



# Decommissioning What's At Stake?

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NEI

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# **Safe, Timely, Efficient Decommissioning Essential for:**

- Public Confidence
- Ratepayer and Shareholder Value

# **Safe, Timely, Efficient Decommissioning**

- What's Needed?
  - Certified Spent Fuel Casks
  - Efficient License Termination Process
  - Risk Informed Regulations



# Spent Fuel Management

## ■ Historical Perspective

- NRC rules of engagement
- Cask certification time line reduced
  - ◆ 3-4 years down to about 20 months
- Scope of certifications are limited!

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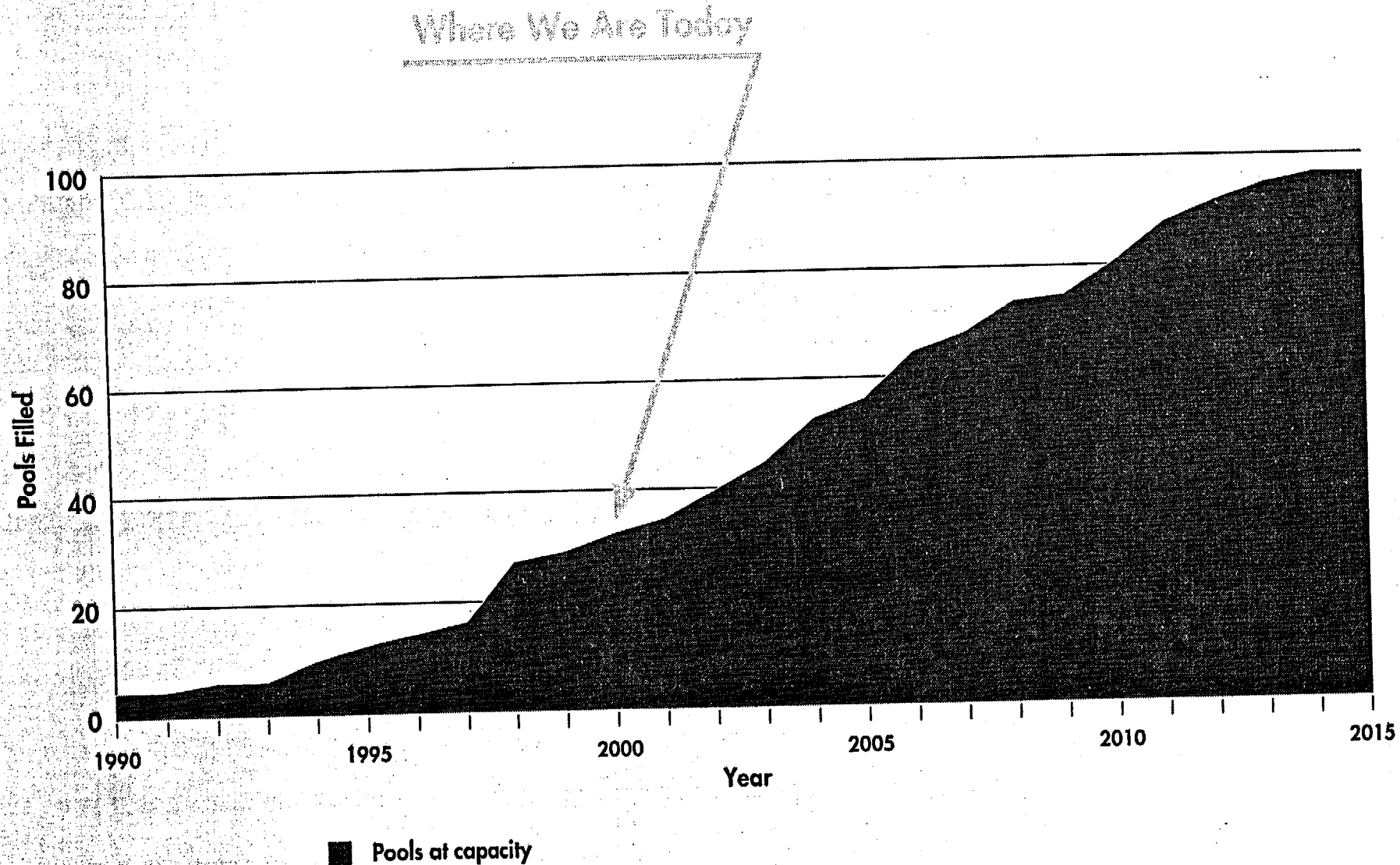


# Spent Fuel Management

- Impact of Limited Certification
  - Decommissioning plants can't decommission their pools
  - Operating plants can't unload fuel
  - Band-Aids proposed are:
    - ◆ Impractical
    - ◆ VERY costly, i.e., in excess of \$10 Billion

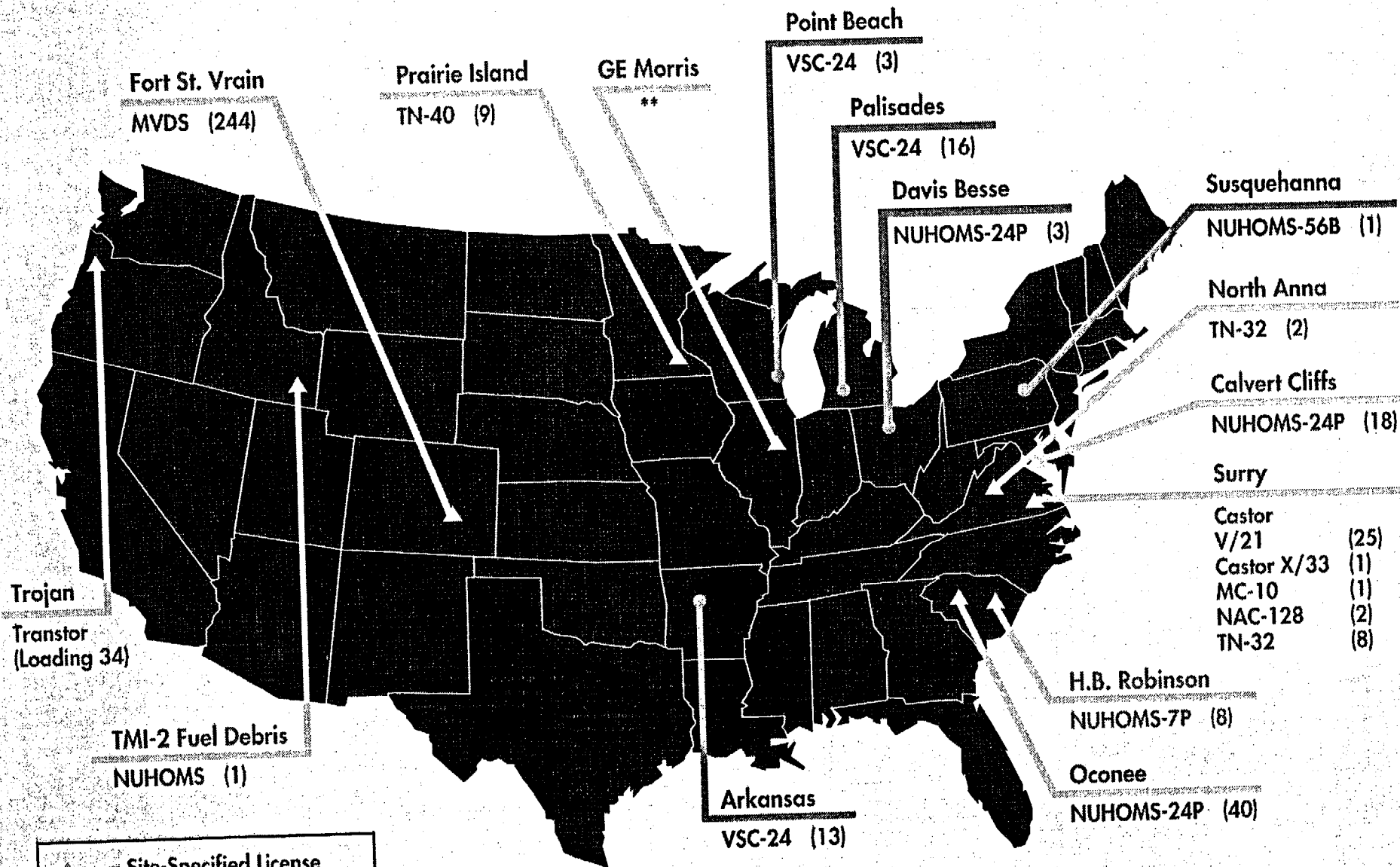
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# Projected Loss of Full Core Reserve



Sources: Energy Resources International  
& DOE/RW-0431-Rev.1

# Operating Spent Fuel Storage Sites (ISFSI)

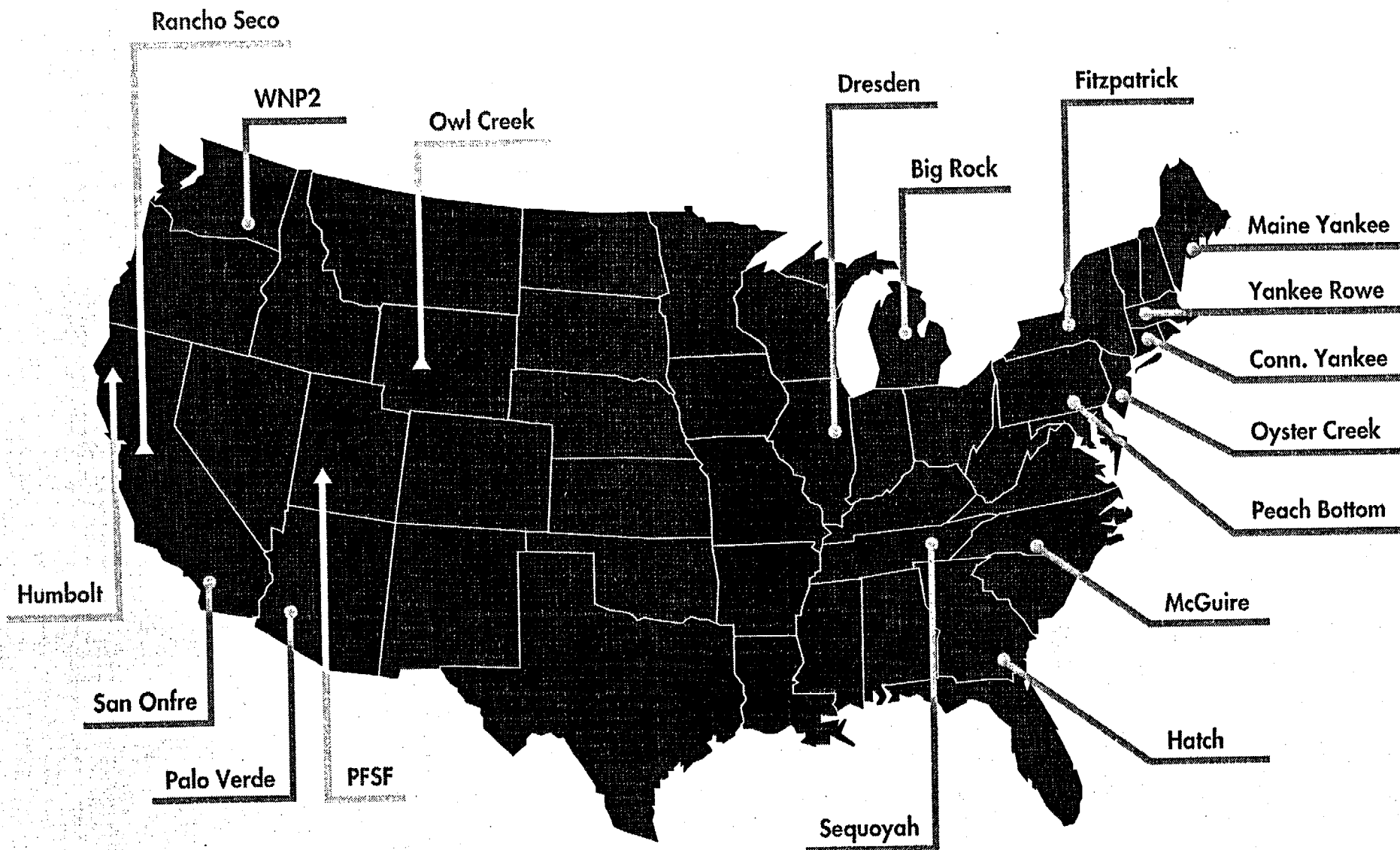


- ▲ = Site-Specified License
- = General License
- (#) = Number of Loaded Casks

\*\* GE Morris Uses Wet Storage

Information as of September 13, 1999

# Potential Near-Term, New ISFSI Sites



- △ = Site-Specified License
- = General License

Information as of September 13, 1999  
(Based on NRC & Licensee Assessments)



# Limited Scope of Certification

## ■ Recommendations

- PRA would demonstrate extremely low risk
- PRA results support more timely, realistic Internal Staff Guidance

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# Spent Fuel Management

- Inefficient Cask Listing/Amendment Process
  - Rulemaking to list takes too long
  - Amendment by rulemaking is a resource nightmare

# Inefficient Cask Listing/Amendments

## ■ Recommendations

- Cut time to process internally
  - ◆ NRC review indicates several months can be eliminated from schedules
  - ◆ NRC PRs for fabrication at risk, final rule withdraw 30-day fabrication hold

# Inefficient Cask Amendment Process

## ■ Recommendations

- Include process and criteria for amendments in initial listing rule
- Smarter Certificates
- Resolve generic issues!!

# Efficient License Termination

## ■ Recommendations

- Test needed for level of detail supporting LTP
- Dual regulation needs legislative fix
- Industry supports NRC initiative on material release
- Novel issues should go to Commission



# **Risk Informing Decommissioning Regulations**

Mike Meisner, President of  
MYAPC



# Risk Informed Regulations

## ■ Overview

- Commission directed staff to integrate and risk inform certain regulations
- Staff produced good model in short time frame
- Conservatism and worst case estimates skewed risk profile and risk insights



# Risk Informing D&D Regs

## ■ Conservatism Added:

- Human reliability -- *dominate entire analysis*
- Heavy loads (used upper bound from previous analysis)
- Consistent bias toward upper bound (Diesel pump reliability used .18 vs. .044 ALWR)



Table 3.3-1

## HEP EXAMPLES FROM NRC STAFF DRAFT

Operating Crew Action	HEP	Time Available	
		Hours	Shifts
Recognition of Loss of Cooling (Alarm)	3E-3	120	15
Recognition of Loss of Cooling (Walkdown)	1E-2	120	15
Restart SFP Cooling	3.5E-3	120	15
Start Diesel Fire Pump	1E-2 2E-2	120 112	15 14
Align SFP Makeup Using Offsite Resources	1E-2	120	15

**Table 3.3-2****HEP CONSISTENCY WITH AT-POWER PRA VALUES: SELECTED EXAMPLES**

Action	Time Available	Time to Perform Action	HEP
ATWS Level Control	15 min	2 min	1E-2
ECCS System Initiation	30 min	1 min	1E-3
RHR Initiation	20 hrs	4 min	1E-6

# Fuel Uncovery Endpoint

- Not related to public risk
- Postulated runaway oxidation correlates with risk to public
- Realistic heatup and endpoint adds 3 days to recovery time! (8 days Vs. 5)

**Figure 5-1**  
**COMPARISON OF POINT ESTIMATES**

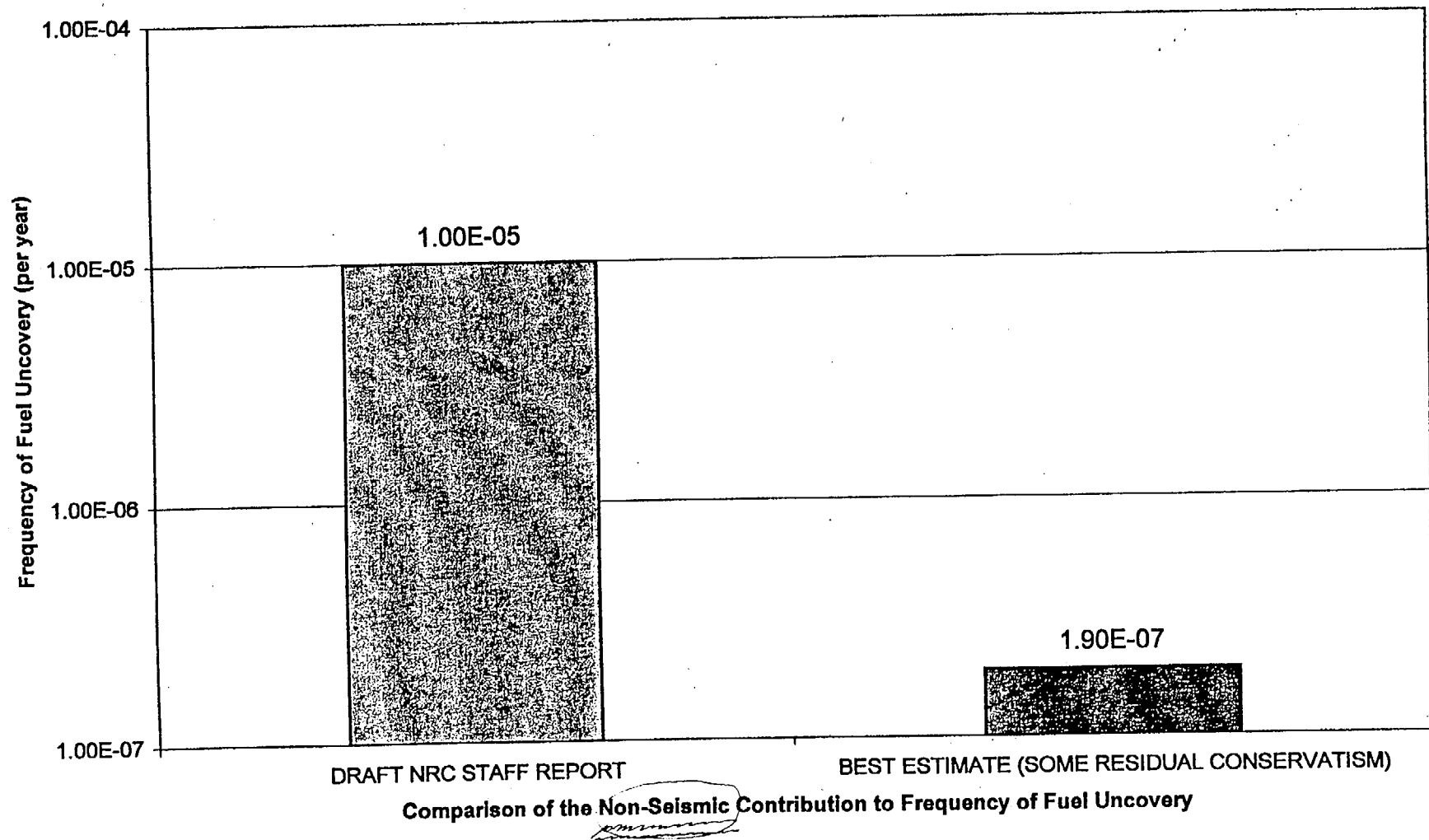


Table 5-1

## RESULTS SUMMARY – FREQUENCY OF FUEL UNCOVERY (FFU)

Accident Initiator	Potential Adverse Impact on Offsite Response	Plant Response Characterization	DRAFT NRC Staff report Frequency (Per Year)	Revised Frequency Estimate (Per Year)
LOOP - Plant Centered	No	Frequencies are substantially lower and the time line extends beyond 7.	1.3E-6	3E-10
- Grid Related	No	Frequencies are substantially lower and the time line extends beyond 7 days.		
- Severe Weather	Yes	Frequencies are substantially lower and the time line extends beyond 7 days.	1.4E-6	7.4E-8
Fire	No	Frequencies are substantially lower and the time line extends beyond 7 days.	8.8E-7	1E-8
Loss of Pool Cooling	No	Frequencies are substantially lower and the time line extends beyond 7 days.	1.5E-7	1.5E-8
Loss of Coolant Inventory	No	No mechanisms have been identified for the spontaneous failure of the SFP boundary causing loss of inventory. Data from NUREG-1275 are for cases with fuel movement and gates opened which are not applicable to the static conditions being considered here. Frequencies have been adjusted appropriately.	2.9E-6	5.8E-8
Seismic Event	Yes	Reevaluation by DES using average of EPRI and LLNL.	2.0E-6	6E-7 <sup>(4)</sup>

Table 5-1

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Accident Initiator	Potential Adverse Impact on Offsite Response	Plant Response Characterization	DRAFT NRC Staff report Frequency (Per Year)	Revised Frequency Estimate (Per Year)
Heavy Loads (CASK Drop)	No	No heavy loads are being transported over the SFP during this time period. (Bundles need to decay for >5 years.) Single failure proof crane.	2.5E-6	3.1E-8
Aircraft Impact	No	Not reassessed, but likely lower contribution than cited here. Best estimate is used in the revised assessment.	4.0E-8 <sup>(1)</sup>	6E-9
Tornado Missile	Yes	The tornado evaluation description in the DRAFT NRC Staff report indicates that a tornado is not expected to damage the spent fuel pool itself. Therefore, the frequency cited in the DRAFT document is related to the failure of the cooling systems and makeup systems. Because cooling system failures lead to fuel heatup after 7 days, it is considered negligible frequency.	5.6E-7 <sup>(2)</sup>	ε
TOTAL			1.2E-5	7.9E-7
TOTAL without seismic contribution			1.0E-5	1.9E-7

<sup>(1)</sup> Upper bound used from Appendix A.6.<sup>(2)</sup> Main report says 2E-7/yr, Table 3.1-3 says 5.6E-7/yr., Appendix A.4 says 8E-7/yr for events that can cause missile damage to support systems for spent fuel cooling.<sup>(3)</sup> Not applicable contribution to risk profile based on the ability to demonstrate complete fuel coverage in excess of 7 days (1 year after shutdown).<sup>(4)</sup> Seismic is judged to be a small risk contributor if checklist is used to disposition the seismic fragility of the plant. [To be supplied under separate cover.]



# Implications for Operating Plants

- Inconsistent with Commission Policy  
and IPEs



# Recommendations

- Credit industry commitments
- Revise study to:
  - Use best estimates
  - Remove conservatisms
- Truncate sequences beyond 2 days
- Requantify Model



# Benefits of Corrected Study

- Valuable risk insights
- Tool to focuses resources on risk
- Demonstration of margin and defense in depth
- Basis to avoid unnecessary resources for EP, insurance and security
- Avoids Carryover of erroneous risk insights to operating plants IPEs

