



NUCLEAR ENERGY INSTITUTE

Rod McCullum

26th Annual NUPIC Vendor Meeting
June 21, 2017

Decommissioning – Avoiding it by doing it more efficiently



NATIONAL NUCLEAR ENERGY STRATEGY

CREATE THE NUCLEAR IMPERATIVE

DEFEND

Defend our exemplary fleet through reformed electricity markets

SUSTAIN

Create sustainability via improved regulatory framework and reduced burden

DEPLOY

Innovate, commercialize, and deploy new nuclear

THRIVE

Compete globally



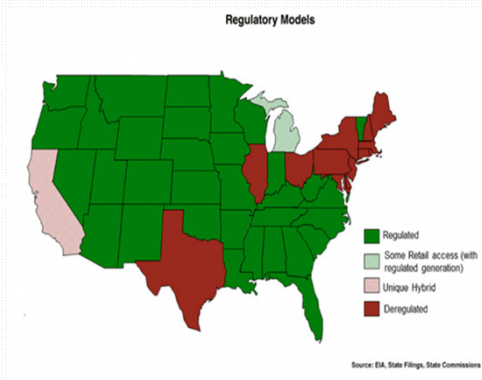
Decommissioning Landscape

- NRC has a proven regulatory framework for decommissioning activities
 - Regulations for Permanent Defueling, SAFSTOR, Radiological Decommissioning, & Spent Fuel Management are well established
- 11 plants have safely completed decommissioning
- 19 plants are in the process of decommissioning
- 7 plants planning near term shutdown
- There currently is no regulatory framework to govern the transition from operations to decommissioning

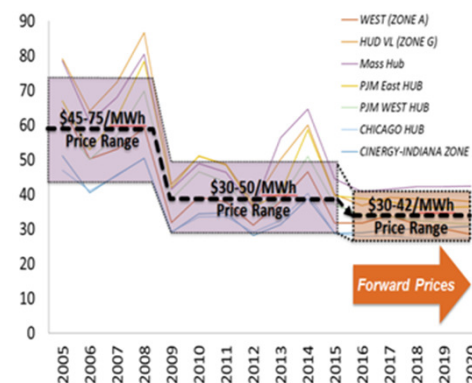


Drivers of Early Shutdown Decisions

- For plants shutting down prior to the turn of the century, early shutdown decisions were less complicated/dynamic
- Then the world changed....



Declining Wholesale Electricity Prices



Early Plant Shutdowns

Plant	MWe	Closure Year	Latest Electricity Generated (billion kWh per year)	Latest CO2 Emissions Avoided (million tons/year)
Crystal River 3	860	2013	7.0	5.3
San Onofre 2 & 3	2,150	2013	18.1	8.8
Kewaunee	566	2013	4.5	4.8
Vermont Yankee	620	2014	5.1	2.7
Fort Calhoun	479	2016	3.5	3.7
Palisades	811	2018	5.8	5.0
Pilgrim	678	2019	5.0	2.6
Oyster Creek	610	2019	5.3	4.4
Three Mile Isle. 1	837	2019	6.8	5.2
IPEC 2 & 3	2,083	2020/21	16.6	8.5
Diablo Canyon 1 & 2	2,240	2025/26	18.5	8.5

11,938 MWe of baseload capacity

59.5 million short tons of CO₂ avoided

14% of Clean Power Plan's 2030 414-million-ton target

Over 9,500 direct jobs



Efficiency Opportunities

- Smooth transition from operating to decommissioning regulations
- Best use of resources
- Innovative business models
- Minimizing the impacts of used fuel

explanation of
the main idea



Smooth Regulatory Transition

- Industry Supports Timely, Focused NRC Rulemaking
 - Transition from operations to decommissioning is unnecessarily inefficient & costly
 - Licensing actions take 12-18 months to complete and cost millions
 - NRC has a proven regulatory framework for assuring the safety of decommissioning activities
 - A regulatory framework that efficiently governs the transition from operations to decommissioning by eliminating unnecessary barriers and licensing actions is needed



Smooth Regulatory Transition

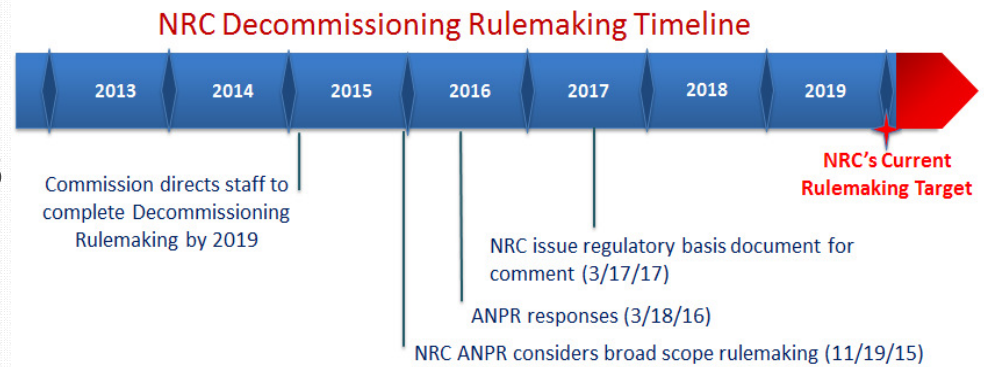
- The transition in requirements should be operable by rule – eliminating the need for exemptions and license amendments – at the following points:

Transition Points	What is Transitioning
Post Shutdown – certification of permanent cessation of operations/removal of fuel from reactor vessel	Emergency Preparedness (EP), Security, Work Hours, Staffing/Training, Use of Trust Fund for Spent Fuel Expenses
Permanently Defueled – No possible design basis accident with offsite consequence & ability to mitigate beyond design basis accident	EP, Insurance
All Fuel in Dry Storage	EP, Security, Staffing/Training, Foreign Ownership
All Fuel Removed from Site	EP, Security



Smooth Regulatory Transition

- Ongoing NRC rulemaking is generally headed in right direction
- NRC's Draft regulatory basis soundly supports changes to improve the efficiency of transition – but leaves open door for other changes
- Progress has been slow
- Comment period closed 6/13



Smooth Regulatory Transition (not)

From NRC presentation 5/4/2016 (the same views were echoed in a 9/16/2016 letter from 14 members of Congress to the NRC Chairman)

Representative Comments

- Against relaxation of requirements with fuel still in the pool / transfer fuel to ISFSI ASAP
- Increase involvement of State and local governments and public groups / require CAP
- Against SAFSTOR / 60 years too long
- NRC should approve PSDAR / reinstate DP
- Increase decommissioning funding oversight
- Supportive with specific suggestions

Congress of the United States
Washington, DC 20540
September 16, 2016

The Honorable Stephen G. Russo
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20540-0001

Dear Chairman Russo:

We write to you today regarding the Nuclear Regulatory Commission's (NRC) proposed rulemaking for the decommissioning of nuclear power plants under the Regulatory Commission's (RC) Plan for Decommissioning Activity Report (PDAR) to be approved by the Nuclear Regulatory Commission. The decommissioning of a nuclear power plant has a significant impact on local communities, making it critical that the rules governing this process be more comprehensive, transparent, and inclusive.

The NRC's rulemaking reflects feedback on a number of questions, specifically:

- Issues discussed in NRC's (2015) rule, such as the gradual approach to emergency preparedness, issues related to the plan that have already for one country going through the decommissioning process, the availability of requiring a license's Plan for Decommissioning Activity Report (PDAR) to be approved by the Nuclear Regulatory Commission, the appropriateness of maintaining the three existing criteria for decommissioning and the standard associated with those criteria, the appropriate role of State and local governments and non-governmental stakeholders in the decommissioning process, and any other issues raised by the NRC's proposed rulemaking.

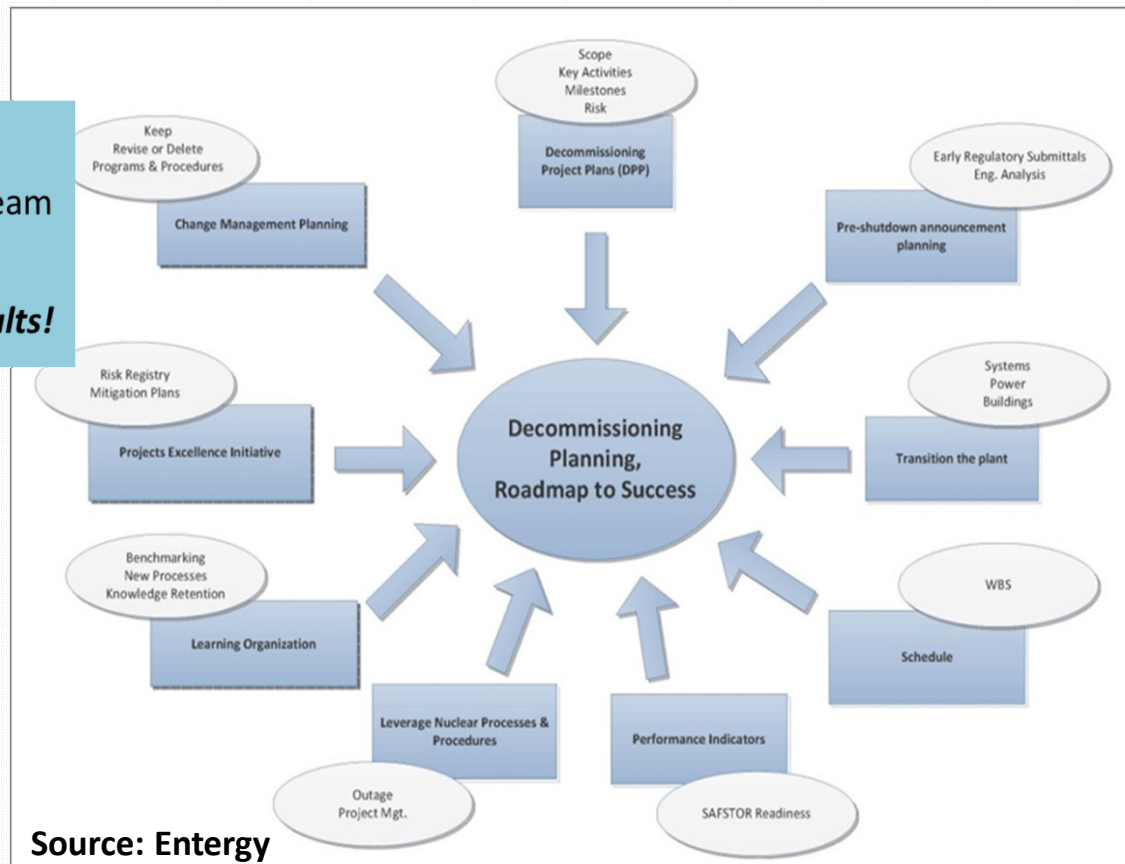
We support the NRC's plan to develop a rulemaking to replace the current rule, which the NRC plans to submit to the Commission in a future rulemaking. As such, we were pleased to see the Commission's rule to authorize its current rulemaking to develop a more comprehensive decommissioning framework.

However, we are concerned by recent reports calling on the NRC to review the scope of this rulemaking. These reports have suggested that the NRC focus first on the standardization of emergency response, with differing considerations of the broader decommissioning process such as whether or not PDARs should be required, and the proper role of state and local government stakeholders. We believe that the NRC should first focus on the standardization of emergency response and then on the broader decommissioning process, and we support the NRC's plan to develop a rulemaking to replace the current rule, which the NRC plans to submit to the Commission in a future rulemaking.

Best Use of Resources




Map the Critical Steps

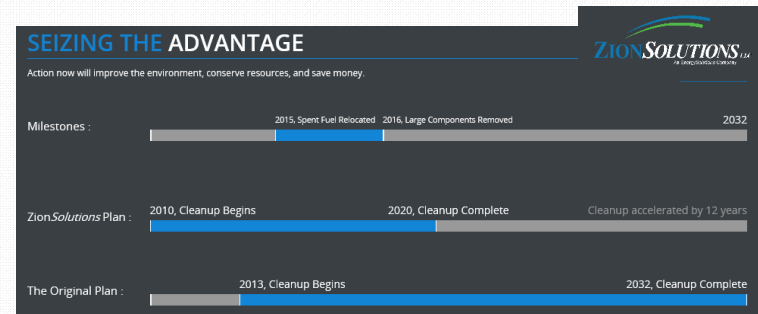
- Develop Strategy & Build The Team
 - Implement the Plan
 - ***Deliver Predictable Results!***



Innovative Business Models

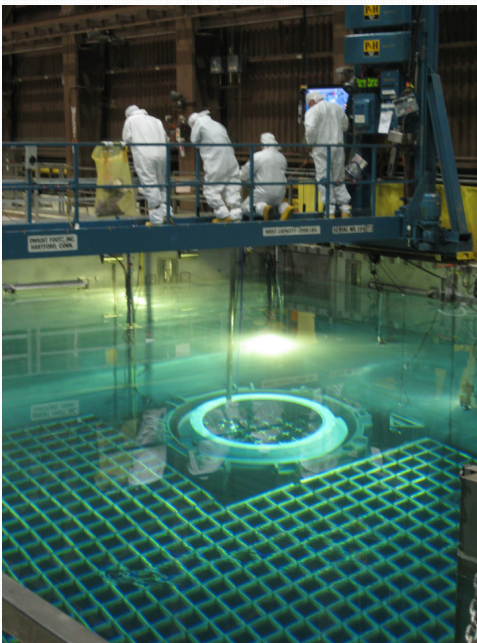
- Align work with core business competencies
- Timely, compliant decommissioning
- Optimize NDT funds
- Accelerate spent nuclear fuel transfer to dry storage
- Employee and Community commitment

Principled Approach	 Entergy	 NorthStar	 VERMONT
<i>Business Alignment</i>	Strategic Alignment <i>Focus on nuclear operational excellence</i>	Team Core Competency <i>Decon & Demo & Waste Disposal</i>	Economic Impact <i>D&D work and re-develop site promptly</i>
<i>Risk Management</i>	Risk Management <i>Aligns with core competency</i>	Financial Assurance <i>GFP, Bonding & Support Agreement</i>	Confidence <i>On-time, on budget, health & public safety</i>
<i>Schedule Certainty</i>	Commitment <i>Fulfills 2013 commitment to State Accelerate Fuel on Pad</i>	Accelerate Decom <i>Committed Schedule (2021 – 2030)</i>	Certainty <i>Regulatory & contractual commitments</i>



Minimizing the Impacts of Used Fuel

Accelerated transfer of fuel to dry cask storage provides for more efficient progress through decommissioning transition points – dramatically reducing costs



Source: Holtec International



Source: AREVA TN Americas



NAC MAGNASTOR spent fuel casks on the Zion ISFSI pad.

Source: NAC International

Zion – 61 Dry Storage
Systems loaded in 52 weeks



Minimizing the Impacts of Used Fuel

Shutdown Sites Without An Operating Reactor

- **California**

- Humboldt Bay
- Rancho Seco
- San Onofre

- **Colorado**

- Ft. St. Vrain

- **Connecticut**

- Connecticut Yankee

- **Florida**

- Crystal River

- **Illinois**

- Zion

- **Maine**

- Maine Yankee



Humboldt Bay



Rancho Seco



Trojan

- **Massachusetts**

- Yankee Rowe

- **Michigan**

- Big Rock Point

- **Nebraska**

- Ft Calhoun

- **Oregon**

- Trojan

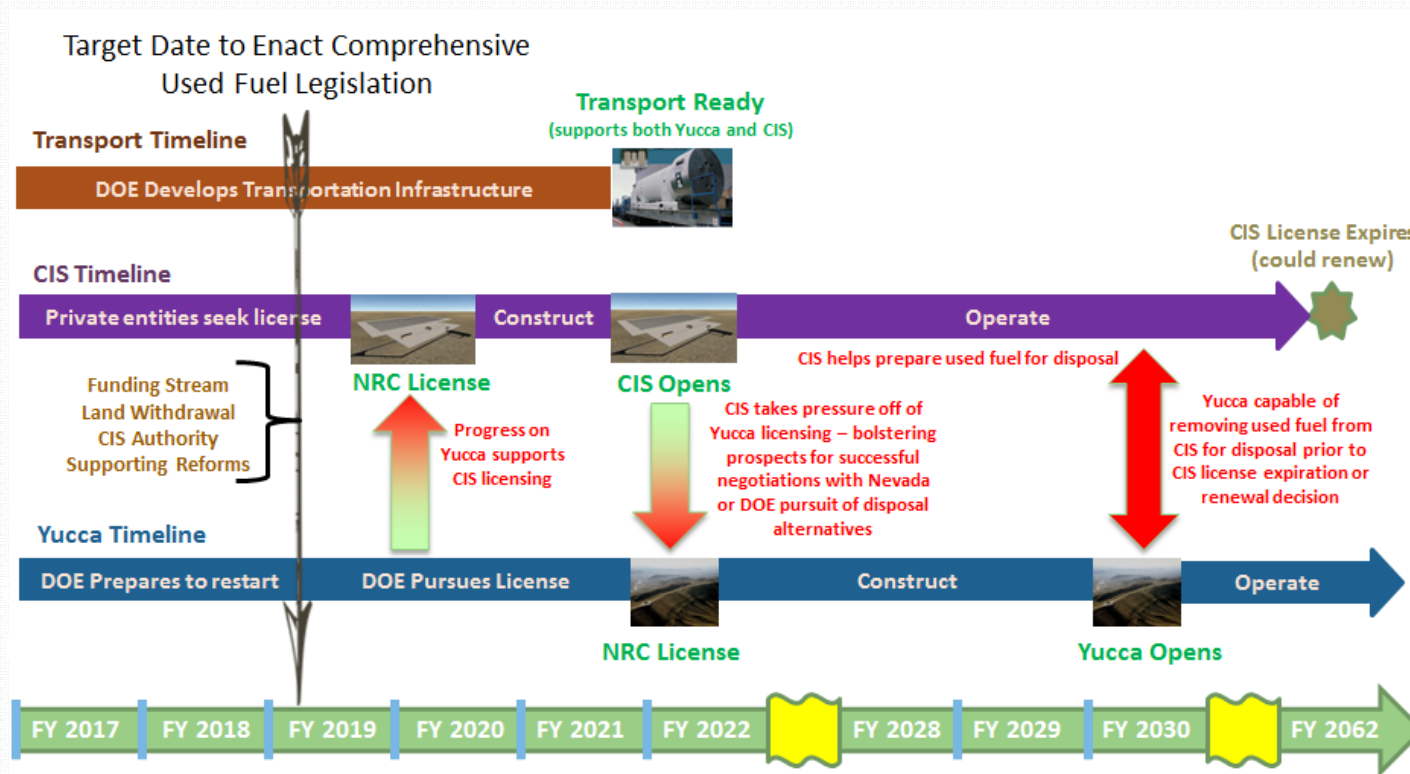
- **Vermont**

- Vermont Yankee

- **Wisconsin**

- LaCrosse
- Kewaunee

Minimizing the Impacts of Used Fuel



Industry Challenge

Develop innovative approaches to reduce “days, dollars and dose” in decommissioning, reduce regulatory burden, execute efficient removal and disposal of waste, partner with communities

