

# D&D Track Panel 22: March 16, 2015

15:15 - 17:00

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## **Global Emerging Issues and Strategies** **Focus: Why Immediate Dismantling is Being Preferred Over Deferred Dismantling**

### **Panelists**

**Mr. Jeff Hays**, *Vice President of Decommissioning, AREVA*

**Dr. Claudio Pescatore**, *Principal Administrator, OECD-NEA Decommissioning*

**Mr. Bruce Hinckley**, *Vice President of Decommissioning, HOLTEC*

**Mr. Tom LaGuardia**, *Managing Member, LaGuardia & Associates*

**Dr. Laurence Piketty**, *Director of Nuclear Decommissioning; CEA*

### **Co-Chairs**

**Dr. Jas Devgun**, *Sargent & Lundy*

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# Immediate Dismantling vs. Deferred Dismantling

\*Remarks by Dr. Jas Devgun

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## “Why is this topic important

- Post Fukushima environment difficult for older reactors
- Harder to remain cost competitive
- Many likely to shutdown for economic and other reasons (before their licensed operating period ends)
- Projections show a steeper upswing in the D&D of power plants -worldwide
- “wait & see” strategy and “deferred dismantling” no longer acceptable in many cases

## Why “Immediate Dismantling” is more advantageous and a preferable option

## Another important topic

The shrinking “decommissioning cavalry”

# DECON vs SAFSTOR

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DECON: Equipment, structures, removed or decontaminated to a level that permits radiological release (generally without restrictions)

Time frame:  $\approx$  10 years

SAFSTOR: Plant placed in a safe, stable condition and maintained in that state for long periods of time until subsequently it is decontaminated to levels that permits radiological release of the site

Time frame:  $\approx$  60 years (max)

# Immediate Dismantling vs Deferred Dismantling

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## Many factors may contribute to this

- Regulatory Requirements (e.g., NRC in US)
- Multi-unit sites
- State intervention
- Public intervention
- Decommissioning fund status
- Maturity of technologies (D&D – a mature industry)
- Retaining the knowledge of plant staff
- Land reuse

Should optimized decommissioning option be assessed for each individual nuclear facility?

# US DECON and SAFSTOR Options

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- 10 CFR 50.82 requires decommissioning to be completed in 60 yrs
- Bases for maximum: SAFSTOR for 50 yrs + 10 yrs for decommissioning.
  - Radiation dose rates reduced to 1 - 2 %
  - Co-60 decay
  - Radioactive waste volumes reduced to 10%
  - Allows decommissioning fund to increase
- Coincidentally, the time frame corresponds well with 20 year life extension for multi-unit sites
  - Initial incense 40 yrs
- 10 fully decommissioned (DECON)
- 13 being decommissioned (6 in DECON and 7 remain in SAFSTOR)
- Example of SAFSTOR: Dresden 1 in Morris, IL since late 1970s; Units 2 and 3 are still operating

# Technologies are Mature

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- Proven techniques and equipment are available for D&D
- Most technologies have now been well demonstrated in decom projects
- Worldwide: about 85 commercial reactors, 45 experimental or prototype power reactors, and over 250 research reactors have been retired
- Technologies are available for :
  - Radiological characterization
  - Decontamination
  - Dismantling
  - Equipment removal
  - Remote cutting
  - Robotic application
  - Packaging and transportation
  - Site status survey methodologies (e.g. MARSSIM)

# Decommissioning Cost issue

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Cost estimates (approx.):

Near Future: Vermont Yankee: \$1.24 billion  
SONGS 2&3 \$4.4 billion

Current: Zion 1& 2: \$1.1 billion

Past: Big Rock Point: \$420 million  
Main Yankee \$630 million  
Yankee Rowe \$600 million  
Connecticut Yankee \$820 million

Cost escalation  
- a big issue

# Decommissioning Funds

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- 10 CFR 50.75
- Funds Collected over operating lifetime of the reactor
- NRC minimum required (range from \$300 million to \$400 million)
  - Not sufficient/inadequate
  - GAO says (for example) for a plant license expiring in 2015 and with license extension to 2035, NRC determined cost represents only 57% of site-specific projected cost
- Public and state sentiments about “ *Raiding the Cookie Jar*”
  - e.g., use of Decommissioning fund for
    - moving fuel
    - other activities
    - need NRC permission
- “Decommissioning trust funds are the property of customers and dedicated irrevocably to decommissioning”





# Public As a Stakeholder

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- States are significant stakeholders
- Local public is a significant stakeholder
- 60 Years is beyond life expectation for people involved (after plant shutdown)
- Public reluctant to leave burden to next generation
- Local public interest in land re-use
- “*Trust Issue*”
- “*Lifespan of corporations*” a concern
- “*Legal Issues*”

# International Guidance

## Public as a Stakeholder

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### Examples

#### **INSAG -20** (*Stakeholder Involvement in Nuclear issues*)

“Dismantling and closing nuclear installations, in particular when there is a release of the site for other applications, is often of concern to local and regional authorities and to the surrounding population”

#### **IAEA NG-T-1.4** (*Stakeholder Involvement Throughout the Life cycle of Nuclear Facilities*)

“Local oversight of decommissioning and cleanup activities is now a feature of stakeholder involvement at closed nuclear facility sites in a growing number of Member States, and there is an abundance of experience providing best practice evaluation”

#### **NEA 6859** (*OECD 2010*) (*Public Attitudes to Nuclear power*)

“depth of concern on waste disposal”

# Erosion of Public Confidence

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- *“Many factors can affect the SAFSTOR duration, and we cannot say with any certainty at this time how long SAFSTOR may last”*
- *“depends on the growth of the decommissioning fund”*
- *If “collected” funds are used for “other” activities, what will be left for actual dismantling/decommissioning”*
- Federal government (DOE) inability to take spent fuel from the site
- Yucca Mountain site – project closure; No Federal facility for SNF
- “Blue Ribbon Commission” and other studies- lack of progress on back end of the fuel cycle
- Public wants reasonable time frame: Maine Yankee 8 years, BRP 7 years, Yankee Rowe 14 years

# SNF Issue

## Impact on Decommissioned Reactor Sites

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### ISFSI/Dry storage:

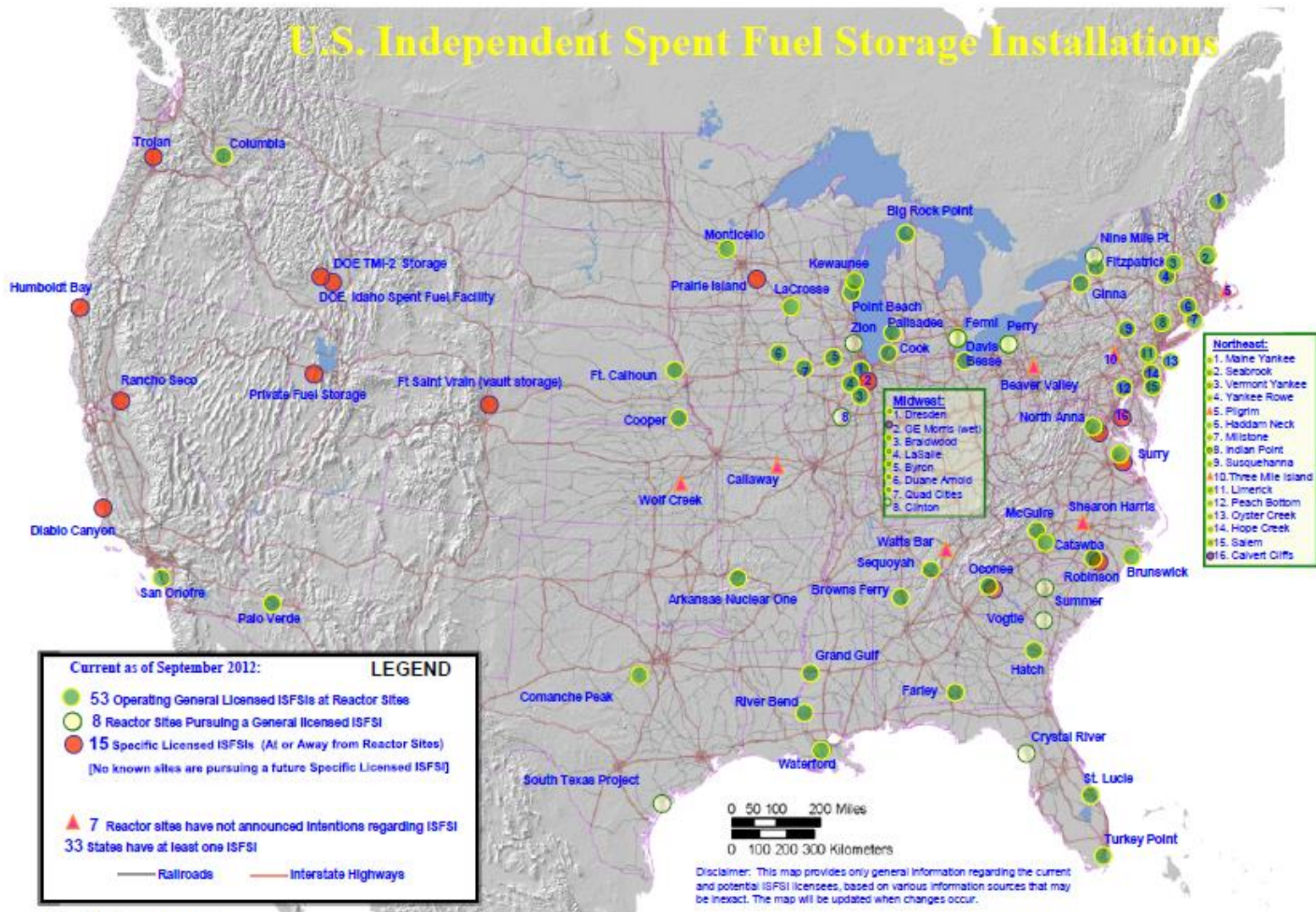
- Main Yankee, Connecticut Yankee, Trojan, Rancho Seco, Yankee Rowe, Big Rock Point, Humboldt Bay, La Crosse, and Zion 1&2
- Total from decommissioned reactor sites:  $\approx 2,800$  t

### Advantages of moving to Central Storage:

- Decommissioned sites are unique
  - No operating facilities
  - No revenue
  - Incentive to remove fuel from site
- **Where license terminated (e.g. BRP), ISFSI is the only facility**
  - Stand-alone facilities
  - Security costs
  - Maintaining license on the ISFSI site
  - Consolidated storage will allow economies of scale and better security



# ISFSI Locations



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Source: NRC

# Good Reasons for Selecting DECON

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- Nuclear industry has substantial experience in DECON option
- Technologies are proven and available
- “Prompt” DECON ensures access to workforce and retired employees with legacy knowledge on the plant
- Class A waste disposal path still available
- Access to a licensed disposal facility for Class B and C waste
- Provides greater assurance and reduced uncertainty
  - on access to waste disposal
  - on cost (and fund status)
  - on regulations
  - mitigation of risk
- Returns site to other uses

# Good Reasons for Selecting DECON

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- Less expensive than SAFSTOR
- Reduces oversight costs in the long term
- Reduces emergency preparedness costs
- Allows completion of decommissioning in a safe, timely, and efficient manner
- Stewardship and best interests of stakeholders
- Ensures intergenerational equity