

ISFSI Oversight: A Case Study in Transformative Leadership

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The Point of this Case Study:

- Change is difficult.
- You won't know if your change is transformative until you reach your desired endpoint and you look back to examine how you got there.
- It could be that the path you took, the methods you employed, and the leadership you exercised may indeed be transformative...
- If you believe it was transformative, capture it, celebrate it, train on it, and do it even better next time.



We have a lot of “eyes” on commercial nuclear operations...

NRC Inspection Teams
NRC Performance Indicators
NRC Resident Inspectors
INPO & WANO
ANI & NEIL

Nuclear Safety Review Board
Fleet/Corporate Assessment Board
Nuclear Oversight – Quality Assurance
Management Review
Individual

Internal Layers

- Employee, Programs, Processes, Procedures
- Management Review
- Nuclear Oversight/Quality Assurance
- Fleet/Corporate Oversight Assessment

External Layers

- Nuclear Safety Review Board
- American Nuclear Insurers (ANI)
- Nuclear Electric Insurance Limited (NEIL)
- Institute of Nuclear Power Operations (INPO)
- World Association of Nuclear Operators (WANO)

NRC Layers

- Resident Inspectors (2 to 3 per site)
- Performance Indicators
- Inspection Teams

Is There a Premise for Change?

- Is there a mis-match between the resources applied to oversight and the safety benefit realized?

Is There a Basis for Change?

- Do substantial margins of safety exist in the program?
- Has the understanding of the safety significance of the program evolved over time?
 - Safety margins
 - Technology
 - Experience

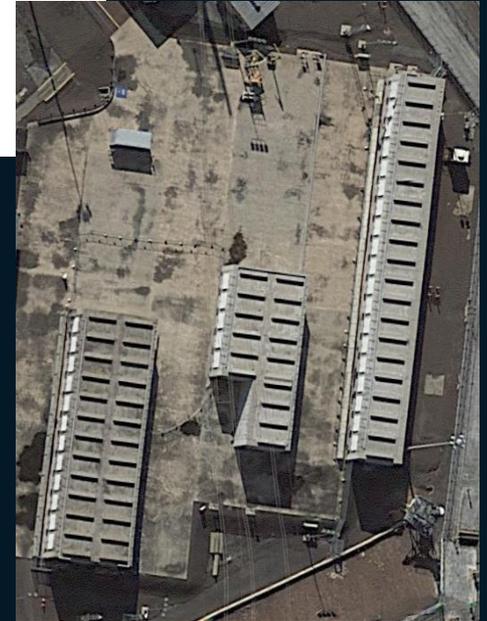
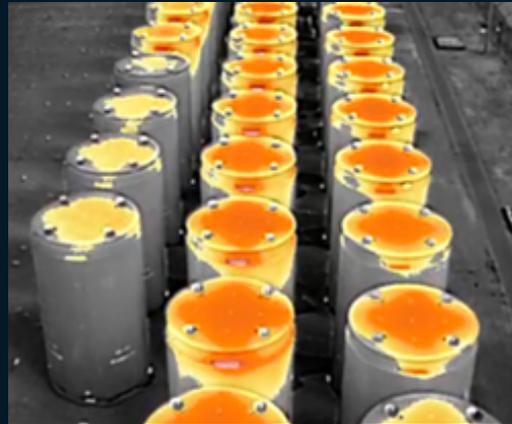
Safety Margins in Dry Fuel Storage

Dry storage technology is robust with significant designed-in safety margins:

- Mechanical integrity
- Source terms
- Thermal parameters
- Radiological parameters
- Fuel qualification
- Criticality

Technology Enhances Oversight

- Remote inspection of casks and ISFSI pads using drones:
 - Heavy haul path
 - Cooling vents/screens
 - DSC lids/bolts
 - Temperature
 - ISFSI pad condition
 - Electrical grounding
 - Housekeeping



Technology Addresses Gaps in Knowledge

- Remote inspection of canisters using robots provides data not previously available.
- Remote inspection reduces uncertainty in material condition while reducing occupational exposure and costs.
- Technological advances establish a sound basis for adjustments to oversight.



Dry Storage Experience

Used fuel inventory*

Approximately 83,978 MTU
Increases 2 - 2.4k MTU annually

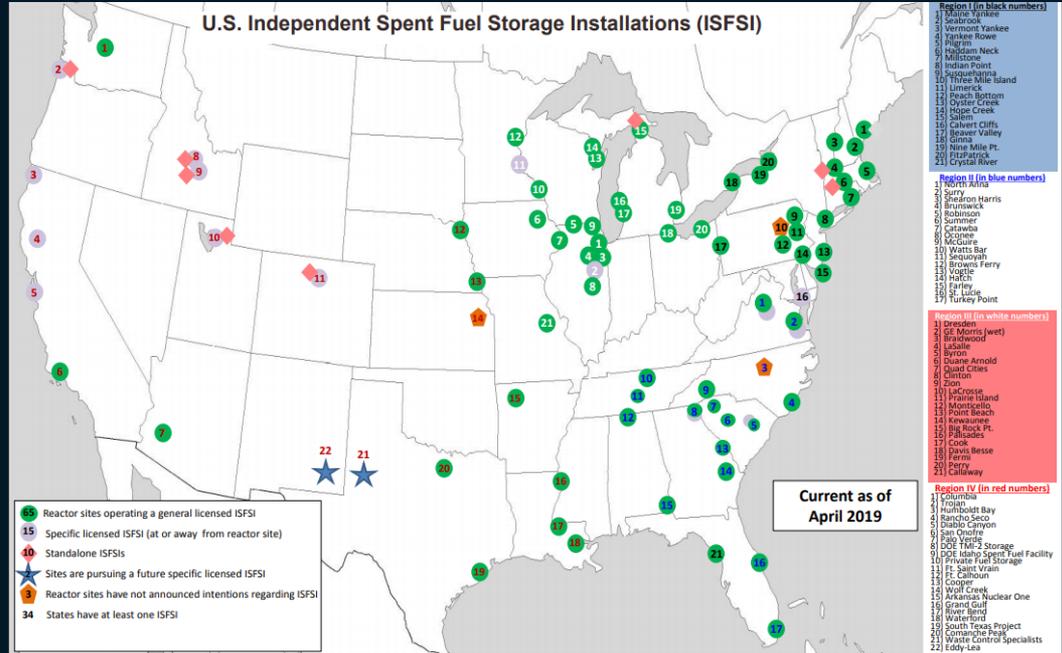
ISFSI** storage

140,492 assemblies
39,860 MTU (46%)
3,196 casks/modules loaded
73 Operating ISFSIs
72 dry storage, 1 pool
Eventually to be deployed at 76 sites
Fuel from 119 reactors

Long term commitment to ISFSIs

Licenses being extended to 60 years
Licenses extensions approved at 32 sites

Technology is mature



*As of December, 2019

** ISFSI = Independent Spent Fuel Storage Installation



Now...Back to the Case Study

NRC Management Recognizes an Opportunity for Transformative Change

- NRC Agency-wide Transformation Team formed (early 2018)
- NEI letter September 19, 2018, ROP recommendations
 - Recommendation 1H: “Eliminate Materials Inspections of the ISFSI”
- NMSS decides to focus on ISFSI in 2019

Considerations for Change (NEI view)

- An ISFSI has no moving parts.
- Conditions change very slowly with time, if at all, and have very small safety impacts.
- The majority of the things that could negatively affect safety originate during DSC loading, sealing and transfer to the ISFSI.

Conclusion: Maybe best to focus on the DSC loading and ISFSI transfer activities?

But Change is Not Easy!!!

- Setting the parameters for change is hard
- Defining the change is complicated
- Organizational inertia resists change
- Public stakeholders need to be informed of any change
- Change occasionally generates external controversy

Result: It is easier to not change.

NRC Approaches Change in A New Way

Unique ISFSI Project Enhancement Team Charter:

- Led by Regional staff
- Broad latitude for... “developing a clearer risk-informed, comprehensive and consistent approach to ISFSI inspections across the four regions.”
- Included a communications plan
- Appropriately involved external stakeholders
- Established a schedule for deliverables

The Team Delivers on all Charter Elements

Demonstrates the transformational value of:

- A “bottom up” approach to leadership;
- Using a team of personnel close to the issue;
- Creating an environment encouraging innovation;
- Listening to and promoting diverse opinions, and
- Communicating internally and externally.

In the end, this approach facilitated agency decision-making.



NEI believes the approach taken by NMSS's ISFSI team can serve as a model for future transformational change.