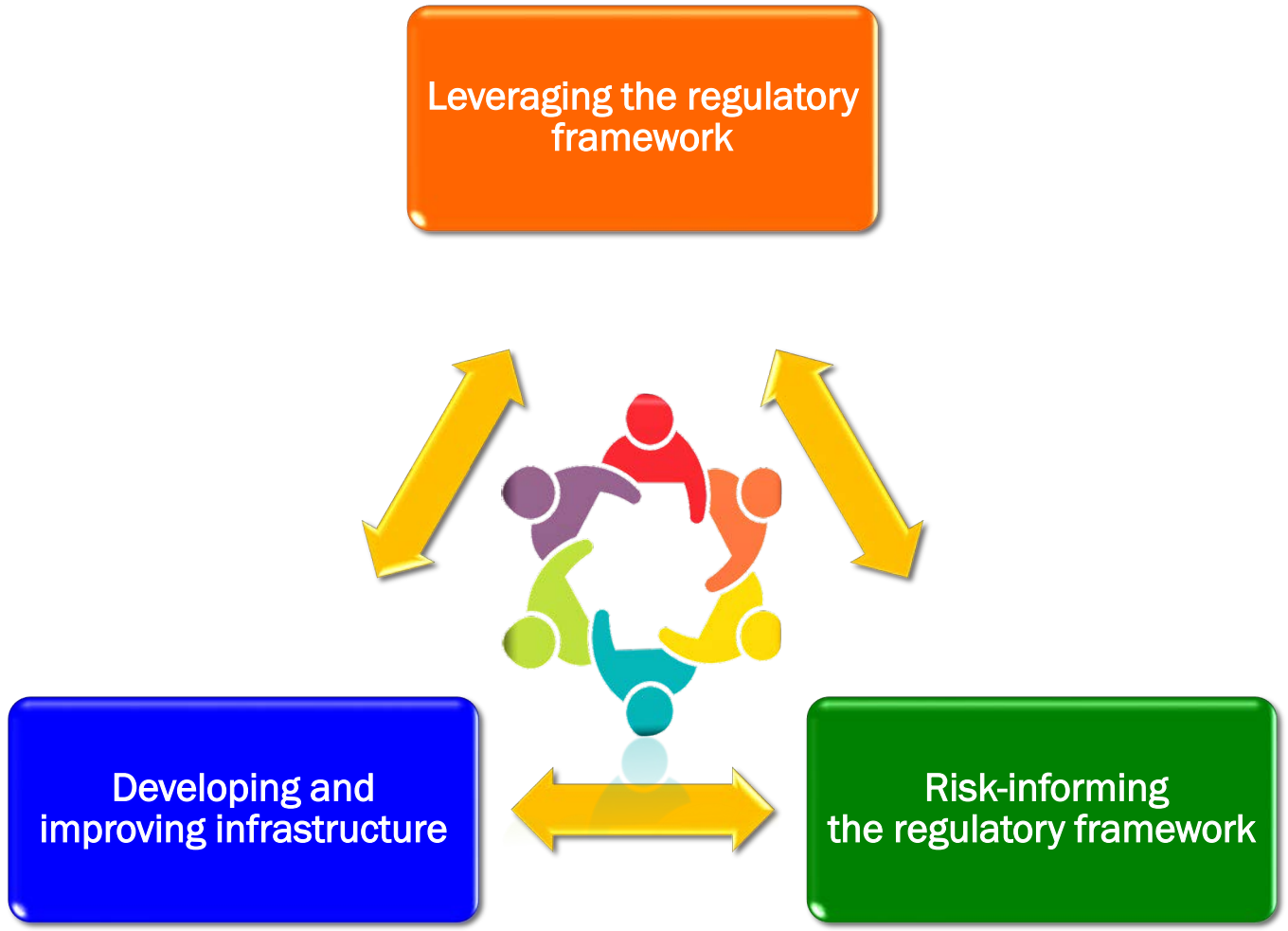
Fiscal year 2022 – 63 licensing actions completed

Fiscal year 2023 (Quarters 1 and 2 only) – 64 licensing actions completed

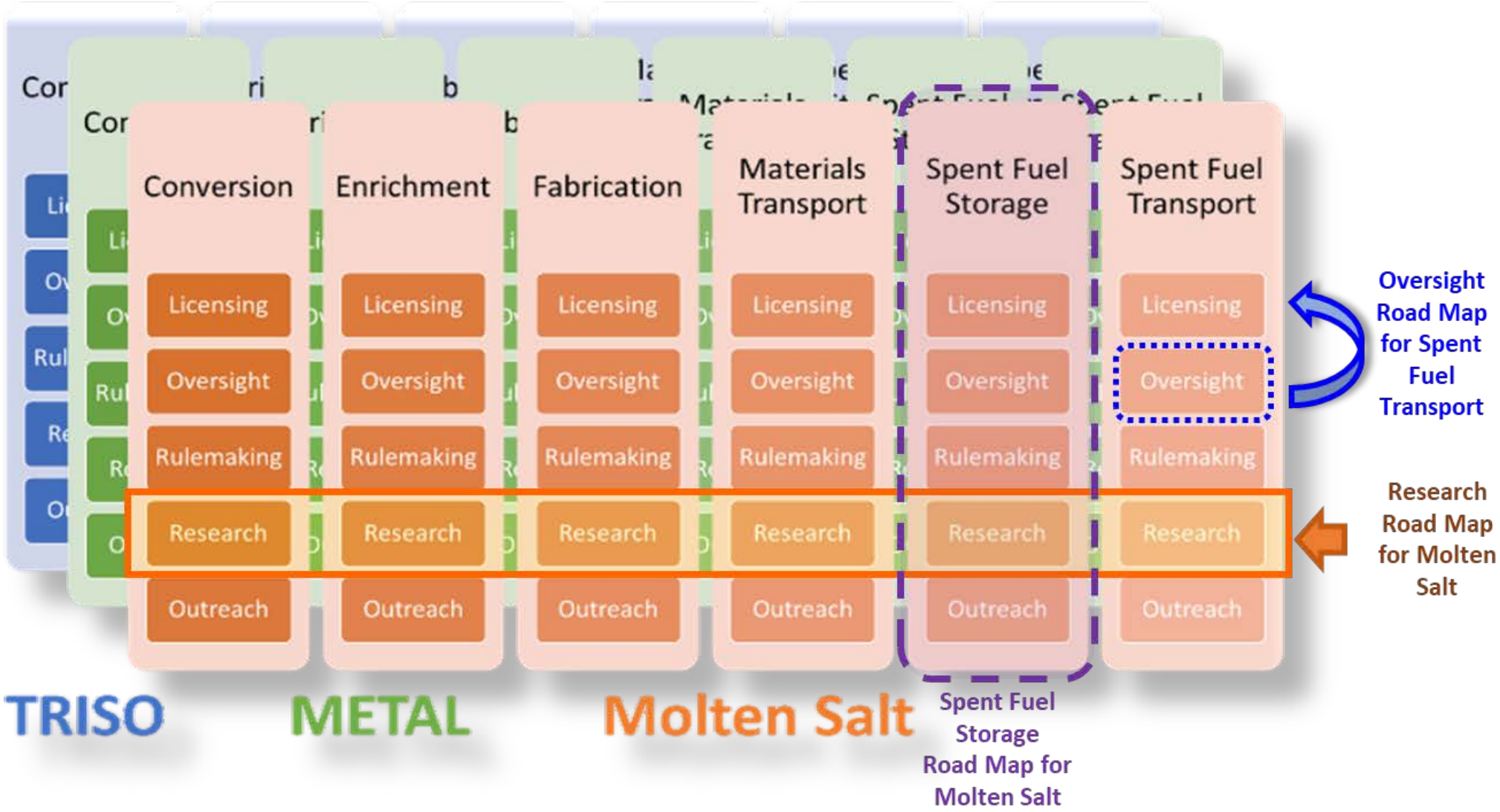
Accomplishments and Significant Licensing Reviews (Continued)

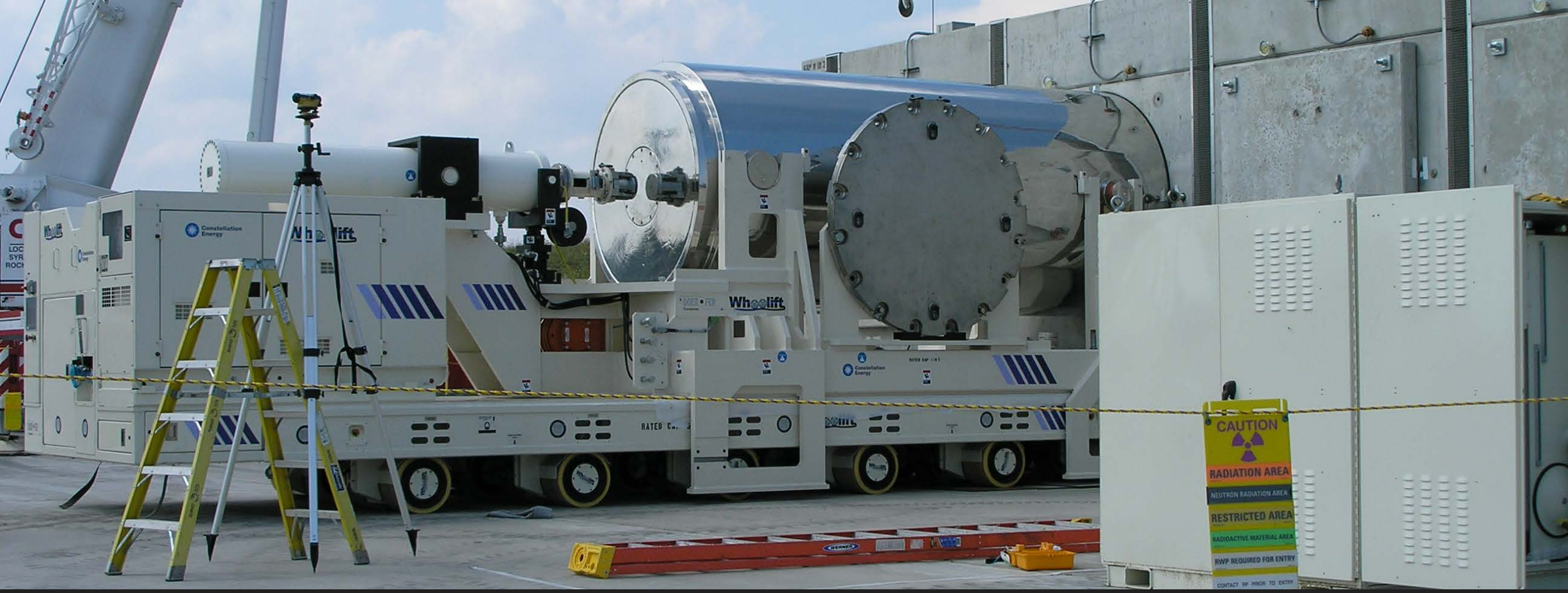


Spent Fuel Storage and Transportation Licensing Activities



New Fuels Atlas:
Regulatory Planner





Inspector Insights

Mark Henrion, Senior Health Physicist

Decommissioning, ISFSI, and Reactor HP Branch | Division of Radiological Safety and Security | Region I

Maintaining a Strong Focus on Staffing

Hiring new staff and qualifying new inspectors

IMC 1246, APPENDIX B3, TRAINING REQUIREMENTS AND QUALIFICATION JOURNAL FOR
INDEPENDENT SPENT FUEL STORAGE INSTALLATION INSPECTOR

Open Communication

Maintaining open communication and engagement with the public.

Working with Our NRC Counterparts to Disposition Complicated Issues

Safety Significant

Evaluate issue to determine regulatory actions, such as:
- Generic Issue Screening
- Order
- Backfit (72.62)

Address issue with appropriate regulatory tools, such as:
- Enforcement
- Order
- Consider Prompt Corrective Action

NOT Clearly in Licensing Basis

Clearly in Licensing Basis

VLSSIR

Limited effort to determine issue is **outside licensing basis and of (very) low safety significance:**
- Stop Pursuing to Full Resolution
- Document Decision with Bases
- Refocus Resources

Low Safety Significant

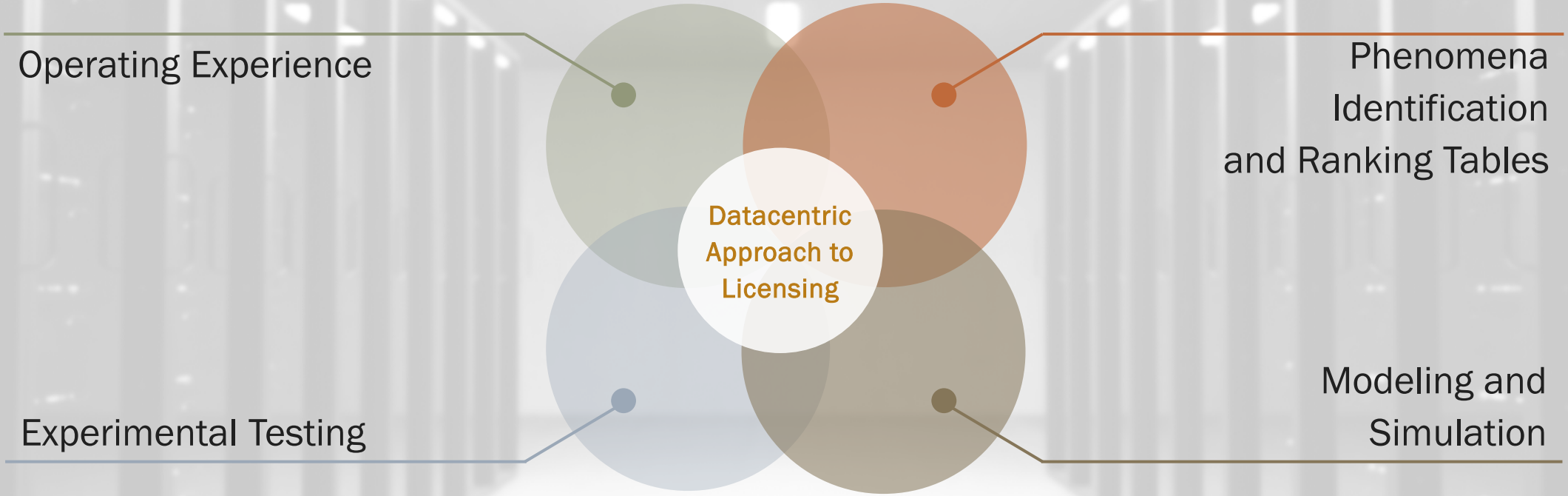
Address issue with appropriate tools (**achieve compliance or change licensing basis**), such as:
- Corrective Action
- Enforcement Discretion for past noncompliance
- Change Licensing Basis (72.7 Exemption, 72.56 Amendment, etc.)
- Change Requirement (Rulemaking)

Update on Spent Fuel Research Activities

John McKirgan, Deputy Director

Division of Engineering | Office of Nuclear Regulatory Research

DATA



be | READY

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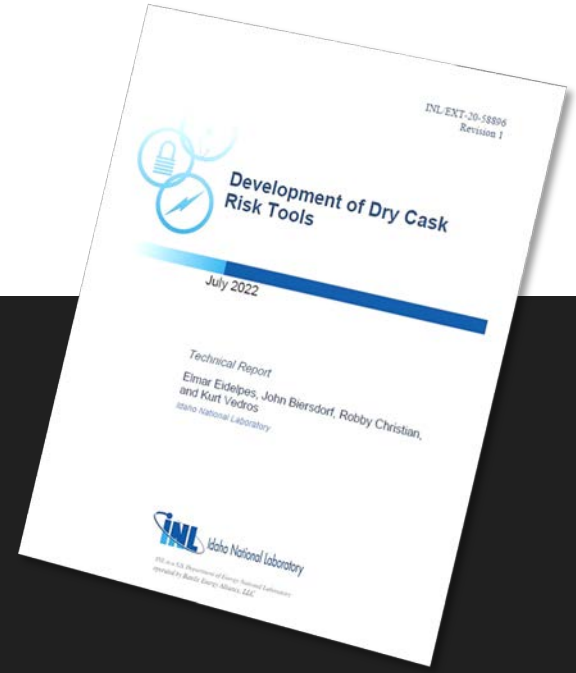
United States Nuclear Regulatory Commission
Protecting People and the Environment

TOOLS

- Risk-informed tools facilitate more efficient licensing reviews for spent fuel storage canisters.
- RES has developed risk-informed tools for spent fuel storage canisters.
- RES is supporting review of a risk-informed approach to transportation of microreactors.



be | READY

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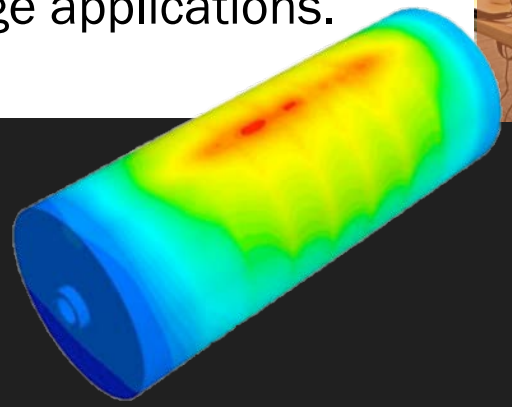
Protecting People and the Environment

TRAINING

- There is increased industry interest in putting hotter fuel rods in spent fuel storage canisters.
- Computational fluid dynamics can simulate the complex heat transfer mechanisms in canisters to inform safety decisions.
- RES subject matter experts recently produced a series of training seminars to instill the specialized skills needed to perform CFD analyses for spent fuel storage applications.



be | READY

In the Sibling Rod Project, an instrumented spent fuel storage container with high burnup fuel assemblies is collecting data.

RES staff participation is securing valuable validation and nondestructive examination data at a discount.

Observation of DOE ARPA-e activities provides early insights into advanced reactor waste forms and types.

It also provides insights into spent fuel treatment processes and different storage and transportation considerations.

be | READY

be | ENGAGED

Closing Remarks

DANIEL H. DORMAN

EXECUTIVE DIRECTOR FOR OPERATIONS

Acronyms

- ACO: American Centrifuge Operating
- ARPA-E: Advanced Research Projects Agency - Energy
- ATF: accident tolerant fuel
- CFD: computational fluid dynamics
- EPRI: Electric Power Research Institute
- GNF-A: Global Nuclear Fuels - America
- GTCM: Greater Than Critical Mass
- HALEU: High-Assay Low-Enriched Uranium

Acronyms (continued)

- ISFSI: independent spent fuel storage installation
- LES: Louisiana Energy Services
- MC&A: material control and accounting
- NMSS: Office of Nuclear Material Safety and Safeguards
- RES: Office of Nuclear Regulatory Research
- SNM: special nuclear material
- SRP: Standard Review Plan
- VLSSIR: Very Low Safety Significance Issue Resolution